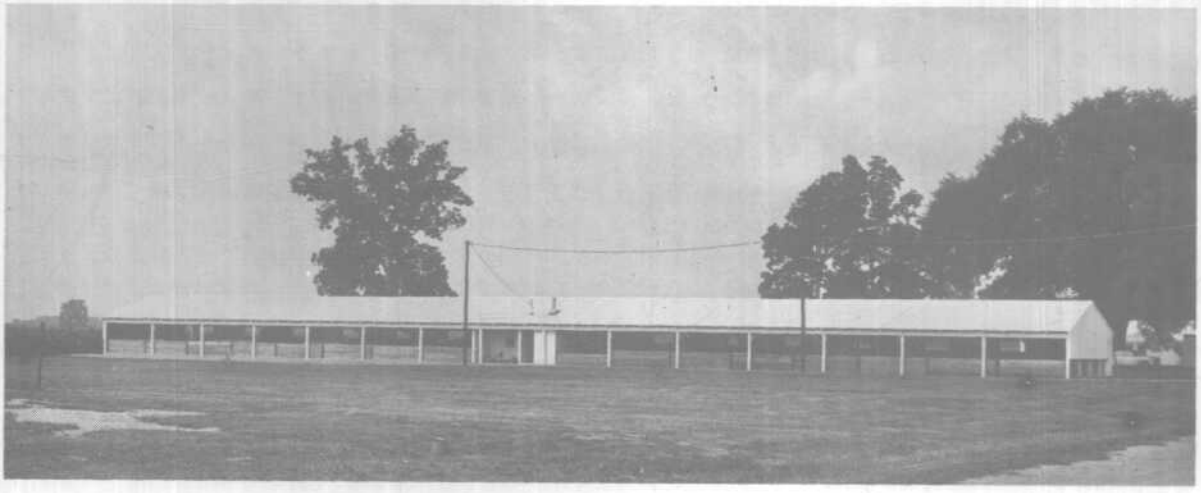
RESEARCH SUMMARY 23 SEPTEMBER 1967

RESEARCH AT THE WESTERN BRANCH

ABOVE: NEW FARROWING UNIT

BELOW: NEW SWINE FINISHING UNIT



OHIO AGRICULTURAL RESEARCH AND DEVELOPMENT CENTER
Wooster, Ohio

CONTENTS

* * * *

8-67-3.7M

FACTS ABOUT THE WESTERN BRANCH

Outlying research branches are an important part of the total research facilities of the Ohio Agricultural Research and Development Center. Nine branches are located at strategic points in Ohio representing the various soil types, climatic conditions, and farming enterprises of the state. The Western Branch is an important link in this research chain.

During the summer of 1958, the Board of Control of the Ohio Agricultural Research and Development Center approved the purchase of 428 acres of land, a portion of Kroger farm No. 1, located 8 miles southeast of Springfield and 3½ miles northwest of South Charleston in Clark County. This marked the beginning of the Western Branch. Funds for the purchase of this tract were appropriated by the 102nd General Assembly. In addition to the appropriation for purchase of land, the Ohio Agricultural Research and Development Center received a $35,000 appropriation for research development at the Branch for the biennium beginning July 1, 1959.

Soon after the farm was acquired, an eight-pen finishing unit was constructed. It has been used in conjunction with farrowing facilities which already existed in the main barn. A new well was drilled and a complete water system, including lines to the pasture areas, has been installed.

The Department of Agricultural Engineering has completely surveyed the farm and designed a tile drainage layout. Slightly more than one third of the drainage system is installed at the present time.

Nearly 370 of the total acres in the farm are tillable and approximately 160 acres have been reserved for rotational swine pasture areas. The swine pasture area lies approximately in the center of the farm. It is divided into four sections handled on a 4-year rotation, with 2 years of corn, small grain, and swine pasture or meadow.

An area involving approximately 40 acres in the northwestern corner of the unit has been improved for agronomic research by tiling, construction of diversion terraces, and seeding of permanent alleyways.

A detailed soils map has been completed for the entire farm by the local Soil Conservation Service. The predominant soil types on this farm are the Miami, Celina, Crosby, and Brookston soils typical of the west central Ohio area.

In the spring and summer of 1967, a new 32-sow farrowing unit and a 16-pen finishing unit were constructed to provide facilities for expansion of the swine research program. An 8-inch irrigation well was drilled the same year and irrigation facilities were developed for 10 acres of agronomic research.

The Western Branch was established primarily for the conduct of research on swine production. Correlated with swine research is a program of agronomic research relating crop performance to soil type.

The total experimental program of the farm was developed in cooperation with farmers, extension agents, and the research staff of the Ohio Agricultural Research and Development Center at Wooster.

The current research program at the farm includes 36 separate experiments under 21 different projects. It involves the work of 28 research staff members in five subject matter departments.

Under the leadership of Dr. H. S. Teague, professor of animal science, swine research on feeding and management of gilts, sows, and growing-finishing swine has been in progress. Past and present experiments include:

1. Effect of supplemental Vitamin A in growing-finishing rations.
2. Vitamin B_{12} supplementation of sow rations.
3. Finishing hogs on concrete with and without bedding.
4. Effectiveness of added copper in pasture rations in the presence or absence of green forage.
5. Effect of crowding on performance of feeder pigs.
6. Measurement of and ways of affecting sex-influenced performance of boars during the growing-finishing period.
7. Weaning of pigs at 3 weeks or at a weight of approximately 12 pounds.
8. Effect of limited feeding on the reproductive performance of gilts and sows.
9. Paste feed for pigs.
10. Determination of swine carcass composition by slaughtering littermates at different ages.

This swine research program is currently being increased threefold. It will include a large scale breeding and selection project with Dr. L. A. Swiger, associate professor of animal science, as the project leader.

Bred gilts are supplied from the Western Branch for specific pathogen-free baby pig research by the Department of Veterinary Science at Wooster.

Agronomic research in progress includes: grain and storage variety testing, fertility studies, tillage practice evaluation, weed control studies, and corn and soybean management studies.

The Department of Agricultural Engineering has extensive work in progress involving corn harvesting as it is affected by type of machine, date of planting, variety, row spacing, and time of harvest.

The Department of Entomology has work in progress to study the nature and control of the northern corn rootworm.

The Branch is managed by James Foster, who moved to the farm in January 1959 when the Research Center first began operations there. Mr. Foster is a 1950 graduate of the Ohio State University College of Agriculture and Home Economics with a major in agricultural education. He taught vocational agriculture for 2 years and served as manager of the Trumbull County Farm and the Southeastern Branch for the Research Center before coming to the Western Branch.

The assistant farm manager and swine herdsman is James Gilliland, a 1960 graduate of the Ohio State University College of Agriculture and Home Economics with a major in animal science. Mr. Gilliland managed the Ohio Swine Evaluation Station prior to coming to the Western Branch on October 1, 1966. Six other full-time persons are employed to help with the total program.

Visitors are always welcome at the Western Branch to view the research in progress. Special tours can be arranged by contacting Mr. Foster, Manager, Western Branch, 7639 South Charleston Pike, R. D. 1, South Charleston, Ohio 45368.

A group is shown here touring the field plot research area at the Western Branch.

WEATHER OBSERVATIONS...ESSENTIAL FOR FIELD RESEARCH

Mitchell Bayes is shown recording daily minimum and maximum air temperatures. Soil temperatures and rainfall are also recorded daily and soil moisture is measured to a depth of 36 inches weekly during the growing season.

DAILY AND WEEKLY WEATHER OBSERVATIONS

J. B. Jones, Jr. and Marvin Miller
Department of Agronomy and U. S. Weather Bureau

The weather center on this Branch is similar to those at all Branches of the Ohio Agricultural Research and Development Center. Daily observations include air and soil temperatures, precipitation, evaporation, wind, and general weather conditions. Soil moisture determinations are made weekly. These data are summarized and made available to all researchers with experiments at the Branch.

Crop yield responses and insect and disease infestations are frequently related to climatic conditions. By comparing field observations with weather data, researchers are better able to evaluate experimental results.

Three lilac plants which are part of a nationwide network are located near the weather shelter. Similar plantings have been made at eight other locations in Ohio. The lilac plant is an integrator of many climatic factors and its period of leaf emergence and flowering gives an indication of the climatic character of the region. A timetable of phenological events may be drawn from lilac observations and related to other events of agricultural significance.

Weather data gathered at this Branch is helping climatologists characterize the climate of Ohio. A knowledge of the climate of an area is essential when new cultural practices are being developed, introduction of new varieties is proposed, or new methods of disease and insect control are being tested.

Climatic Characteristics of Western Branch and Vicinity

Mean annual temperature: 52° F.

Mean annual precipitation: 32 inches

Length of growing season: 165 days

Date after which less than 50% chance of freezing temperatures (32° F.): May 2

Date after which more than 50% chance of freezing temperature: Oct. 12

Normal mean growing season temperature: 66° F.

Number of days with 90° F. + temperature: 25 days

Normal rainfall for growing season: 18 inches

Mean number of days during July and August with 0.10 inch or more rainfall: 14 days

Average annual inches of snowfall: 30 inches

Precipitation and Snowfall-Monthly Summary of Averages and Extremes, 1962-65.

Month	Greatest Precipitation Monthly Av. In.	Monthly Amt. In.	Yr.	Daily Amt. In.	Daily Yr.	Day	Greatest Snowfall Monthly Av. In.	Monthly Amt. In.	Yr.	Daily Amt. In.	Daily Yr.	Day	Average Number of Days >.01"	>.10"	>.50"	>1.0"
Jan.	2.03	2.65	62	.95	63	11	12.8	27.0	65	20.0	65	20	7	5	1.5	.0
Feb.	1.91	3.59	65	.96	62	24	4.5	10.0	62	4.0	65	1	7	4	1.5	.0
March	5.23	9.22	64	3.19	64	9	4.3	8.5	63	8.5	63	1	12	7	3.6	1.2
April	4.15	6.62	65	1.47	64	20	.0	.0	0	.0	0	0	11	7	3.5	.5
May	2.12	4.06	62	.91	62	28	.0	.0	0	.0	0	0	8	5	1.2	.0
June	1.37	2.43	64	.64	64	13	.0	.0	0	.0	0	0	6	4	.5	.0
July	4.69	6.26	62	2.44	62	22	.0	.0	0	.0	0	0	10	7	3.2	1.7
Aug.	3.19	5.49	63	2.00	65	7	.0	.0	0	.0	0	0	8	6	2.0	1.0
Sept.	3.00	6.60	65	2.30	65	15	.0	.0	0	.0	0	0	6	5	2.0	.7
Oct.	1.55	2.91	65	1.05	62	3	.2	1.0	62	1.0	62	25	6	3	.7	.2
Nov.	1.70	2.64	62	1.15	62	10	.3	1.0	63	1.0	63	14	7	5	.5	.2
Dec.	1.44	3.72	64	.95	64	11	3.1	5.8	63	3.0	63	12	6	3	1.0	.0
		Mar.		Mar.				Jan.		Jan.						
Annual	32.38	9.22	64	3.19	64	9	25.2	27.0	65	20.0	65	20	94	61	21.0	6.0

Western Branch - Station Number 33-0001

Air Temperature-Monthly Summary of Averages and Extremes, 1962-65.

Month	Average Daily Max. °F.	Average Daily Min. °F.	Average Monthly Mean °F.	Highest °F.	Yr.	Max. Day	Lowest °F.	Yr.	Min. Day	Average Number of Days Maximum >90° F.	Maximum <32° F.	Minimum >32° F.	Minimum <°F.
Jan.	35.4	16.1	25.7	60	65	8	-21	63	24	0	12	28	3
Feb.	36.9	17.0	26.9	63	65	10	-12	65	2	0	8	26	3
March	47.8	28.2	38.0	77	63	29	6	65	5	0	2	21	0
April	63.3	38.4	50.8	88	62	30	15	64	1	0	0	8	0
May	77.3	51.0	64.1	93	62	18	29	63	1	2	0	0	0
June	82.3	56.4	69.3	96	64	30	41	65	18	3	0	0	0
July	84.2	58.0	71.1	98	64	27	43	65	30	4	0	0	0
Aug.	82.1	55.9	69.0	100	64	2	35	65	29	4	0	0	0
Sept.	75.2	50.6	62.9	95	64	8	30	63	30	1	0	0	0
Oct.	67.1	41.0	54.0	84	63	11	16	62	26	0	0	6	0
Nov.	53.5	32.5	43.0	76	64	4	5	64	22	0	0	15	0
Dec.	36.8	18.5	27.6	62	65	24	-13	63	21	0	11	27	3
						Aug.			Jan.				
Annual	61.8	38.6	50.2	100	64	2	-21	63	24	14	33	209	9

SPRING OAT VARIETY TEST

Dale A. Ray
Department of Agronomy

Comparative yield, test weight, maturity, lodging, and disease infection data are obtained each year from a performance test of spring oat varieties at the Western Branch. Ten varieties are seeded with a farm grain drill in four replications and are harvested with a combine. Variety recommendations are based on consideration of the performance test data, observations of other characteristics, and disease reaction ratings.

The current recommendations of Brave, Clintford, Clintland 60, Garland, and Goodfield spring oat varieties for production in western Ohio are based on information gained from successive years of testing these varieties at the Western Branch.

Yield and test weight data obtained from recent tests conducted at the Western Branch are summarized in the following table:

Oat Variety	3-Yr. Av., 1964-66		2-Yr. Av., 1965-66	
	Yield Bu./A.	Test Wt. Lb./Bu.	Yield Bu./A.	Test Wt. Lb./Bu.
Brave	55.2	35.5	48.0	35.3
Clintland 60	51.8	35.2	46.8	35.0
Clintland 64	51.3	35.4	44.5	35.3
Garland	55.1	36.0	52.1	36.0
Goodfield	50.7	38.3	48.5	38.5
Clintford (1966 only)			84.0	37.2
Orbit (1966 only)			80.9	30.8
Tyler (1966 only)			72.0	30.7

H-32

WINTER BARLEY VARIETY TEST

Dale A. Ray
Department of Agronomy

Performance tests of winter barley varieties have been conducted annually at the Western Branch. The varieties are compared in replicated grain drill seeded and combine harvested trials to obtain information on relative adaptation for production in western Ohio. Yield, test weight, maturity, lodging, winter survival, and disease-infection data are summarized each year in publications available to growers.

Dayton, Harrison, and Pennrad winter barley varieties have exhibited superior performance in successive years of testing and are recommended on the basis of test information. Harrison has been outstanding for winter survival, yield, and bushel weight. Pennrad is an awnless variety with an excellent yield record. Dayton, an early-maturing variety, has provided high yields when winter survival has not been a limiting factor.

The following table summarizes yield and test weight data obtained from recent variety tests at the Western Branch:

	6-Yr. Av., 1961-66		2-Yr. Av., 1965-66	
Barley Variety	Yield Bu./A.	Test Wt. Lb./Bu.	Yield Bu./A.	Test Wt. Lb./Bu.
Dayton	66.8	47.8	48.9	50.5
Kenbar	64.6	47.1	52.2	49.7
Wong	61.3	46.6	46.1	49.6
Harrison			51.0	51.0
Pennrad			58.0	50.9

S-61

WINTER WHEAT VARIETY TESTING

H. N. Lafever
Department of Agronomy

Recommended varieties, new varieties, and advanced experimental lines of wheat are tested in large drilled plots in various areas of the state where different soil and climatic conditions occur. This test at the Western Branch is one of ten such tests conducted in the state. This test helps determine how the various varieties and lines of wheat perform in this general area. From the results of these tests conducted year after year, new varieties from other states are found to be better than others and are thus placed on the list of recommended varieties. Advanced Ohio experimental lines, if found to perform well for at least 3 years in such tests as this one, are named, released, and placed on the recommended list.

There are 16 varieties and experimental lines in this test, with four replications of each. Among the recommended varieties, Monon, Reed, Redcoat, and Fulton are included. These serve as a standard for evaluating new varieties released by other states and advanced expermental lines from the Ohio breeding program. Benhur and Riley, two new releases from Indiana, are currently being evaluated for their performance in Ohio. Of the experimental lines in the test, TN 1455 appears the most promising and most likely will be released to registered growers in 1968 if its performance continues to measure up to its past record.

Performances of some varieties and advanced lines grown at this location in past years are given in Table 1.

Advanced Rod Row Wheat Trials

In the development of a new variety of wheat, numerous experimental lines are tested before one is found which has all the characteristics required to merit its release as a new variety. This trial is one of the last steps in testing experimental lines for their performance. Those lines in this test which appear promising in yield, quality, straw strength, bushel weight, and disease resistance are then planted in the large drill plot trials in following years for final testing prior to their release or discard.

This test includes 22 new experimental lines, with three named varieties serving as standards for comparison. Each line or variety is planted in two-row plots, each 10 feet long, with four replications. Results of this test agree very well with data obtained from large drilled plots.

Eastern Uniform Wheat Nursery

This is a regional planting in rod rows. It includes the best experimental lines from various state and commercial breeding programs in the eastern soft wheat region. This nursery is grown at about 25

locations in the eastern states, including three locations in Ohio. Three promising Ohio-developed lines are entered in this test for evaluation. Since there are considerable differences among the entries in height and maturity, the entries are planted in four-row plots. Only the two center rows are harvested.

This test reveals much about the adaptation of a new line to different areas of the region, permits a test of plant characteristics under a wide range of environments, and provides for an interchange of material among breeders. This test also allows breeders to obtain early information on lines which may later be released by other states as new varieties. Lines taken from this nursery have been used as parents for new crosses in all breeding programs in this region.

TABLE 1.-Winter Wheat Variety Test, Western Branch.

Variety	4-Yr. Av., 1963-66 Yield Bu./A.	Test Wt. Lb./Bu.	Remarks
Seneca	41.2	59.1	Old variety. No longer recommended.
Fulton	42.0	59.2	Mid-season maturity. Medium tall.
Monon	44.6	58.4	Very early maturity. Short.
Redcoat	43.9	58.8	Good disease resistance. Sometimes shatters.
Reed	44.2	59.4	Mid-season maturity. Medium height.
Knox 62	42.2	59.4	High test weight. Erratic yield record.
TN 1403	46.0	59.2	Promising new line. Stiff straw.
	2-Yr. Av., 1965-66		
Seneca	40.5	60.4	
Fulton	42.2	60.3	
Monon	44.8	59.6	
TN 1403	44.1	60.1	
TN 1455	48.6	60.0	Promising new line. High yielding.
TN 1457	40.5	61.3	New line. Dropped in 1966.

BIRD-RESISTANT GRAIN SORGHUM

Merle H. Niehaus
Department of Agronomy

Extensive damage to corn by blackbirds has increased interest in possible substitute feed grain crops. Testing of bird-resistant grain sorghums was begun in 1966 at several locations in Ohio. The bird-resistant grain sorghums were recently developed for use in the Southeast but appear to be well adapted to Ohio conditions. These hybrids produce seed high in tannin. The bitterness associated with the tannin disappears at maturity and palatability is not affected adversely.

The 1966 test included five bird-resistant hybrids planted May 20 in 40-inch rows at the rate of 11 pounds of seed per acre. The weed control and fertilizer programs were similar to those recommended for corn.

Yields ranged from 131.7 to 157.2 bushels per acre. Artificial drying would have been necessary for all hybrids at harvest date, October 7. There was no bird damage.

The 1967 trial is similar except 10 bird-resistant hybrids are planted at a rate of 12 pounds per acre in 30-inch rows.

S-400

D. L. Katterheinrich, superintendent of outlying branches (left)and J. H. Foster, branch manager, are shown looking at the hybrid grain sorghum variety test.

ALFALFA VARIETY TEST

George R. Gist
Department of Agronomy

The alfalfa variety test was seeded in March 1965. The table below includes 1966 yields from this test, along with average adjusted yields of these same varieties in several tests throughout Ohio.

Tons per Acre Dry Matter

Variety	1966	Average Adjusted Yield-Ohio Tests		
		No. of Tests	Average Yield	Percent of Vernal
DuPuits	4.17	20	4.90	104
Mustang	4.15	-	- -	- -
X583 Brand	4.14	8	4.69	100
Warrior	4.11	15	4.86	103
Progress	4.11	6	4.57	97
525	4.02	15	4.72	100
Vernal	3.97	20	4.71	100
WL-302	3.91	11	4.89	104
Culver	3.87	12	4.36	93
Scout	3.77	3	4.49	95
Haymor	3.74	12	4.72	100
Orchies	3.69	14	4.83	103
WL-202	3.62	10	4.76	101
Alfa	3.59	8	4.78	101
Cayuga	3.57	9	4.76	101
Saranac	3.56	7	5.02	107

A new alfalfa variety test, seeded in April 1966, includes the following varieties:

Cayuga	Arnim	Scout	WL-202
Culver	522	DuPuits	WL-210
Saranac	525	Europa	WL-303
Vernal	X583 Brand	FD-100	Mark II
Alfa	Mustang	Progress	NY 66-50
Apex			NY 66-51

Ohio Cooperative Extension Service Bulletin 472, The 1967 Ohio Agronomy Guide, lists important characteristics of many alfalfa varieties marketed in Ohio.

STRAINS AND VARIETIES OF SOYBEANS

P. E. Smith
Department of Agronomy

These tests constitute an important phase of the soybean breeding program. They make it possible to determine the field performance of new experimental strains in comparison with the standard recommended varieties. A practical use of results from these tests is illustrated by three new soybean varieties recently released in Ohio--A-100, Amsoy, and Wayne. The superiority of these varieties was established from the results of these and many similar tests.

Annual and 5-Year Average Yields of Seven Soybean Varieties, Western Branch, OARDC, South Charleston, Ohio.

Variety*	5-Year Av. 1962-66	Annual Yield - Bushels per Acre 1962	1963	1964	1965	1966
Lindarin-63	33.4	42.7	37.2	21.3	31.2	34.8
Lindarin	-	-+	38.9	21.3	26.6	36.0
Harosoy	35.7	46.1	38.3	28.5	31.6	34.1
Harosoy-63	35.1	43.2	39.1	25.8	29.7	37.5
Shelby	38.2	41.8	42.8	39.2	35.2	32.2
Clark	38.8	38.7	38.1	39.7	37.3	40.3
Clark-63	-	-	-	39.0	37.0	41.2
Yearly Average		42.5	39.1	30.7	32.7	36.6

*Varieties are listed according to date of maturity with the earliest first and the latest last.

+Missing data indicate that the particular variety was not included in the test for a specific year.

H-46

SOYBEAN VARIETY EVALUATION

Ten to twelve new and recommended soybean varieties are tested each year at the Western Branch.

CORN HYBRID TRIALS-
EVALUATION OF PROGRESS FROM MASS SELECTION

W. R. Findley and E. J. Dollinger
Department of Agronomy

A synthetic corn variety was developed by crossing 13 elite inbred lines, of which 8 were southern prolific types and 5 were early Corn Belt types. This variety was grown at the Ohio State University Farm. Mass selection was practiced for two eared plants with good stalks and not more than medium height ears through six cycles. Principal objective of this planting is to develop an adapted germ plasm source for new inbred lines with a high frequency of genes for the characters for which selection is practiced.

This test is designed to evaluate progress made in improving the population for prolificacy, ear height, and stalk quality with the mass selection procedure.

H-20

THE EFFECT OF PLANTING DATE ON CORN GROWTH AND YIELD

J. B. Jones, Jr.
Department of Agronomy

Date of planting can have a significant effect on corn growth and yield. Early planted corn tends to mature faster and yield better. However, corn can be planted too early. Corn seed will not easily germinate when the soil temperature is less than 50° F. At this Branch, the average soil temperature at the 4-inch depth does not exceed 50° F. until about May 1. Note in the following table that, although planting was done prior to May 1, emergence did not occur until about the end of the first week in May in each of the 3 years.

Yields, as indicated by bushels in 1965 and ear weight in 1964 and 1966, do not give the typical yield response expected. This may be due in part to the fairly dry years and variable weather conditions in the last several years. For this latitude, corn planted between May 1 and 15 generally gives the best yields. Grain moisture at harvest also was less for the earlier than mid-May plantings. The earlier planted corn will not grow as tall as the later plantings, making the plants less likely to lodge or break over.

Much of the research on date of planting indicates that for this area, corn planted between May 1 and May 15 give the best results.

1964

Date Planted	Emergence	Silking	Grain Moisture		Ear Weight
			9-22-64	10-7-64	Lb.
4/20	5/8	7/13	18	15	.24
4/27	5/11	7/14	17	18	.26
5/4	5/14	7/16	23	15	.19
5/11	5/21	7/22	23	19	.21
5/18	5/26	7/27	24	23	.26
5/25	6/6	8/5	38	31	.45

1965

			9-24-65	10-7-65	Yield Bu./A.
4/16	5/6	7/16	29	22	62
4/23	5/8	7/19	28	20	96
4/30	5/10	7/20	28	21	95
5/7	5/16	7/21	29	21	124
5/14	5/22	7/23	30	24	145
5/21	5/28	7/30	36	29	136
5/28	6/6	8/3	41	32	131

			9-23-66	10-7-66	Ear Weight Lb.
4/15	4/29	7/16	28	19	.42
4/22	5/14	7/16	29	31	.26
4/29	5/19	7/18	31	29	.30
5/6	5/22	7/20	33	31	.24
5/13	5/25	7/21	37	31	.29
5/20	5/31	7/24	36	32	.31
5/27	6/5	7/30	39	37	.27

S-365

NITROGEN FOR CONTINUOUS CORN

J. B. Jones and H. J. Mederski
Department of Agronomy

Nitrogen at rates ranging from 0 to 200 lb. per acre is being applied annually to a continuous corn cropping system at this Branch. The experiment includes a treatment in which all corn stalks are removed each year and another treatment in which corn is rotated with alfalfa sod.

The continuous corn rotation was begun in 1962 and the first differential nitrogen treatments were started in 1963. The effect of applied nitrogen on yield is just beginning to be seen as the yields on the 0 and 50 lb. rate treatments are beginning to decline.

This experiment has not been conducted enough years to draw any significant conclusions regarding nitrogen needs for continuous corn. However, similar nitrogen experiments at other Branches indicate that for continuous corn the most profitable nitrogen rate is somewhere between 100 to 150 lb. N/A.

TABLE 1.--Yields of Continuous Corn as Affected by Rate of Nitrogen.

Treatment Lb. N/A.	1963	1964	1965	1966	4-Yr. Mean
		Bu./A.			
0	111	72	69	95	87
50	112	83	99	114	102
100	117	87	105	118	107
150	123	74	104	113	103
200	124	83	102	127	109
200*	123	77	88	116	101
100**	-	-	133	134	133

*All stalks removed.
**Corn in 2-year rotation with alfalfa sod.

TABLE 2.--Corn Ear Leaf Composition as Affected by Nitrogen Treatment. Sampled 8/1/66.

Treatment Lb. N/A.	Ear Leaf Composition									
	N	P	K	Ca	Mg	Mn	Fe	B	Cu	Zn
	%					ppm				
0	3.09	.22	1.68	.56	.37	35	109	4	7	18
50	3.28	.26	1.81	.63	.42	40	149	5	9	21
100	3.30	.26	1.63	.56	.42	39	176	5	9	22
150	3.40	.26	1.70	.60	.45	47	138	5	10	21
200	3.32	.28	1.72	.58	.43	54	141	5	10	25
200*	3.50	.28	1.64	.60	.44	58	143	5	10	23
100**	3.64	.32	2.20	.68	.45	51	180	8	17	26

*All stalks removed.

** Corn in 2-year rotation with alfalfa sod.

H-210-5

This corn is sixth year continuous corn. Plot at right has received no nitrogen. Soybeans were grown at plot ends to determine their response to the various nitrogen levels.

FACTORS INFLUENCING THE INFECTIVENESS AND EFFECTIVENESS OF *RHIZOBIUM JAPONICUM* ON SOYBEANS

R. H. Miller
Department of Agronomy

This year (1967) represents the beginning of field and laboratory studies on factors affecting the success of soybean inoculation. The field plots established at the Western Branch are designed to observe any yield changes which can be attributed to legume inoculation as influenced by rotation, fertilizer, and pesticide treatments. As an integral part of this study, any changes in the population of indigenous rhizobium or the success of inoculant strains as affected by these same variables will be followed by serological typing with appropriate antisera. It is hoped that observations of this type will provide answers on how to establish a more infective and effective symbiosis in soybeans.

PHOSPHORUS ON CONTINUOUS CORN

D. J. Hoff
Department of Agronomy

Field experiments were initiated in 1964 on Brookston, Crosby, and Miami soils to determine the response of continuous corn to applied phosphorus. The average annual application of phosphate ranges from 0 to 160 lb./A.

To date there has been no significant yield response to applied phosphate. Yields have been considerably higher on the Brookston than on the Crosby and Miami soils. The average yields have been - Brookston 120 bu./A., Crosby 95 bu./A., and Miami 85 bu./A.

Plant analysis of the third corn leaf taken at tasseling has been essentially the same on all three soils.

As yield levels increase through new and improved production practices and through new and more efficient hybrids and varieties, more plant nutrients are removed from the soil. The following table indicates the amounts of phosphate and potash removed by the more important agronomic crops.

Phosphate and Potash Removal by Farm Crops

	Phosphate Lb./A.	Potash Lb./A.
Corn (100 bushels)		
Grain	40	40
Stover	10	75
Wheat (40 bushels)		
Grain	25	10
Straw	5	35
Soybeans (35 bushels)		
Grain	30	40
Haulm	10	25
Hay (4 tons)		
Alfalfa	40	180
Alfalfa-Timothy	35	145

Crop removal without fertilization rapidly lowers the available phosphate and potash in most soils. One objective of this study is to determine the rate at which the soils of western Ohio can supply available phosphate to crops over an extended period of time.

HERBICIDES ON SOYBEANS

Edward W. Stroube
Department of Agronomy

Amiben, Alanap plus CIPC, and linuron (Lorox) have resulted in fair to excellent control of annual broadleaf and grass weeds when applied at or very soon after planting. Jimsonweed, velvetleaf, morning glory, and cocklebur often escape the action of these herbicides. Soil moisture at the time of and soon after application of herbicides greatly influences their effectiveness. The best conditions are for the soil to be at the optimum moisture for tillage at planting time and for a ½ to 1 inch rainfall to occur within a few days after application. The greater the variation from these conditions, the less weed control will be obtained.

Trifluralin (Treflan) and vernolate (Vernam) are herbicides which must be incorporated into the soil for maximum benefit. Incorporation should be done prior to planting. Both materials have resulted in better control of grasses than broadleaf weeds. Smartweeds are quite resistant to the action of these two materials.

DNBP (Dinitro, Premerge, Sinox PE) has resulted in good control of grass and broadleaf weeds when applied just as the soybeans and weeds emerge through the soil. Timeliness is important in this application. If applied after the soybeans have the first true leaves, the soybean plants may be injured, especially when the temperatures are above 80° F.

Cockleburs can be controlled by spraying 2,4-DB (Butoxone SB; Butyrac 175) at a rate of 0.2 lb. in 10 to 20 gallons of water per acre. Application should be made from 10 days before the soybeans bloom up to mid-bloom. This treatment will also have some effect on jimsonweeds but they are more difficult to kill than cockleburs.

Other herbicides under investigation in soybeans are Dacthal, Diphenamid (Enide, Dymid), Planavin, Ramrod, Tenoran, and Sirmate.

H-71-1

HERBICIDES ON CORN

Edward W. Stroube
Department of Agronomy

Pre-emergence. Atrazine and simazine applied to corn at planting are the most consistent herbicides tested for the control of annual weeds. They give season-long control of weeds and do not cause corn injury at rates much higher than recommended for weed control. Rates of application are 2 lb. per acre overall on clay and sandy soils and 3 lb. on high organic matter soils or where giant foxtail is a problem. After applying atrazine and simazine, it is not unusual for the weeds to germinate and emerge before they are killed.

In research trials, oats, wheat, or soybeans following simazine or atrazine treated corn have not been injured when the materials were applied at the rate of 2 lb. per acre or less. However, there is the possibility of injury to small grain seeded the same year of application, especially in a dry year. Vegetable crops and sugar beets should not be planted the year following an application of atrazine or simazine.

A combination of atrazine and linuron (Lorox) has resulted in good control of annual weeds. This combination is less likely to result in a carryover in the soil than a higher rate of atrazine alone. Corn should be planted at least 1-3/4 inches deep to reduce the injury hazard of linuron.

Randox-T (CDAA plus an additive) has resulted in good control of grass weeds and fair control of broadleaf weeds in corn when applied pre-emergence. This material should be applied to moderately dry soil and is fairly critical in needing a moderate amount of rainfall within a week after application to give good weed control. Randox-T performs best on soils with organic matter of 5% or above.

Ramrod has given excellent control of annual grasses and fair to good control of most annual broadleaf weeds. Smartweeds often escape the action of this material. The addition of 2,4-D to Ramrod has at times improved the control on broadleaf weeds.

A low volatile ester of 2,4-D applied pre-emergence has resulted in good annual weed control but is extremely critical in needing moisture soon after application. The most consistent results have been obtained when this treatment was applied just before corn emerged through the soil.

Post-emergence. 2,4-D applied after the corn and weeds have emerged continues to be an effective and economical method of controlling broadleaf weeds. Dicamba (Banvel-D) can be mixed with 2,4-D to improve control on some species, especially smartweed and Canada thistle.

Atrazine has resulted in excellent control of annual broadleaf and grass weeds when applied at 2 lb. per acre when the weeds are small (less than 1½ inches tall). It should be applied within 3 weeks after the corn is planted. The addition of 1 to 2 gallons per acre of a special oil will improve control, especially on grasses.

Linuron (Lorox) and a combination of dalapon (Dowpon) and 2,4-D are approved for use on corn as a directed post-emergence application. The method of application is critical because these treatments will injure corn foliage if applied directly to the foliage. Special spray equipment is available for this type of application. If properly applied, these treatments will control grasses and broadleaf weeds. The corn must be 12 to 18 inches tall and the weeds 6 inches or less for the success of this treatment.

H-71-1

EVALUATION OF HERBICIDE TREATMENT FOR CANADA THISTLE CONTROL

Donald E. Herr and E. W. Stroube
Department of Agronomy

An experiment designed to evaluate various combinations of herbicides applied at different times for the control of Canada thistle was initiated at the Western Branch in the fall of 1966. The herbicides will be evaluated in terms of immediate control, the length of time control is maintained, and the possible effects of herbicide residues on subsequent crops.

Since this experiment is new, no information is available on results. Current recommendations for Canada thistle control are given in the Agronomy Guide available at county Extension offices.

H-71-1

EVALUATION OF TILLAGE SYSTEMS

S. W. Bone, A. J. Baxter, and G. B. Triplett, Jr.
Department of Agronomy

Commercial agricultural producers, in increasing the size of their operation, have been confronted with problems of increasing their rate of planting during times in the spring when soil conditions are desirable for this operation. The more tillage which is done before planting increases the time involved and decreases the amount of acreage which can be planted in a specific period of time.

Within the last 2 years, equipment available to commercial producers has enabled them to decrease the time involved in primary and secondary tillage prior to planting. In some instances, both primary and secondary tillage may be entirely eliminated, thus going to a fairly simple no-tillage, once-over operation.

The objective of this research is to evaluate the different tillage systems which are available and applicable to the soils in southwestern Ohio. The soil selected for this study was Brookston silty clay loam, which is typical of the dark-colored soils in this part of the state.

The systems involved range from plowing to no-tillage. Plowing is performed both in the spring and in the fall, disking only just ahead of planting, rotivating only just ahead of planting, and planting with a no-tillage planter with no primary or secondary tillage. There will be no cultivation of the systems. However, there will be an indication of the influence of residues on no-tillage systems.

Evaluations will be made in terms of how quickly corn emerges and what yield differences may occur as a result of water under the different systems. The tillage system evaluation was initiated in 1967 and will be continued for several years to enable evaluations to be made over different climatic conditions.

H-38

Corn shown at right was planted in corn stalk residue with a no-tillage planter.

Roscoe Bilyeu is shown here operating a plow with a mounted harrow. Success in using minimum tillage practices depends on a good plowing job.

LONG TERM SOIL AND CROP MANAGEMENT STUDY

D. M. Van Doren, Jr. and G. B. Triplett, Jr.
Department of Agronomy

Research at Wooster on soils similar to the Miami, Crosby catena has indicated several successful alternative practices to the commonly used plowing plus overall working of the soil for corn production. An experiment initiated at the Western Branch in 1962 compares two of these alternative practices with the commonly used treatment for corn, soybeans, oats, and alfalfa production. At some future date, these practices will be compared relative to long-term effects on soil tilth.

The tillage treatments are:

1. Spring plow and complete secondary tillage.

2. Spring plow and secondary tillage only in the row for corn and soybeans (strip-processed).

3. No tillage at any time.

Each tillage treatment is performed for continuous corn, a 2-year corn-soybean rotation, and a 3-year corn-oats-alfalfa rotation.

All three tillage practices have produced equal oat yields (75 bu./A.). No-tillage soybean (21 bu./A.) and alfalfa (1.8 tons/A.) yields have been less than the other two tillage treatments (soybeans = 29.5 bu./A. and alfalfa = 3.2 tons/A.).

Problems with weed control and some spray drift from adjacent plots have been partly responsible for low soybean yields with no tillage. Complete failure of alfalfa in 1965 and 1966 on no-tillage plots was probably due to buildup of triazines at the soil surface. The herbicide system was changed in 1967 in an attempt to alleviate these problems.

Corn yields have been the same (95 bu./A.) for all tillage treatments despite extremely low stands for strip-processed and no-tillage treatments in 1966, except no-tillage corn after soybeans, which has yielded 12% below average. This is probably due to small quantities of plant residues left on the soil surface by the soybean crop, resulting in relatively low soil moisture for that treatment.

Several more years will be required to determine if any other yield trends will develop.

HIGH YIELD CORN AND SOYBEAN DEMONSTRATION

A 6-acre area with both Brookston and Crosby soil types has been reserved to demonstrate the best practices known for growing corn and soybeans.

In 1967, the entire area was plowed in late March and had ample rainfall to be well weathered by planting time. Preplant tillage was accomplished with a spring-tooth harrow once before fertilizer application and once thereafter for the corn. A third harrowing was necessary prior to planting the soybeans. The corn was cultivated once and the soybeans were rotary hoed once and cultivated twice, primarily to open the soil surface following the heavy May rains and to accomplish some weed control, especially on the soybeans.

Soil tests were taken as a basis for fertilizer application. Both crops received 250 lb. of 6-24-24 applied to the side and below the row with the planter and 180 lb. of K_2O applied broadcast prior to the second tillage operation. The corn also received 40 lb. of low salt 10-24-6 in contact with the seed as a pop up fertilizer and 300 lb. of actual nitrogen in the form of anhydrous ammonia, half of which was plowed down and the rest applied preplant at about a 10-inch depth. Leaf samples are being taken to be used as a guide for future fertility practices on these areas.

Three corn hybrids representing 500, 700, and 900 maturity ranges and three soybean varieties, Wayne, Harosoy 63, and Clark 63, were planted on both the Brookston and Crosby soil types. Irrigation was not available in 1967 but will be used on half of these plots in future years of demonstration.

Row spacing of 30 inches was used for both crops. The planting date was April 29 for the corn and May 5 for the soybeans. The corn hybrids were planted at the rate of 30,000 to 33,000 seeds per acre to obtain a harvest population of 26,000 to 28,000 plants per acre. This may be slightly higher than is desirable without irrigation. The soybeans were planted with a seed drop of about ten seeds per foot of row.

Aldrin was applied overall as a preplant application for soil insect control under the corn. The normal corn seed treatment was also used. The soybean seed was treated with Captan to prevent early seedling diseases which are a problem when planting early. Other insect pests were controlled as necessary.

Herbicides applied for weed control include 2 lb. active atrazine and 1 lb. 2-4-D Amine per acre applied to the corn overall pre-emergence and 3 lb. per acre active amiben applied to the soybeans pre-emergence. Some weeds did emerge in the soybeans and a post-emergence application

of Tenoran was applied before the weeds were 1 inch tall. Weed control in the soybeans was satisfactory but some injury and stunting from the Tenoran was observed.

Yield data will be taken by crop and variety to determine response to soil type and irrigation. This demonstration, initiated in 1967, will be continued. Varieties and other practices may be changed as more information becomes available.

Committee: Alfred J. Baxter, Committee Chairman, Area Extension Agent, Agronomy, Washington Court House
James H. Foster, Manager, Western Branch
Dean L. Katterheinrich, Superintendent, Outlying Branches
Sam G. Huber, Department of Agricultural Engineering
John E. Moore, Department of Agricultural Economics
Harry D. Niemczyk, Department of Entomology
Robert E. Partyka, Department of Plant Pathology

Demonstration

A. J. Baxter, area agronomist (left) and J. H. Foster, branch manager, take corn ear leaf samples. Plant tissue analysis is an important tool in working toward maximum crop production.

TOTAL CORN YIELDS FROM PICKERS AND COMBINES

W. H. Johnson and J. E. Henry
Department of Agricultural Engineering

There has been much speculation about the amount of an invisible loss when corn is field shelled. The invisible loss comes about because kernel tips are left in cobs when corn is shelled at high moisture and because cracked kernels (the chips) are partially ejected by the cleaning mechanism of the sheller or combine.

During 1965 and 1966, tests were conducted at the Western Branch with a picker and combine. Grain yields were measured from a relatively large plot, losses were measured, and an apparent total yield was calculated. The difference between these two total yields represented an estimate of the invisible loss.

From four dates of harvest during 1965, the average invisible loss for the combine was measured as 2.2 bushels per acre. From two dates of harvest in 1966, the value was 4.0 bushels per acre.

The work will be continued for at least one more season.

H-218

INFLUENCE OF CORN ROW SPACING ON HARVEST LOSSES

W. H. Johnson and J. E. Henry
Department of Agricultural Engineering

During 1966, work was initiated at the Western Branch to determine the snapping roll loss, ear loss during harvesting, and extent of lodging as row spacing and plant population were changed. A one-row picker was used to harvest all plots.

Results are preliminary but the following statements can be made:

1. For the same plant population per acre and picker travel speed, decreasing the row spacing from 40 to 20 inches reduced the snapping roll loss about one-half. Ear loss for the same conditions increased about 2.5 times. The magnitude of the ear loss increase was more significant than the snapping roll loss decrease.

2. For a constant picker travel speed and row spacing but with an increasing plant population, the snapping roll loss increased nearly twice in going from 12,000 to 20,000 plants per acre. Ear loss for the same conditions doubled.

3. Overall, in going from 40-inch rows to 20-inch rows, the harvesting loss increased about 1 percent of the yield and the change from 12,000 to 20,000 plants per acre increased the harvesting loss about 4 percent of the yield.

4. Lodging in the 20-inch row was 1.7 timesgreater in percentage than the 30 and 40-inch rows.

H-218

CORN MOISTURE AND LODGING BY DATE

W. H. Johnson
Department of Agricultural Engineering

For the last three seasons, the rate of field drying and lodging of corn has been observed at several Branches. This information will be helpful to farmers in making managerial decisions about their harvesting system. This is a long-term study and, ultimately, probability statements will be made which relate corn moisture and lodging to dates during the harvest season.

To date at the Western Branch, six hybrids have been followed during the 3-year period. Between September 15 and November 7, the kernel moisture loss was 0.36 percent per day and the rate was nearly constant. For all years and all hybrids, the range was 0.24 to 0.50 percent per day during this period. Later in the harvesting season, the rate of moisture loss reduced. The average lowest kernel moisture content occurred on November 19 and was 17 percent.

The 30 percent kernel moisture level was reached on September 29, average, with the range September 6 to October 19. Average cob moisture at 30 percent kernel moisture was 53 percent. On the average, the crop was lodged 10 percent on November 5.

Other data are available in Ag. Eng. Dept. Series No. 10.

EVALUATION OF RESISTANCE OF CORN TO CORN ROOTWORM

J. B. Polivka
Department of Entomology

Twelve inbred and twelve single cross corn lines are planted in plots 2 rows wide by 50 feet long. Each line is randomized 4 times. The area in which these plots are located had a potential corn rootworm population of 9 larvae per plant.

The object of the test is to determine the resistance or susceptibility of the corn lines to the northern corn rootworm.

All of the corn lines are being evaluated on the basis of plant stand, number of roots damaged, amount of root recovery, and lodging. The single cross lines will also be evaluated on the basis of yield in bushels per acre.

In the past few years, the OH 05 and OH7N inbred lines and the single cross lines containing these inbred lines were less seriously damaged by the corn rootworm larvae than any of the other corn lines.

H-111

EVALUATION OF INSECTICIDES FOR CONTROL OF THE CORN ROOTWORM

J. B. Polivka and Orve Hedden
Departments of Entomology and Agricultural Engineering

Insecticides were applied in the granular form and as emulsifiable concentrates in a 6-inch band over the planter track in front of the press wheel, broadcast over the planter track and raked into the soil, mixed with fertilizer and applied to both sides of the planter track at the same depth as seed placement, along both sides of the corn row when corn was about 14 inches in height, and over the corn plants when the corn was about 14 inches in height. This area had a potential larvae population of 36 per plant.

The objectives of the study are to compare the effectiveness of candidate insecticides with insecticides recommended for general use, to compare the effectiveness of different formulations of the same insecticide, and to compare the effectiveness of application methods.

Effectiveness of the insecticides is based on plant stand, root damage, lodging, and yield in bushels per acre.

H-111

Entomologist J. B. Polivka (left) examines normal corn root and root damaged by corn rootworms. His assistant, Ivan Zuercher, records the extent of lodging of corn variety shown in foreground.

SWINE BREEDING RESEARCH

L. A. Swiger and Walter R. Harvey
Department of Animal Science

The objectives of swine breeding research at the Western Branch are:

1. To evaluate the effectiveness of selection for ultrasonic measures of lean growth and percent lean cuts and the associated genetic changes in other economic traits.

2. To evaluate the addition of sib carcass data to ultrasonic measures in selection for percent lean cuts.

Genetic progress through selection of meat-type hogs could proceed at a faster rate if accurate appraisal of live breeding stock could be made rather than depending on carcass evaluation of progeny or sibs. Preliminary work in this project indicates that backfat and hamfat measures with ultrasonic equipment can be used to predict percent lean cuts with a correlation of 0.84. The formula uses live weight, the sum of five backfat measures 2 inches off the midline equally spaced from the fifth rib to the last lumbar vertebrae, and hamfat measured at the point of greatest bulge on the outside of the ham. The formula has been developed from data on approximately 400 hogs which were subsequently slaughtered and lean cuts obtained. The formula is:

Percent Lean Cuts = 65.4 + .03 x Live Weight - 2.2 x Total Backfat - 6.4 x Hamfat.

The experimental plan consists of four selection lines in each of two breeds (Hampshire and Yorkshire). The selection criteria in the four lines are the same for each breed. The four lines will be selected as follows:

A. Random selection (control).

B. Selection for percent lean cuts at 140 days, predicted with ultrasonics.

C. Selection for percent lean cuts at 200 lb., predicted with ultrasonics.

D. Selection for percent lean cuts at 200 lb., predicted with ultrasonics and carcass data on two pigs per litter.

Lines B and C will contrast selection for growth rate of lean and selection for percent lean at a given weight. Lines C and D will contrast the balance between the increased accuracy of carcass data vs. ultrasonics and the loss of selection intensity resulting from slaughtering two pigs per litter. Line A is necessary to be sure that the changes observed are genetic.

Each line will consist of 5 boars and 15 gilts each generation. All replacements will be selected from gilt litters so the generation interval will be 1 year. Second litters will be produced to evaluate the genetic change in carcass traits and for additional breeding, nutrition, or management research.

The best boar pig and the three best gilts will be selected from the progeny of each sire. Mating will be at random among those selected except full-sib and half-sib matings will be avoided to minimize inbreeding.

In addition to the traits undergoing selection, other economic traits of swine will be measured such as various measures of reproductive ability, growth, feed consumption, soundness, carcass cutout, and carcass quality.

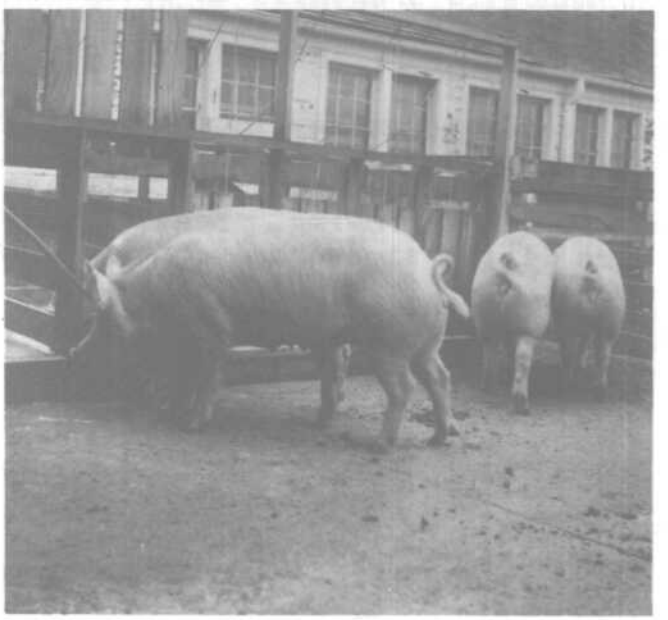
The foundation breeding stock for the experiment was purchased in 1967. Forty gilts of each breed, sired by several boars, were obtained from The Ohio State University herd. Six boars of each breed were purchased from individual breeders. The boars were unrelated to the gilts and to each other. An attempt was made to purchase boars with good performance data behind them and with no apparent unsoundnesses or hereditary defects.

It is quite apparent that swine breeders can make rapid genetic improvement for carcass leanness and, in fact, have demonstrated this over the past few years. Considerable doubt exists as to the associated genetic changes in growth, feed efficiency, soundness, and carcass quality traits which go along with genetic changes in leanness. Thus one of the main contributions of this experiment is to show the genetic relationships of carcass leanness with other traits which are of economic importance to pork producers.

This project should yield clear answers in 5 to 10 years. The selection procedures do not reflect the way breeders should select. Rather, they follow an experimental plan which will yield answers useful to breeders in improving their selection procedures.

H-323

Individual feeding stalls used in conducting study. Once-a-day feeding was practiced.



3 lb. per day

5 lb. per day

Condition of sows during the third gestation period.

EFFECT OF REDUCED FEED INTAKE ON SOW PERFORMANCE

H. S. Teague and A. P. Grifo, Jr.
Department of Animal Science

The effects of gestation feeding level on sow performance are of great economic importance in swine production. In conjunction with increased use of sow feeding stalls, there has been renewed interest in restricted or limited feeding of sows.

At the Western Branch, comparable groups of sows were fed 3 or 5 lb. of a complete gestation ration per day for three consecutive farrowings. During the first, second, and third lactation periods, both groups received 8.0, 9.5 and 11.0 lb. of feed per day, respectively.

The study is coordinated with a North Central regional project (NCR-42). Comparable trials are being carried out at other stations within the region.

The two rations were formulated to be nutritionally similar except for their energy content. During gestation, animals which consumed 5 lb./day received the same ration as those fed 3 lb./day, except for the addition of 2 lb. of corn starch. Thus, the former were supplied with additional energy only. Individual feeding was practiced and the animals were fed once daily. A summary of performance is presented in Tables 1 and 2.

Based upon both sow and pig performance, the 5 lb. feeding level was superior to 3 lb. per day. Measurements most severely affected by decreased energy intake were live weight of the sow, weight and vigor of the pigs at birth, and maintenance of the ability of individual sows to reproduce. The latter effect was most pronounced in the third farrowing. Measurements less affected by energy intake were litter size, the percent born alive, and post-farrowing death loss.

TABLE 1.--SUMMARY OF PERFORMANCE - 5 lb. OF FEED/DAY DURING GESTATION

	Farrowing		
	First	Second	Third
No. of sows at beginning of breeding period	12	12	11
No. of sows bred	12	12	11
No. of sows farrowed	12	11*	11
Av. wt. at start of trial, lb.**	238.2	-	-
A.D.G. during gestation, lb.	1.21	1.00	.51
Av. length of gestation, days	113.0	113.7	113.1
Av. wt. 6 wk. post-farrow, lb.	344.5	407.0	395.5
Av. wt. loss or gain during lactation, lb.	-48.5	-27.3	-42.0
Av. farrowing performance:			
Live pigs	9.3	9.9	9.9
% born alive	94.1	90.8	89.3
Litter weight, lb.	27.0	30.6	29.4
Pig weight, lb.	2.92	3.09	2.97
Stillborn pigs, total	7	11	13
Vigor classification at birth:			
% strong	82.0	82.6	85.3
% medium	15.3	11.0	9.2
% weak	2.7	6.4	5.5
Av. six-week measurements (weaning):			
Litter size	8.8	7.7	8.4
Post-farrowing death loss, %	4.5	22.0	15.6
Litter weight, lb.	221.3	206.4	220.2
Pig weight, lb.	25.0	26.7	26.3

*One sow became ill and was removed.

**32 days prior to beginning of first breeding period.

TABLE 2.--SUMMARY OF PERFORMANCE - 3 lb. OF FEED/DAY DURING GESTATION

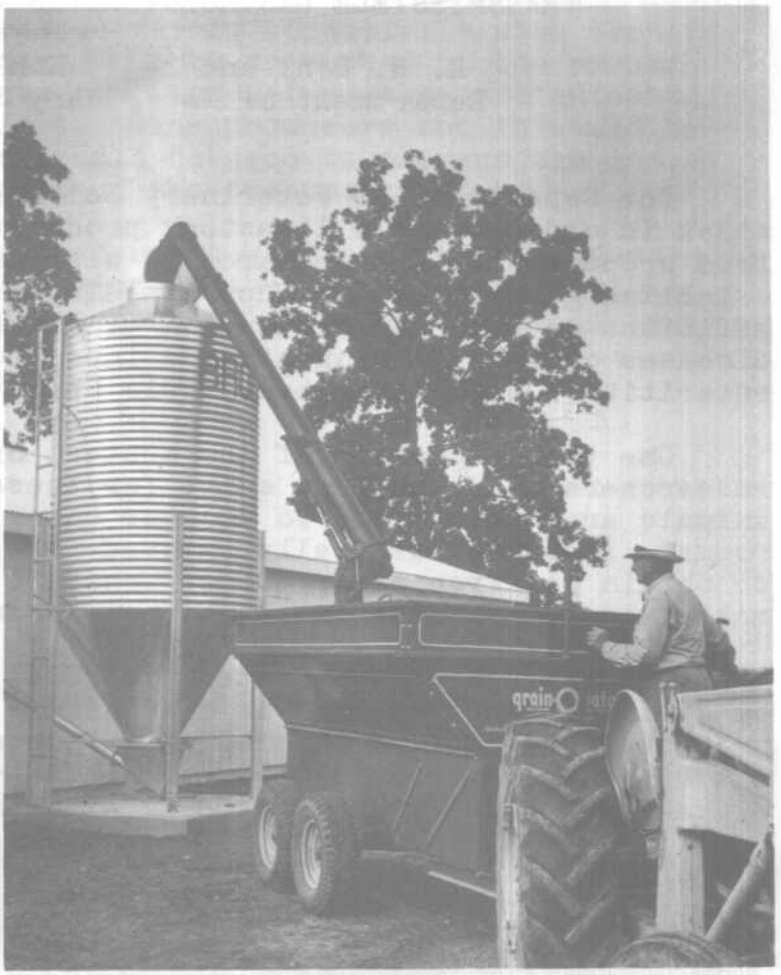
	Farrowing		
	First	Second	Third
No. of sows at beginning of breeding period	12	8	8
No. of sows bred	10	8	8
No. of sows farrowed	8*	8	4**
Av. wt. at start of trial, lb.***	234.6	-	-
A.D.G. during gestation, lb.	.61	.28	-.10
Av. length of gestation, days	112.8	113.5	114.5
Av. wt. 6 wk. post-farrow, lb.	285.5	312.0	306.5
Av. wt. loss or gain during lactation, lb.	-8.5	+.4	+18.2
Av. farrowing performance:			
Live pigs	9.6	8.6	10.5
% born alive	96.3	93.2	95.5
Litter weight, lb.	22.2	19.8	19.6
Pig weight, lb.	2.30	2.30	1.87
Stillborn pigs, total	3	5	2
Vigor classification at birth:			
% strong	64.9	42.0	2.4
% medium	15.6	29.0	61.9
% weak	19.5	29.0	35.7
Av. six-week measurements (weaning):			
Litter size	8.3	7.6	7.8
Post-farrowing death loss, %	14.3	11.6	26.2
Litter weight, lb.	187.3	171.7	161.0
Pig weight, lb.	22.7	22.5	20.8

*One gilt removed after breaking leg, one failed to come into estrus and two returned to heat after breeding.

**Three sows showed a gradual weight loss after the weaning of their second litter. After becoming weak and severely emaciated they were removed. Although bred, none of the 3 were pregnant at time of removal. A fourth sow was autopsied following a rectal prolapse 62 days after breeding and was not pregnant.

***32 days prior to beginning of first breeding period.

SWINE RESEARCH
FACILITIES



Loren Huffman is shown filling the bulk feed tank at the new farrowing unit.

Farrowing pens in the new building have guard rails and heated creep area in rear. Manure is removed in gutter beneath raised central alley in foreground. Unit will also be used as a nursery after weaning.

TRANSMISSIBLE GASTROENTERITIS AND COLIBACILLOSIS

E. H. Bohl and E. M. Kohler
Department of Veterinary Science

The Department of Veterinary Science studies diseases of livestock in order to help livestock producers improve the efficiency of food production. The research is also directed toward helping to establish guidelines for accurate diagnosis and developing practical, efficient methods for prevention of diseases in livestock. Swine diseases currently being studied intensively are transmissible gastroenteritis (TGE) and colibacillosis (baby pig scours).

One vital function of the Western Branch is to provide the researchers with pregnant swine for these studies. The pregnant animals are transported to Wooster where they farrow in isolation rooms. Pigs are surgically removed from some pregnant sows in order to obtain germfree pigs. Other sows are vaccinated with various materials to evaluate vaccination procedures.

Transmissible gastroenteritis (TGE) is a disease of swine caused by a virus. This disease is most severe in young pigs which can be protected if they are nursing sows immune to TGE. Work at Wooster has helped to provide methods to obtain more accurate diagnosis of the disease both in young pigs and older swine.

The virus has been isolated from naturally occurring outbreaks of TGE and has been grown in the laboratory. The disease has been experimentally reproduced in pigs which have been fed virus grown in the laboratory.

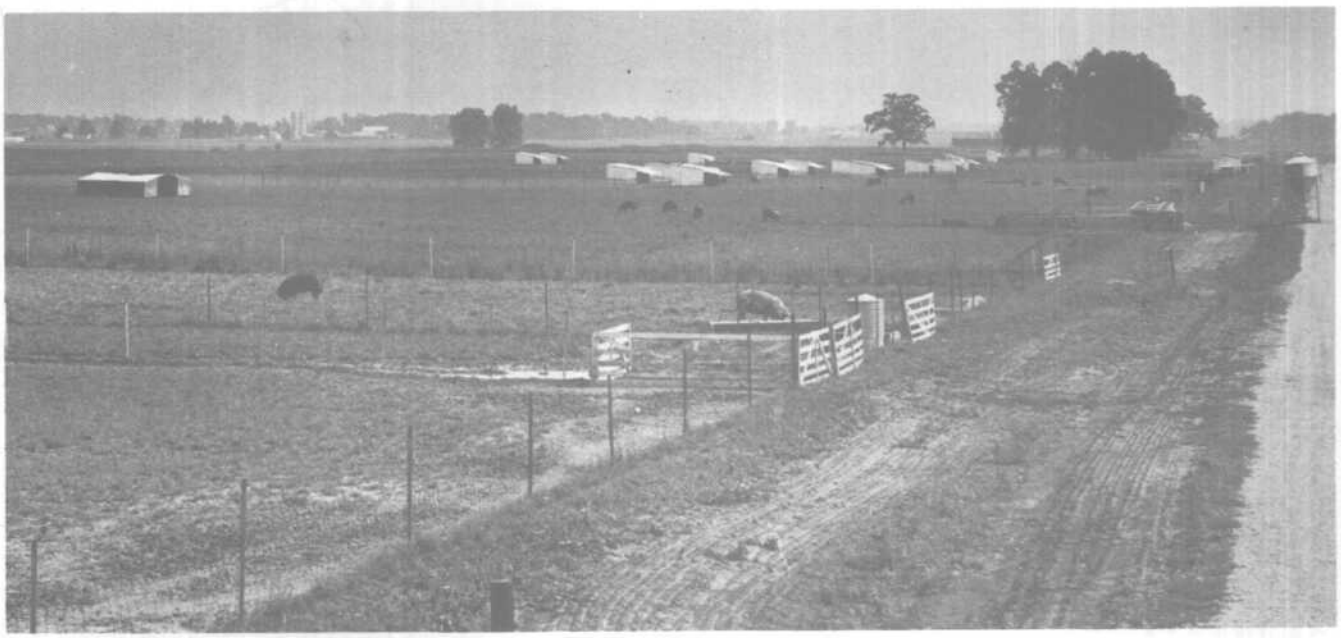
Emphasis is being placed on evaluating vaccines for sows. A vaccine must be safe (it must not spread the disease or cause significant illness in the vaccinated animals) and it must provide satisfactory immunity. Young pigs born and reared in isolation are essential in studying vaccines for TGE. Studies of vaccines for TGE will continue until one has been developed which is proven to be safe and effective.

Colibacillosis, commonly called baby pig scours, is a disease caused by certain strains of a very common type of bacteria, Escherichia coli. It occurs most often where intensive farrowing systems are used and is usually a major problem where there is some illness or other condition interfering with the optimum performance of the sows. It has been possible to reproduce this disease in baby pigs by feeding certain strains of E. coli. Some of the findings from these experiments should be an aid to diagnosis.

Colibacillosis can be treated fairly effectively with certain antibiotics and the disease can often be prevented if the proper antibiotics are administered to the pigs before they are infected. These methods have been an aid to swine producers but it would be much more valuable if vaccines could be used to prevent the losses due to this disease and the cost of the treatments.

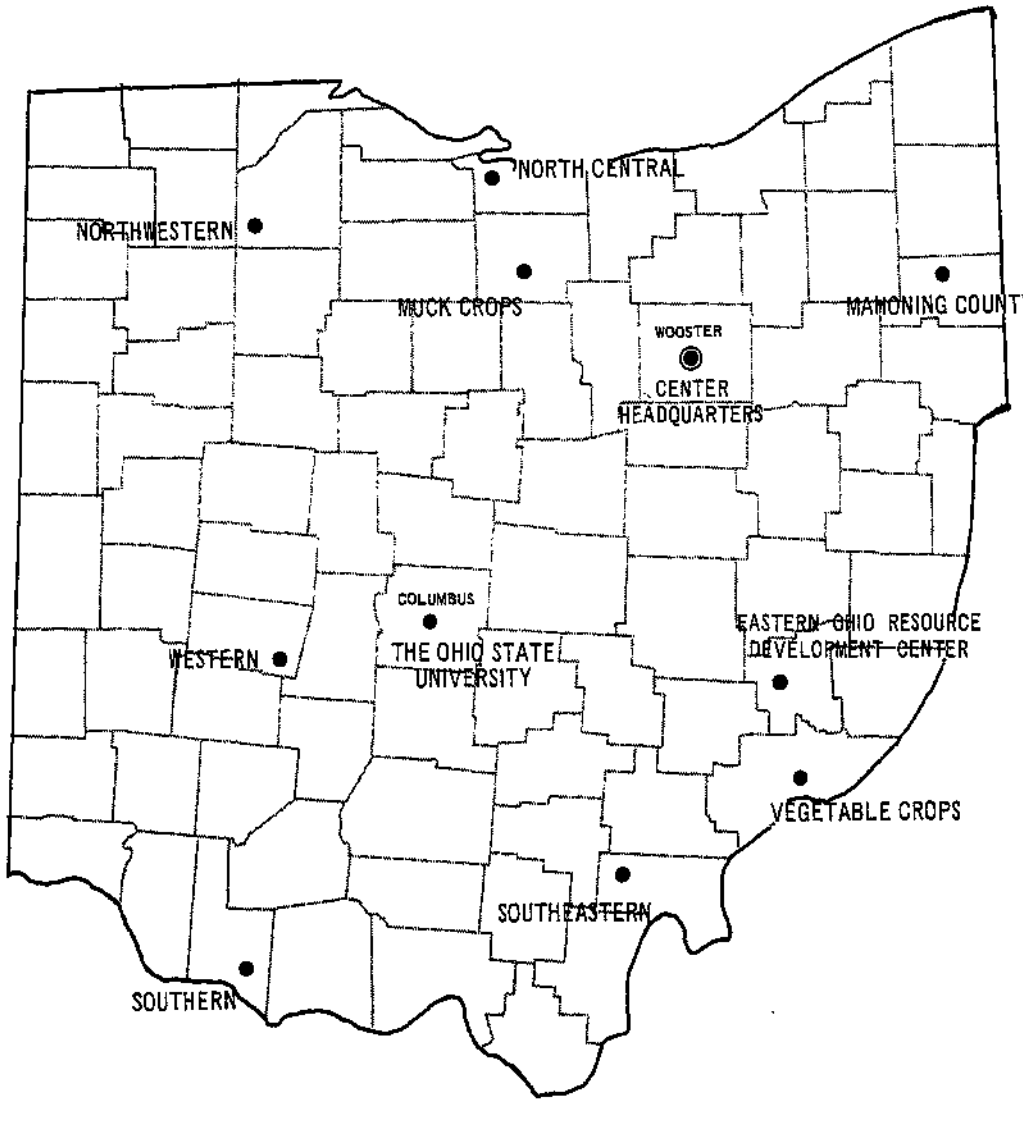
At the present time, researchers at Wooster are using sows from the Western Branch to determine whether it will be possible to develop effective and safe vaccines which will prevent colibacillosis.

H-248



The swine pasture area is shown above. As a sanitation practice this land is used for swine pasture only once every 4 years. Two years of corn and a seeding establishment year in a small grain make up the rest of the rotation.

The State Is the Campus for Agricultural Research and Development



Ohio's major soil types and climatic conditions are represented at the Research Center's 11 locations. Thus, Center scientists can make field tests under conditions similar to those encountered by Ohio farmers.

Research is conducted by 13 departments on more than 6000 acres at Center headquarters in Wooster, nine branches, and The Ohio State University.

Center Headquarters, Wooster, Wayne County: 1918 acres

Eastern Ohio Resource Development Center, Caldwell, Noble County: 2053 acres

Mahoning County Experiment Farm, Canfield: 275 acres

Muck Crops Branch, Willard, Huron County: 15 acres

North Central Branch, Vickery, Erie County: 335 acres

Northwestern Branch, Hoytville, Wood County: 247 acres

Southeastern Branch, Carpenter, Meigs County: 330 acres

Southern Branch, Ripley, Brown County: 275 acres

Vegetable Crops Branch, Marietta, Washington County: 20 acres

Western Branch, South Charleston, Clark County: 428 acres