THE INFLUENCE OF THE CORN BORER UPON CROP ACREAGES AND METHODS OF CORN GROWING IN REPRESENTATIVE AREAS OF NORTHWESTERN OHIO

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THE INFLUENCE OF THE CORN BORER UPON CROP ACREAGES AND METHODS OF CORN GROWING IN REPRESENTATIVE AREAS OF NORTHWESTERN OHIO

The European Corn Borer has now been in Ohio for several years and is now quite generally established over a considerable area of the Northern part of the State. If the damage from this pest becomes as serious here as it has in some other areas we know the prevailing type of farming and the crops produced will be greatly changed. Since the area under quarantine is so large in proportion to the section where commercial damage has already resulted, many farmers wonder how the corn borer has affected farming in the older infested areas. Are farmers reducing the acreage of corn in those sections? If so, what crops are they substituting for corn? Are they husking less corn from standing stalks? Are they continuing to sow wheat in long stubble ground in the fall? Are they plowing more of the corn land for oats the following spring instead of disking it? Questions such as these are in the mindsof many farmers who have not yet met with commercial damage from the borer but who feel they may have to battle with it before many years.

A farm study was made in 1927 in Paulding, Fulton, Seneca, Lucas, and Hancock Counties in Northwestern Ohio and Ashtabula, Medina, and Wayne Counties in the northeastern part of the State to determine the cost and practicability of the methods used in meeting the corn borer control requirements. In the summer of 1928 a similar type of study was made to determine what the effects of the corn borer have been on the acreages of various crops, crop rotations, methods of handling corn and corn land, and in so doing arrive at the changes in the types of farming caused by

the borer up to the present time. The study in the summer of 1928 was conducted in five counties, four of which were included in the previous year's survey, published as a mimeograph report. The four counties that were surveyed in 1927 but not in 1928 were Ashtabula, Medina, Wayne, and Hancock Counties. The three Northeastern Ohio counties were dropped because, in general the small corn acreage and the type of farming done in that section will probably be affected but very little by the corn borer, if the clean-up is successful. Hancock County was dropped because of the similarity in type of farming to that in some other counties studied. The four counties that were surveyed in 1927 and continued in 1928 were Paulding, Fulton, Seneca and Lucas. These include areas of different degrees of infestation and also represent more nearly the type of farming typical of the larger corn areas of the State and of the corn belt. In the survey of 1927 the acres in various crops for 1926 and 1927 were secured along with data to determine the cost and practicality of various methods. The 1928 survey was conducted in the same communities as in 1927 and an effort was made to include as many as possible of the same farms that were studied in 1927. The result was that out of 226 farms visited in the four counties in 1927, 105 were interviewed again in 1928, and in addition 131 other farms were visited. The data secured in the four counties by both surveys made available the acreages and methods for 1926, 1927 and 1928.

The fifth county, Ottawa, was added in the place of Hancock in 1928 because of the longer period it is known to have been infested and the present higher degree of infestation. In order to make the material collected in Ottawa County comparable with the other four counties, it was necessary to collect, as far as possible, in the 1928 survey, the

material collected in the previous surveys in the other counties. This data on crop acreages and methods were secured on the same farms for three years.

In 1927 all of the counties surveyed had an enforced clean-up, while in 1928 Lucas was the only one of the five having a government controlled clean-up.

Table I.

DEGREE OF INFESTATION OF THE CORN BORER IN THE COUNTIES SURVEYED

County	Average percent of stalks infested			Borers per 100 stalks		
	1925	1926	1927	1925	1926	1927
Paulding		0	0		0	0
Fulton	0	.24	1.27	0	.53	2.22
Seneca	.09	.19	.97	.31	.29	1.6
Lucas	7.34	22.6	11.9	9.4	70	28.8
Ottawa	9,96	12.3	14.3	10.2	30.7	33.5

CHANGES IN KIND AND ACRES OF CROPS RAISED

In 1928 corn acreage for Ohio was slightly below the eight-year average (1920-1927) but higher than any year since 1925. Ohio corn acreage has been below the State average since 1925, reaching the lowest acreage in 1927. The decrease in acreage in 1927 although general for the entire state was greatest in the northern part. Corn acreage, of the counties included in the survey dropped in 1927 along with the rest of the state. The State acreage for 1927 was 6% below that of 1926 and the five counties studied, averaged 7% below. A comparison of corn acreage for different years in Ohio and the U. S. is given in the following table.

Table II.

ACRLAGL OF CORN IN OHIO AND U. S.

	Ohio	U. S.
1920	3,965,000	101,699,000
1921	3,785,000	103,740,000
1922	3,823,000	102,846,000
1923	3,899,000	104,324,000
1924	3,650,000	105,012,000
1925	3,741,000	101,359,000
1926	3,591,000	99,713,000
1927	3,376,000	98,914,000
1928*	(3,846,000)	(102,380,000

* Preliminary-U. S. Crop Report.

In general, weather conditions in Ohio in the fall of 1926 and spring of 1927 were very unfavorable for the carrying out of the normal farm operations. In the fall of 1926 the wet weather disrupted the normal harvesting methods and made the seeding of fall wheat impossible in many cases. The following spring was no better and its influence was heavily felt in the acres of corn and other crops planted that spring.

Table III.

CHANGES IN PERCENT OF TOTAL FARM AREAS IN CORN ON ALL FARMS SURVEYED, BY COUNTIES, 1926, 1927, and 1928

County	Average Size of Farm Surveyed Acres	Number of Farms	Percent of Total Farm Acreage in Corn		
			1926	1927	1928
Paulding	163	59	38	35	43
Fulton	108	61	18	17	23
Seneca	153	59	24	21	24
Lucas	90	57	20.4	16	19
Ottawa	77	60	18.9	16.4	16.5
All Counties Surveyed	117	296	24.3	22.6	27.1

The results secured in the survey of the five counties show that the corn acreage on the surveyed farms was 7 percent less in 1927 than in 1926 and 11 percent greater in 1928 than in 1926.

The reduction in corn acreage on all the farms surveyed and for the state, in 1927, was approximately the same; but in 1928 the corn acreage on all the farms surveyed showed a larger percentage increase over 1927 than the state as a whole. Since the survey was conducted in counties of varying degree and periods of infestation, a comparison on this basis can be made. The western counties in the lighter infested area, Paulding, Fulton and Seneca, when compared with the heavier infested counties of Lucas and Ottawa show practically the same reduction in corn acreage in 1927. In 1928 the corn acreage on the surveyed farms in the lighter infested counties shows a big increase over the

previous year and also some increase over that of 1926. The farms in the heavily infested area showed but very little increase in corn acreage in 1928 over 1927 and remained below 1926. The comparison given in Table IV is based on those farms from which crop acreages for three consecutive years have been secured.

Table IV.

CHANGES IN CORN ACREAGE ON THE SAME 165 NORTHWESTERN OHIO FARMS FOR 3 YEAR PERIOD

	Number of Farms	Percent of Total Farm Acreage in Corn		
		1926	1927	1928
Lightly infested area				
Paulding County	26	40%	33%	43%
Fulton County	31	20%	16%	23%
Seneca County	27	23%	21%	24%
Total	84	28%	23.8%	30.2%
Heavily infested area				
Lucas County	21	23%	15%	17%
Ottawa County	60	18.9%	16.4%	16.5%
Total	81	20.0%	16.0%	16.6%

While changes have been going on in the acreage of corn for the last 3 years there have naturally been changes in the acreage of other crops during the same period in this section. These shifts may be due to corn borer, to weather conditions or to changes in market demands.

Table V.
THE DISTRIBUTION OF CROPS GRO"N ON ALL FARMS SURVLYLD
IN FIVE COUNTIES

Item	1926	1927	1928
Acres in farms surveyed	32690	34992	35350
	Percent of total acres		
Crops Grown:			
Corn	24.37	22.65	27.15
Wheat Sown (winter)	14.8	9.6	17.7
Wheat harvested	14.8	9.6	3.5
Spring wheat	*	1.1	2.0
Oats	16.9	18.3	22.8
Barley	1	2.1	5.3
(Total Small Grain)	(32.7)	(31.1)	(33.6)
Sugar beets	1.2	1.6	1.9
Clover and Timothy	9.1	9.0	6.6
Alfalfa	3.1	4.4	3.6
Miscellaneous		*	*
Rotation Pasture	3.7	3.3	2.9
Permanent Pasture	12.8	13.5	13.7
Orchard	*	*	*
Truck	0.4	0.6	0.7

* Less than 1 percent.

The size of farms varies widely among the counties surveyed. Paulding County has the largest farms of the five counties which average more than 160 acres and Ottawa has the smallest with its farms averaging less than 80 acres.

The area of winter wheat seeded and harvested has experienced some radical variations in the entire state during the three year period. Weather has been a big factor influencing the acreage of wheat. Very little was sown in the fall of 1926 because of unfavorable weather. In the fall of 1927 a large acreage was seeded to wheat but the winter was so severe that most of it was winter killed, which resulted in a large acreage of wheat ground being seeded to other crops in the spring of 1928.

~~During the three years 1926 to 1928~~ wheat acreage has gone through the same changes ~~in all of the~~ counties studied. Wheat holds about the same importance in the cropping system in all of the counties surveyed except in Paulding. The wheat acreage in Paulding County makes up but 5 to 6 percent of the total farm acreage while in the other four counties wheat was sown on from 15 to 25 percent of the total acreage. The reduction in wheat acreage in 1927, because of the difficulty of seeding in the fall of 1926 affected all of these four counties to the same extent. Basing the wheat acreage for 1928 on the acres sown in the fall of 1927 there was a substantial increase in all of the Counties over that of 1927, and in all of the counties except Seneca, there was an increase over 1926. The wheat acreage that survived the winter, however, was very small. Spring wheat acreage although very small has been increasing during the last two years in Lucas and Ottawa, where it has been used in some cases to make up for the winter wheat failure.

Figures indicate a general tendency to increase the acreage of oats throughout the state during the past three years but this change can largely be attributed to the small acreage of wheat seeded in the fall of 1926 and the extreme winter killing a year later. The acreage of oats per farm in Paulding County where it is the principal small grain crop decreased in 1927 because of the extreme delay in seeding but increased again in 1928. In the other four counties it increased both years since 1926.

Barley production has increased noticeably in nearly all sections during the past three years and the acreage in Ohio in 1928 160% above that of 1926. On the farms surveyed the increase was over

400%. A small portion of this barley increase was probably due to its being used as a substitute feed crop for corn either directly or indirectly on account of the corn borer but the major portion of it was unquestionably the result of abnormally low wheat acreage and the relatively good yields and high price of barley during the last year or two.

Sugar beets, although they represent only a small percent of total farm acreage, showed substantial increases on the farms surveyed in Fulton and Lucas Counties. Seneca raises few beets and in Ottawa and Paulding the acreage has remained about stationery.

Alfalfa holds fairly substantial position in the cropping system in most of the counties. It has been increasing somewhat during the last several years and would probably have showed an increase in 1928 if it had not been for the severe loss due to winter killing.

Ottawa and Lucas are the only counties surveyed that show any appreciable amount of commercial trucking. The acreage in Truck in these two counties makesup between 2 and 3 percent of the farm area and has been increasing somewhat during the last two years. These two counties not only have the heaviest borer infestation of any studied but are also near the Toledo Market and somewhat adapted to truck growing.

The changes in acreages of the various crops during the three years of the study, with but little exception, can be accredited to weather conditions at seeding time or crop failures due to the weather. The corn acreage on the farms surveyed in the three counties with the lowest infestation was greater in 1928 than in 1926, as was true of the state as a whole. In the two counties with the heaviest infestation

Table VI.

CROP YEAR COMPARISON OF CROP DISTRIBUTION PER FARM, OF ALL FARMS SURVEYED, BY COUNTIES

Item	Paulding			Fulton			Seneca			Lucas			Ottawa		
	1926	1927	1928	1926	1927	1928	1926	1927	1928	1926	1927	1928	1926	1927	1928
Number of Farms	44	59	59	77	61	61	55	59	59	50	57	57	60	60	60
Acres per Farm	164	160	165	108	109	108	153	154	152	83	91	94	77	77	77
Acres of Crop Land	142	128	142	72	81	82	111	99	101	67	71	80	59	58	57
Acres of Corn	62	56	71	20	19	25	36	32	36	17	15	18	15	13	13
Acres Fall Wheat Sown	5	1	12	17	13	21	31	22	30	17	15	28	13	6	15
Acres of Fall Wheat Harvested	5	1	C	17	13	8	31	22	11	17	15	1	13	6	1
Acres of Spring Wheat	-	3	*	-	-	-	-	-	-	-	2	9	*	2	4
Acres of Oats	54	47	57	14	18	21	13	15	25	14	15	21	12	13	13
Acres of Barley	*	-	*	1	4	10	2	4	8	*	2	8	2	3	5
Acres of Sugar Beets	*	1	1	1	1	2	-	*	-	5	6	8	1	1	1
Acres of Clover and Timothy	19	16	10	10	13	6	14	14	13	7	3	5	6	7	6
Acres of Alfalfa	*	1	1	5	6	4	4	5	4	3	9	6	5	5	7
Acres of Orchard	-	-	-	-	-	-	-	-	-	-	-	-	4	4	4
Acres of Truck	-	-	-	-	-	-	-	-	-	1.5	2	3	1	1	2

the failure of the corn acreage to come back in 1928 indicates some slight shift from corn to other crops.

Crops Following Corn on Corn Ground

There are many places where the corn borer may have an effect on farming and farm practices other than that of changing the acres of corn and other crops. Farmers may find that with a reasonable amount of precaution and cleaning up of corn land that they will be able to grow as many acres of corn as ever. The information collected in the 1927 and 1928 surveys make available the crops which followed the 1926 and 1927 corn crop. The crops which followed the 1926 corn crop were sown on corn ground that the government required cleaned. The crops sown in the fall of 1927 and in the spring of 1928, in 1927 corn ground were influenced by the Government requirements, only to the extent that farmers were preparing for another enforced clean-up. After it became apparent that no clean-up would be required the only influence which may have turned the established practices out of their normal course was the extra clean-up that the farmers themselves thought advisable.

The variation in farm practices in the counties surveyed makes it desirable to present the crops following corn by counties rather than as a composit of all counties.

As Table VII includes all farms surveyed in 1927 and 1928, it might be expected to show more difference than if the same farm were compared for those years. Those farms that were visited both in 1927 and 1928 in each county show the same percent of corn land going to various crops, in almost every case as all farms surveyed.

Table VII.

PERCENT OF CORN GROUND SEEDED TO VARIOUS CROPS; BY COUNTIES, ON ALL FARMS SURVEYED IN 1927 and 1928.

Crop	Paulding		Fulton		Seneca		Lucas		Ottawa	
	1927	1928	1927	1928	1927	1928	1927	1928	1927	1928
Corn Ground of Pre-year seeded to -										
Oats	83%	90%	64%	67%	35%	37%	53%	59%	63%	54%
Wheat	6	1	3	7	21	35	9	4	5	4
Barley	-	-	6	9	10	9	3	2	11	6
Corn	10	6	23	11	32	15	13	22	14	25
Spring wheat	*		-	-	-	-	-	2	2	3
Sugar beets	1		2	4	-	-	12	11	3	5
Truck	-	-	-	-	-	-	3	*	1	2
Miscellaneous		3	2	2	2	4	7	-	-	1

* Less than 1%.

The heavily and lightly infested areas show marked difference in the amount of corn land seeded to small grain. The amount of corn land seeded to small grain in the lightly infested area increased in 1928, 13 percent over 1927 and at the same time and the amount of corn land seeded to small grain in the heavily infested area decreased in 1928, 21 percent as compared with 1927. The decrease in the corn land seeded to small grain in the heavily infested area and increase of other crops is probably due to the fact that more spring plowing of corn land is being done. Paulding, Fulton, and Seneca show that in the spring of 1927 from 10 to 32 percent of the corn ground was returned to corn. In 1928

there was from 6 to 15 percent returned to corn. In 1927 there was an increase in the amount of corn land that was plowed because of the corn borer clean-up. Due to the delay caused by this extra work and unfavorable weather, and the fact that a large percent of the corn ground was plowed that normally would have been disked for oats, much of it was planted to corn rather than sown to oats. On farms where corn land was returned to corn in 1927 less meadow was plowed for corn than usual. In Ottawa and Lucas Counties the corn ground returning to corn increased in 1928 over 1927 on the farms where three year crop records were secured. Seneca County is the only county of the five that follows to any great extent the practice of sowing wheat in corn ground. The amount of corn ground sown to wheat in the fall of 1927 indicates that the farmers were confident that corn borer control measure would not affect the wheat that was seeded in corn ground.

Table VIII.

CHANGES IN THE AMOUNT OF CORN LAND SEEDED TO SMALL GRAIN FOR TWO YEARS ON THE SAME 165 FARMS

Counties	Acres of Corn 1926	Percent of 1926 Corn Land Seeded to Small Grain	Acres of Corn 1927	Percent of 1927 Corn Land Seeded to Small Grain
Lightly infested Counties				
Paulding	1783	83	1453	94
Fulton	710	78	590	85
Seneca	1121	63	1002	77
Total	3614	76	3045	86
Heavily infested Counties				
Lucas	418	84	284	59
Ottawa	875	81	762	67
Total	1293	82	1046	65

METHODS OF PREPARING SEED BED FOR THE CROP FOLLOWING CORN

The types of soil and soil conditions vary from county to county and to a less extent from farm to farm. Because of these different soil conditions, methods of handling the corn land also vary. One territory may have found it advisable to plow for oats while another may have found that it is better to sow small grain without plowing. The weather conditions affect both, from year to year. Some farmers may find it to their advantage to plow for oats one spring and not another. Corn borer and corn borer control measures have disrupted many established practices during the past few years and the methods of handling corn land have been far from exempt. In fact it was the main battle field in the war waged against corn borer in the spring of 1927. As one would expect many changes were made in long established systems. Whether these changes were permanent or only temporary will remain unanswered for the present. Corn borer control on almost State wide scope was a new and unheard of experiment. Very little was known about the best and most economical methods of getting rid of the stalks. Farmers did not know what the Government was going to require until the spring of 1927, and at that time it was too late to undo many of the things that had been done. Corn ground had been sown to wheat the previous fall, corn had been harvested by hogging or husking off the standing stalks, stubble and stalks were left standing in fields over winter as usual, all of which added to the problem of cleaning up. Farmers who ordinarily plowed corn ground for small grain or other spring crops did not find the problem so difficult. Those who did not normally plow found themselves face to face with the problem of plowing under or raking, picking up and burning the refuse. Some chose one method of meeting requirements and some the other.

In the spring of 1928 conditions were somewhat different. The previous year's experience and the advance notice gave them an opportunity to prepare for the coming clean-up. However, when the time arrived it was not required except in Lucas County.

To get an idea of the shifts in methods of preparing corn ground for the crop that was to follow all of the corn land sown to oats in 1927 and 1928 was separated from the rest and a comparison was made of the methods used. The land sown to oats was used because of the large acreage of oats seeded and the methods employed in preparing ground for oats are very similar to those used for other spring sown grain crops. The methods employed for such crops, as corn, beets, and truck have not greatly changed since the coming of the corn borer for plowing is always done for these crops.

Table IX

SHIFT IN METHOD OF PREPARING CORN GROUND FOR OATS ON FARMS SURVEYED;

BY COUNTIES

	Acres		Percent of Acreage Sown	
	1927	1928	1927	1928
PAULDING COUNTY				
Area sown to oats	2387	2959		
Acres sown in stalk	2377	2941		
Plowed	23	-	1	-
Disked	1412	203	60	7
Neither disked nor plowed	942	2738	39	93
Acres stalks broken	2354	2774	99	94
Acres raked	2356	2813	99	96
OTTAWA COUNTY				
Area sown to oats	554	412	-	-
Acres sown in stubble	554	412	-	-
Plowed	189	186	34	45
Disked or springtoothed	365	214	66	52
Neither disked nor plowed	-	12	-	3
LUCAS COUNTY				
Area sown to oats	448	467	-	-
Acres sown in stubble	263	319	-	-
Plowed	132	164	50	51
Disked	131	145	50	46
Neither plowed nor disked	-	10	-	3
Acres sown in stalk	185	148		
Plowed	85	65	46	44
Disked	100	53	54	36
Neither plowed nor disked	-	30	-	20
SENECA COUNTY				
Area sown to oats	682	687	-	-
Acres sown in stubble	554	503	-	-
Plowed	527	244	95	49
Disked	27	259	5	51
Neither plowed nor disked	-	-	-	-
Acres sown in stalk	128	184		
Plowed	118	176	92	96
Disked	10	8	8	4
Neither plowed nor disked	-	-	-	-
FULTON COUNTY				
Acres sown to oats	954	782	-	-
Acres sown in stubble	510	563	-	-
Plowed	390	428	77	76
Disked	120	135	23	24
Neither plowed nor disked	-	-	-	-
Acres sown in stalk	444	219		
Plowed	342	195	77	89
Disked	102	24	23	11
Neither plowed nor disked	-	-	-	-

THE EFFECT OF CORN BORER ON METHODS OF HARVESTING CORN

The 1926 corn crop was harvested before any Government control measures were issued and as a result the methods of harvesting followed in the fall of 1926, were in no way influenced by control measures. The wet weather in the fall of 1926 probably influenced the harvesting methods more than anything else. The 1927 corn crop was harvested under somewhat different conditions. The farmers had the experience of one year of corn borer control, and were expecting a continuation of the clean-up requirements. There is no doubt that a large majority of farmers found the old method of harvesting corn as satisfactory as any. The most outstanding example of this was Paulding County, where no change was made in the established method. In other counties, there was some change made when compared with the methods employed in 1926. The four counties, Fulton, Seneca, Lucas, and Ottawa use similar methods of harvesting and are more comparable with the rest of the State. On the farms surveyed in Paulding County about 98% of the corn was husked off the standing stalks. In the other four counties more than 50% was cut.

Table X.
SHIFT IN METHOD OF HARVESTING CORN ON ALL FARMS SURVEYED IN FULTON, LUCAS, SENECA, AND OTTAWA COUNTIES

Item	Acres Harvested		Percent total corn area	
	1926	1927	1926	1927
Total Acres Harvested	5262	4646	100%	100%
Acres cut by hand & with binder	3542	3694	67.3	79.5
Acres hogged down or husked from standing stalks	1720	952	32.6	20.5

The four counties, Fulton, Seneca, Lucas and Ottawa with more than 50% of the corn cut show marked difference both in method and degree of change from county to county. A comparison of method and changes by counties for 1926 and 1927 are given in table XI. In 1926, 40% of the corn was husked off the stalk in Fulton, and in 1927, 21 percent, almost a 50% decrease. Lucas in 1926 husked 56% off the standing stalk, in 1927, 33%, a decrease of better than 40%. Accompanying these decreases were corresponding increases in cutting with binder.

Seneca and Fulton follow the practice of hogging some corn down each year. Seneca hogs down from 10 to 12 percent and Fulton from 5 to 7 percent. The farmers surveyed in these two counties, who follow the practice of hogging corn have not found it necessary to make any change. In all of the counties except Paulding, 1927 shows a marked increase over 1926 in the acreage corn cut with a binder. Part of this increase may be due to the influence of corn borer, but undoubtedly much of it was due to the wet weather in the fall of 1926 which in many cases prevented the use of binders.

Table XI.

SHIFT IN METHODS OF HARVESTING CORN BY COUNTIES, ON FARMS SURVEYED TWO YEARS IN SUCCESSION

Item	Acres Harvested		% of Total Harvested	
	1926	1927	1926	1927
Paulding County				
Total Acres Harvested	1783	1453	-	-
Cut by hand	15	36	1	2.5
Cut with binder	-	-	-	-
Hogged down	8	-	*	-
Husked off standing stalk	1760	1417	99	97.5
Fulton County				
Total Acres harvested	710	590	-	-
Cut by hand	363	307	51	52
Cut with binder	17	138	2	24
Hogged down	31	37	5	6
Husked off standing stalks	299	108	42	18
Seneca County				
Total acres harvested	1121	1002		
Cut by hand	246	100	22	10
Cut with a binder	430	694	48	69
Hogged down	184	114	16	11
Husked off standing stalks	261	94	23	10
Lucas County				
Total acres harvested	418	284	-	-
Cut by hand	90	93	22	33
Cut with binder	96	109	23	38
Hogged down	-	-	-	-
Husked off standing stalks	232	82	55	29
Ottawa County				
Total acres harvested	875	762	-	-
Cut by hand	755	584	86.2	76.6
Cut with binder	84	147	9.6	19.2
Hogged down	0	0	0	
Husked off standing stalks	36	31	4.1	4

* Less than 1 percent.

The number of farms having silos and the amount of corn cut for silage varies widely in the counties surveyed. Paulding County with practically no livestock and Lucas and Ottawa with but little more, have very few silos. Seneca and Fulton do considerable dairy and livestock farming. Fulton County has silos on more than 50% of the farms surveyed, and in the fall of 1927 put 22% of its corn in silos.

The possibility of using the shredder to assist in meeting the corn borer problem has been the subject of much discussion. The acreage of corn shredded was highest in Seneca County, of the five counties surveyed. The amount of shredding is not related directly with the amount of livestock raised. The farms in Fulton County shredded but very little corn while in Lucas and Ottawa from 25 to 30 percent of the total corn raised was shredded. The farms in Paulding County with the highest percent of farm land in corn of any surveyed did not shred any which tends to make the percentage of corn shredded in the five counties surveyed very low. In the counties where shredding is done some of the farmers own their shredders while other farms share in company machines.

Table XII.

ACRES OF CORN PUT IN SILOS AND ACRES SHREDDED

BY COUNTIES, 1927

County	Number of Farms	Total Corn Acres	Number of farms having silos	In Silos		No. of Farms owning Shredders in Co.	Shredding	
				Acres	Percent of total Corn Acreage		Acres	%
Paulding	59	3281	1	10	*	0	0	0
Fulton	61	1165	32	257	22	0	26	2
Lucas	57	842	1	14	1.5	9	258	30
Ottawa	60	762	4	26	3	17	192	25
Seneca	59	1880	17	137	7	30	1201	63

* Less than 1 percent.

LABOR ON CORN LAND UNDER COMPULSORY AND VOLUNTARY CLEAN-UP

In 1927 a study to determine the cost of cleaning corn land and the methods used was conducted in 8 counties in Northern Ohio. An effort was made last year by the control authorities to have all of the infested territory meet a set standard of cleanliness. The fact that all farmers had to clean their corn land and barn lots until they would pass a Government inspection, made it possible to compare costs and the efficiency of the various methods. With no enforced clean-up or Government inspection in any of the counties except Lucas in 1928 a comparison of costs and methods of cleaning-up is impossible since there was no way of judging the thoroughness of the various methods used.

Although there was no enforced clean-up in 1928 a comparison of the extra time spent cleaning under enforced requirements in 1927 and voluntarily in 1928 cannot be made, because the farmers in corn borer territory were expecting another enforced clean-up until late in the spring of 1928. By that time some of the farmers had either partially or entirely cleaned their fields and lots. How much of the work that was done before they found that cleaning up was not compulsory would have been done under voluntary clean-up, no one can say.

Some corn land that received extra work in the spring of 1928 may not have been clean enough to have passed last years requirement and other corn land that received no extra work possibly would have passed the inspection. The fact that no extra work was necessary in the spring of 1928 to make some corn land clean was due to more care in planning the normal operations, low cutting, and more favorable

weather conditions. The weather conditions were generally good for such work as burning stalks in the spring of 1928. As a result some clean jobs were reported with much less extra effort than a year earlier.

Table XIII.

CORN LAND RECEIVING EXTRA WORK ON THE SAME 165 FARMS SURVEYED IN BOTH 1927 and 1928

County	Total Corn Acres		Acres Receiving Extra Work **		Percent Receiving Extra Work **	
	1926	1927	1927	1928	1927	1928
Paulding	1783	1453	1705	1298	96	89
Fulton	710	590	710	349	100	59
Seneca	1121	1002	1032	422	92	42
Lucas	418	284	418	201	100	71
Ottawa	*	762	*	295	*	38

* Information not obtained for Ottawa County.
** In preparation for following crop.

Wheat sown in corn ground in the fall of 1926 offered a problem in cleaning up the next spring. Stubble beaters were used after the wheat had made several inches of growth. In the fall of 1927 many farmers who planned upon sowing wheat in corn ground secured stubble beaters from the government and pulverized their stubble before sowing wheat. Sixty-eight percent of the corn ground that was sown to wheat in Seneca County in 1927 was gone over with the beater. This was approximately one-fourth of all corn land on farms surveyed in Seneca County. Ottawa was the only other county surveyed in which the stubble beater was used to any extent. In Ottawa County the survey showed that about 16 percent of

the corn ground was stubble beat in the fall of 1927 for spring grain crop.

The practice of handpicking stubble and stalks which was quite common the previous year, almost disappeared from the list of methods of cleaning corn ground in 1928. How much handpicking would have been done if there had been an enforced clean-up cannot be estimated. The great decrease in the amount done in Lucas with an enforced clean-up in 1928 as compared with the previous year, indicates that it would have been much less. On farms surveyed two years in succession in Lucas County there was a decrease of 50 percent in the acres on which handpicking was done.

The farms in Paulding County with 98 percent of the corn husked from the standing stalks offers a control problem different from the other counties. In parts of Paulding County spring plowing for small grain is almost impossible because of the type of soil, and with 90 percent or more of the corn ground going into spring grain some method other than plowing must be used. Before corn borer control started most of the farmers followed the practice of either disking the stalk ground and then drilling or if the ground was in good shape just drilling. Some of the farmers had been following the practice of breaking their stalks with a pole and raking and burning them even before the advent of the corn borer. In the spring of 1927 the farmers broke their stalks, raked and burned them, often going over their field two and three times. Oats in Paulding County were seeded in 1928 before the farmers found out that there would not be an enforced clean-up. Most of the corn land received some extra work because of corn borer. A slight decrease occurred in 1928 as compared with 1927 in the percent

of corn ground on which stalks were broken. The percent of corn ground that was raked in 1928 was about the same as in 1927. Paulding County reported a higher percent of corn land receiving extra work than any other county in 1928.

After farmers had experienced the difficulties of cleaning up their corn fields in the spring of 1927, many of them were looking into the future to the extent of being better able to meet the requirements in 1928, and avoid some of the difficulties that occurred in 1927.

In most of the counties there was some change in the methods of harvesting. Whether or not this was due to influence of corn borer or the conditions it is impossible to say. When corn was cut, the length of stub quite generally averaged lower than in 1926. On a few of the farms where spring plowing is not practical some fall plowing of corn ground was done. In Seneca and Ottawa Counties in the fall of 1927 much of the corn ground that was to be seeded to small grain that fall or the next spring, was stubble beat. In Paulding County the breaking raking and burning was done in the late winter and early spring so that it would not interfere with spring oats seeding. Those farms reporting extra time spent on corn land including the farms in Lucas County (with an enforced clean-up), showed practically no hand-picking or raking as compared with 1927.

SUMMARY

1. Corn acreage was lower in most all Ohio Counties in 1927 than in 1926 but increased in 1928.

2. In the counties studied where borer infestation was very light, the corn acreage was reduced in 1927 but came back in 1928 to above the 1926 figure as it did for the state as a whole.

3. In the heavily borer infested counties studied the corn acreage also decreased considerably in 1927 but failed to increase in 1928 to the 1926 acreage.

4. The following conditions were noticeable in the heavily infested counties as compared with the other areas:

(a) Increased acreage of alfalfa, sugar beets, and truck crops.

(b) An increase in the amount of corn following corn.

(c) A relative decrease in the area of small grain sown in corn land.

(d) A larger percent of the corn acreage cut.

(e) Much of the corn cut lower.

5. The amount of hand picking and hand labor used in clean-up operations was much less than a year ago.