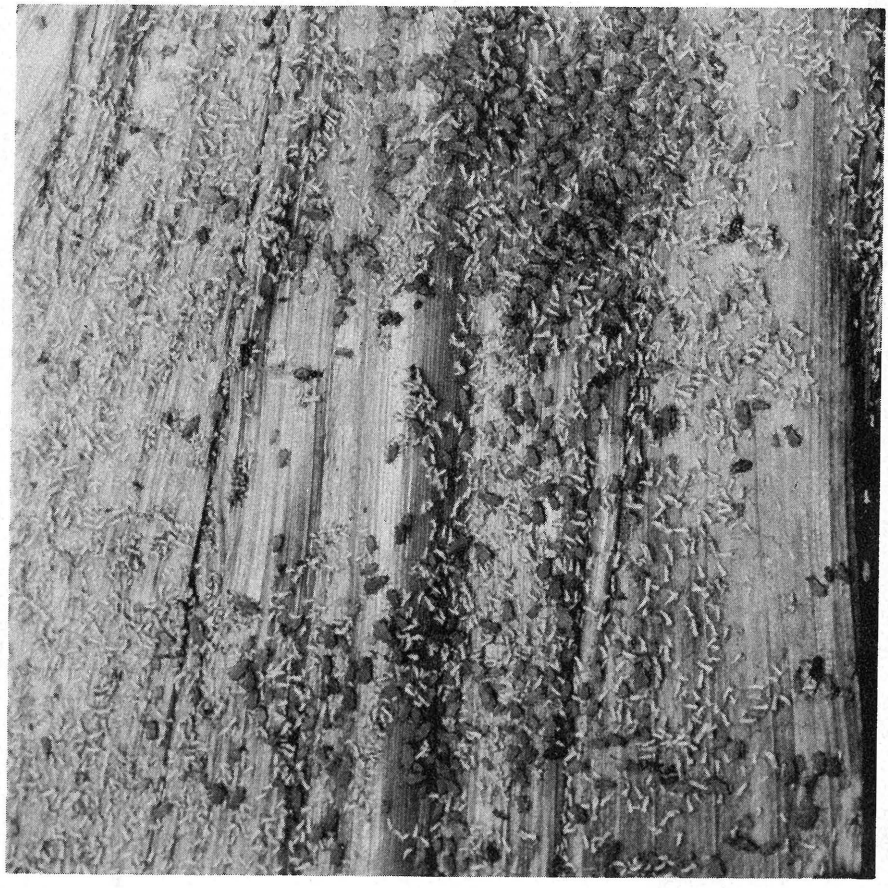
Research Bulletin 898 December 1961

DIFFERENTIAL RESISTANCE OF DENT CORN STRAINS TO THE CORN LEAF APHID, *RHOPALOSIPHUM MAIDIS* (FITCH), IN OHIO

C. R. Neiswander and C. A. Triplehorn



OHIO AGRICULTURAL EXPERIMENT STATION - - WOOSTER, OHIO

LITERATURE CITED

1. Forbes, S. A. 1905. Twenty-third report of the State Entomologist on the noxious and beneficial insects of the State of Illinois. pp. 123-133.

2. Huber, L. L. and G. H. Stringfield. 1942. Aphid infestation of strains of corn as an index of their susceptibility to corn borer attack. Jour. Agr. Res. 64:283-291.

3. McColloch, J. W. 1921. The corn leaf aphis (Aphis maidis Fitch) in Kansas. Jour. Econ. Ent. 14:89-94.

4. Neiswander, C. R., R. O. Snelling and F. F. Dicke. 1949. Uniform methods of recording differential insect injury in plantings of corn strains. Report of Committee Eighth North Central States Corn Improvement Conference. A mimeographed publication.

5. Snelling, Ralph O., Ralph A. Blanchard and John H. Bigger. 1940. Resistance of corn strains to the leaf aphid, Aphid maidis Fitch. Jour. Amer. Soc. Agron. 32:371-381.

6. Triplehorn, C. A. 1959. The possible effect of weather on incidence of corn leaf aphid infestation and damage. Proc. North Central Branch Ent. Soc. Amer. 14:28-29.

7. Triplehorn, C. A. 1960. Corn leaf aphid-Ecology, life history and control. Proc. North Central Branch Ent. Soc. Amer. 15:97-98.

8. Walter, E. V. and Arthur M. Brunson. 1940. Differential susceptibility of corn hybrids to Aphis maidis. Jour. Econ. Ent. 33(4):623-628.

DIFFERENTIAL RESISTANCE OF DENT CORN STRAINS TO THE LEAF APHID, RHOPALOSIPHUM MAIDIS (Fitch), IN OHIO

C. R. Neiswander and C. A. Triplehorn [1]

During the past few years the corn leaf aphid, *Rhopalosiphum maidis* (Fitch), has been of important concern to dent producers over much of Northwestern Ohio. Although the insect occurs on corn throughout Ohio every year it is only rarely that it becomes of severe economic importance. The fact that it has caused rather severe injury in certain sections of the state over the past three or four years has suggested that all accumulated information on the insect and its methods of control should be brought to the attention of seed producers and corn growers in general.

The corn leaf aphid attacks corn only during the early tasseling stage in late July or early August. The infestation starts in the whorl of the plant just as the tassel is appearing. The species multiplies rapidly and the colony attains its greatest numbers on the tassel and on the leaves just under the tassel. In some instances when the colony is large the tassel may fail to open completely, may turn white and apparently fail to produce pollen. Such plants are often barren, leading some observers to think that the barrenness was due to lack of pollination. However, the barrenness and frequent failure of ears to attain full size is more likely explained by the fact that the plant growth nutrients were essentially consumed by the aphids. Even though severely infested plants failed to produce pollen there is usually such an abundance of pollen in the field from uninjured plants that all plants should still be well pollinated.

[1]The data presented in this paper were taken from corn plots grown cooperatively with: G. H. Stringfield, formerly with the Cereal Crops Research Branch, Crops Research Division, Agricultural Research Service, U. S. Department of Agriculture, and Department of Agronomy, Ohio Agricultural Experiment Station; and J. D. Sayre, Cereal Crops Research Branch, Crops Research Division, Agricultural Research Service, U. S. Department of Agriculture, and Department of Agronomy, Ohio Agricultural Experiment Station. The cooperation of these agronomists is greatly appreciated.

Usually the corn leaf aphid has a relatively short period of two or three weeks in which it causes severe damage. After the tassel has matured and tended to dry out, the aphids disperse to other more succulent parts of the plant such as the ears and leaf sheaths. As the entire plant matures the aphids either die or develop winged individuals which migrate to other more succulent plants.

It is not known if or how the aphids spend the winter out of doors in Ohio. Inasmuch as they fail to appear in numbers on corn until late in July some investigators have maintained that they are killed each winter by cold weather and replaced by migrants brought up from the South each spring on air currents. In a recent study of insect migration the corn leaf aphid was first found in a fan trap by Wisconson entomologists at Arlington, Wisconsin, on May 25, 1960. It is not known whether this individual migrated from the south or survived the winter in Wisconsin. It could have come from a greenhouse since the species attacks corn, sorghum, barley and other grasses the year round when these plants were grown under glass.

Experimental plantings of corn grown in the greenhouse in the winter at Wooster almost invariably become infested with aphids. If fresh plantings of corn are kept available the aphids continue to reproduce throughout the winter. Infestations are frequently severe enough to require insecticide treatment in order to save the plants. Forbes (1905) in Illinois reared nine successive generations between November 13 and March 11. During most of this time both winged and wingless females were present but in no case were eggs observed.

The corn leaf aphid is very susceptible to ecological conditions. Although a few colonies may be observed somewhere in Ohio every year there may be an elapse of five or six years in which their numbers are so small as to escape detection on the part of farmers. Suddenly, if weather conditions are right, they can build up to tremendous numbers within a very few days. However, they can also disappear quickly with changes in the weather. Colonies have been known to disappear almost over night following a heavy rain although they have also gone through severe rain storms with but little change in numbers.

The weather conditions that are most favorable for aphid accumulation are not clearly understood. Infestations start when plants are growing luxuriantly and with plenty of soil moisture. However, the colonies can and do persist during dry weather. In fact it often seems that aphid

injury is associated with dry weather. In many instances it is difficult or impossible to distinguish aphid injury from drough injury. Both result in small ears or nubbins and barren stalks. Some authors have used the number of barren stalks as a simple measure of aphid infestation. Snelling (1940) reported an instance where 48% of the aphid infested plants in a field were barren whereas only 1 to 2% of the uninfested plants were barren.

The junior author (1959) studies five fields which had an abundance of rainfall in late July and early August of 1958. Loss in yield due to aphid feeding averaged less than four percent despite the fact that infestations were recorded in which up to 38 percent of the plants harbored major aphid colonies. The number of barren stalks was negligible and were about equally divided between plants which had been infested and those which were aphid-free.

The following year, records were taken in an extremely dry field and a direct correlation was found between the size of the aphid colonies and loss in yield. Every plant which had been supporting near maximum numbers of aphids at tassel emergence was barren at harvest (Triplehorn, 1960). Such differences can usually be attributed to differences in soil moisture. If there is an abundance of soil moisture the corn plants can tolerate aphid feeding and still produce a good crop. For this reason the percentage of barren stalks is not a safe measure of aphid infestation although it might serve as a fairly rough measure of crop loss.

Corn leaf aphids can be killed quite readily by the use of a number of insecticides such as malathion, parathion and others. Unfortunately it is difficult to recognize the occurrence of a severe aphid infestation until the aphids are present in large numbers. By that time it is likely that the damage has been done and insecticide treatment would be of little value. If sprays could be applied just as the colony is getting started no doubt the crop could be protected. However, when the first few aphids appear it is impossible to determine whether or not they will reach economic numbers and the delay of a few days may cause the application to be too late to prevent damage. The effectiveness of insecticides therefore depends on the timeliness of the application. It is probable that most insecticide applications for corn leaf aphid control have been too late for important economic value.

When aphids become abundant on corn they are attacked by a great many parasites and predators prominent among which are the small hymenopteron *Aphidius testaceipes* (Cress.) and the ladybird beetles *Megilla maculata* Deg. and *Hippodamia convergens* Guer. Although

parasites and predators may destroy myriads of aphids, they also come too late to be of much value in preventing injury to the current crop.

The question frequently arises as to whether aphid infestation could be escaped by regulating the planting date. In some years it appears that the earlier plantings tend to escape severe infestation. Examination of the tables, however, will show that over the years of study severe infestations sometimes occurred in late plantings and sometimes on early plantings. In a planting date test conducted by McColloch in Kansas (1921) it was shown that the aphid infestation was practically equal on all plantings. It appears therefore that infestations will appear whenever the weather conditions are most favorable for aphid accumulation regardless of the planting date.

Investigators at the Ohio Station have watched the performance of corn varieties, inbred lines and hybrid combinations in their relation to aphid infestation whenever aphid outbreaks have occurred. There is no question that corn inbreds and hybrids vary greatly in their susceptibility to aphid infestation. By selecting hybrids on the basis of their performance or their pedigree history under aphid infestation, corn producers can accomplish much more in preventing aphid infestation than by the use of insecticides. Even during the past few years when aphid damage has been severe in some areas, Ohio hybrids that were promoted in part because of their corn borer and aphid resistance gave a good account of themselves when many others were severely damaged.

The three outstanding Ohio hybrids, currently recommended as being aphid resistant, and their pedigrees are as follows: K62 (Oh51 x Oh26) x (Oh43 x Oh45), W64 (Oh51A x WF9) (Oh43 x Oh45) and C54 (Oh26 x Hy) x (Oh43 x Oh45). It is noteworthy that the pollinator in each of these hybrids is composed of the same two highly aphid-resistant inbred lines. Among the inbred lines comprising the female parents, Oh51 and Oh51A are highly resistant, Hy is of about average resistance and Oh26 and WF9 are highly susceptible to corn leaf aphids. The reason susceptible lines are used in hybrid combinations is because they have other good qualities that contribute to quality and quantity production.

Much of the data taken at the Ohio Station over the past 15 years on the aphid susceptibility of inbred lines and their hybrid combinations has never been published even though the information has been available to the Ohio corn program. Accordingly several tables are presented here in the hope that the information will be of some help to seed corn producers in the long range aphid control program even though some of the

data are old and some of the lines and hybrids are no longer used. It will be noted that some of the data are presented on the basis of the number or percentage of plants bearing aphid colonies and others as entry rating values for the aphid population per plot as a whole. By the rating system. the plots with the most aphids were rated 5 and those with the least aphids 1. Plots with intermediate aphid infestations were rated intermediately between 1 and 5. By this rating method the percentage of plants infested and the size of the respective colonies can both be taken into consideration in calculating the rating value as entries are compared with each other.

The performance of inbred lines, single crosses, three way crosses and commercial and experimental hybrids under aphid infestation is shown in tables 1 to 9.

TABLE 1[1]. –Aphid susceptibility rating – Inbred line planting. Wooster, 1946. Corn planted June 10. Rating record taken August 19. 31 entries, 5 replicates, 2 x 10 hill plots. (5 = most injury, 1 = least injury)

Inbred lines	Aphid rating					
	R1	R2	R3	R4	R5	Mean[2]
O2	5.0	5.0	4.0	5.0	4.5	4.7
WF9	4.0	3.5	4.5	4.0	4.0	4.0
L289	5.0	5.0	5.0	5.0	5.0	5.0
P8	3.5	3.5	3.0	4.5	4.0	3.7
HY	2.0	2.0	2.5	2.5	3.0	2.4
51A	1.0	1.0	1.0	2.0	1.0	1.2
65	4.5	3.0	5.0	5.0	5.0	4.5
84	3.0	4.0	4.5	4.5	4.0	4.0
26	3.0	3.0	4.0	4.5	4.5	3.8
38-11	2.5	2.5	3.0	3.0	1.5	2.5
OS420	5.0	4.5	5.0	5.0	5.0	4.9
L317	1.0	2.0	1.5	1.5	1.5	1.5
33	2.0	2.5	3.0	2.5	3.0	2.6
O7	4.0	3.5	3.0	2.0	3.5	3.2
1205	3.0	4.0	3.0	2.5	3.0	3.1
M14	3.0	3.0	4.5	4.5	4.0	3.8
CC5	3.5	3.5	5.0	4.0	3.5	3.9
56A	1.0	1.0	1.0	1.0	1.0	1.0
40B	3.5	1.5	1.5	2.5	3.5	2.5
56	2.5	2.0	2.5	1.5	2.5	2.2
4-8	4.0	3.0	4.5	3.0	3.5	3.6
4156	1.0	1.0	1.5	1.0	1.0	1.1
A	1.0	1.0	1.0	1.5	1.0	1.1
51	1.0	1.5	1.0	1.0	1.0	1.1
28	3.0	4.0	4.5	4.0	3.0	3.7
187-2	1.5	1.0	1.0	1.5	1.5	1.3
CI7	3.0	3.0	2.0	2.5	3.0	2.7
K166	1.0	1.0	1.5	2.0	1.5	1.4
93	3.5	2.5	2.0	2.5	3.0	2.7
OS426	5.0	4.5	5.0	5.0	4.5	4.8
O4	3.0	3.5	4.0	2.5	3.0	3.2

[1]This table was made available in mimeographed form to the North Central States Corn Breeders as a committed report at the annual meeting in 1949. (Neiswander, C. R., R. O. Snelling and F. F. Dicke, 1949).

[2]Difference in means required for significance at 5 percent level = 0.74.

TABLE 2. –Inbred line planting, Wooster, Ohio, 1947, showing percent of plants with aphid colonies. Planting date – June 11, Record date- August 26.

Line	R1	R2	R3	R4	R5	R6	Average
OS 420	100	84	100	67	100	90	90.2
OS 426	62	85	55	100	81	100	80.5
O2	70	91	70	63	79	89	77.0
WF9	67	81	32	100	64	100	74.0
O4	72	71	66	95	62	70	72.7
O7	81	79	93	32	88	79	75.3
26	94	74	61	79	60	63	71.8
56	80	32	48	67	88	86	66.8
P8	59	79	52	62	47	97	66.0
187-2	57	65	37	67	51	100	62.8
84	83	67	24	50	100	40	60.7
41	35	45	67	47	98	68	60.0
K166	44	59	54	52	80	67	59.3
28	53	49	50	59	84	50	57.5
L289	55	47	26	59	38	95	53.3
H5	100	62	25	23	19	44	45.5
L317	44	77	13	52	39	35	43.3
HY	10	14	33	67	89	33	41.0
I205	74	38	54	23	26	23	39.7
TR	47	40	33	38	38	32	38.0
M14	39	75	20	32	27	30	37.2
38-11	48	22	20	44	43	44	36.8
65	79	53	16	21	11	27	34.5
CC5	54	32	9	23	37	31	31.0
33	18	20	34	7	52	50	30.2
R4	42	25	5	12	6	6	16.0
40B	2	5	8	0	11	30	9.3
51	6	24	0	4	1	3	6.3
56A	12	4	4	1	0	5	4.3
A	6	1	0	0	8	8	3.8
51A	3	2	0	0	3	0	1.3

TABLE 3. –Plants with Aphid Colonies – Midseason Single-cross Test – 45 entries, 2 x 10 hill plots, Replicated 5 times – Planted May 9; Record taken August 22. Van Wert – 1946.

Entry	Pedigree	R1	R2	R3	R4	R5	Mean[1]
1	Iowa 4059	2	0	4	7	2	3.0
2	L317 x L304A	0	0	0	0	0	0
3	Hy x 304A	0	0	0	0	0	0
4	L317 x K230	0	0	0	0	0	0
5	Hy x K230	0	3	3	1	0	1.4
6	Hy x L317	0	0	0	0	0	0
7	WF9 x L304A	10	14	7	18	2	10.2
8	WF9 x K230	11	5	5	6	6	6.6
9	WF9 x L317	1	0	0	1	0	.4
10	WF9 x Hy	7	1	0	1	3	2.4
11	B2 x L304A	7	15	5	6	9	8.4
12	B2 x K230	17	6	2	6	6	7.4
13	B2 x L317	0	0	0	0	0	0
14	B2 x Hy	0	0	0	0	0	0
15	B2 x WF9	2	3	2	0	0	1.4

[1]Difference in means required for significance at 5 percent level = 3.98.

TABLE 3.—Plants with Aphid Colonies — Midseason Single-cross Test — 45 entries, 2 x 10 hill plots, Replicated 5 times — Planted May 9, Record taken August 22. Van Wert — 1946.—Continued

Entry	Pedigree	R1	R2	R3	R4	R5	Mean[1]
16	38-11 x L304A	2	2	5	3	0	2.4
17	38-11 x K230	2	9	6	1	1	3.8
18	38-11 x L317	2	0	0	0	0	.4
19	38-11 x Hy	0	0	0	0	0	0
20	38-11 x WF9	1	2	2	1	1	1.4
21	38-11 x B2	0	0	0	1	1	.4
22	P8 x L304A	13	9	16	7	5	10.0
23	P8 x K230	1	3	8	4	0	3.2
24	P8 x L317	0	0	1	0	0	.2
25	P8 x Hy	1	0	0	1	0	.4
26	P8 x WF9	10	14	13	12	11	12.0
27	P8 x B2	1	2	1	5	4	2.6
28	P8 x 38-11	1	4	0	7	1	2.6
29	Ohio W10	0	5	2	0	2	1.8
30	OhO7 x K230	3	0	0	2	0	1.0

[1]Difference in means required for significance at 5 percent level = 3.98.

TABLE 3.--Plants with Aphid Colonies -- Midseason Single-cross Test -- 45 entries, 2 x 10 hill plots, Replicated 5 times -- Planted May 9, Record taken August 22. Van Wert -- 1946.--Continued

Entry	Pedigree	R1	R2	R3	R4	R5	Mean
31	OhO7 x L317	0	0	0	0	0	0
32	OhO7 x Hy	0	1	0	0	0	.2
33	OhO7 x WF9	9	1	2	2	3	3.4
34	OhO7 x B2	0	0	0	0	0	0
35	OhO7 x 38-11	1	0	0	3	3	1.4
36	OhO7 x P8	7	0	2	1	2	2.4
37	N6 x 304A	8	3	3	8	3	5.0
38	N6 x K230	21	24	19	13	11	17.6
39	N6 x L317	0	0	0	0	1	.2
40	N6 x Hy	12	6	4	7	2	6.2
41	N6 x WF9	25	19	20	11	7	16.4
42	N6 x B2	13	8	22	11	4	11.6
43	N6 x 38-11	7	1	2	4	2	3.2
44	N6 x P8	14	7	14	13	13	12.2
45	N6 x OhO7	3	7	3	6	5	4.8

[1]Difference in means required for significance at 5 percent level = 3.98.

TABLE 4. –Mean number of plants with aphid colonies for all single-cross combinations. Midseason single-cross test. Van Wert – 1946.

	L304A	K230	L317	Hy	WF9	B2	38-11	P8	07	N6
L304A			0	0	10.2	8.4	2.4	10.0		5.0
K230			0	1.4	6.6	7.4	3.8	3.2	1.0	17.6
L317	0	0		0	.4	0	.4	.2	0	.2
Hy	0	1.4	0		2.4	0	0	.4	.2	6.2
WF9	10.2	6.6	.4	2.4		1.4	1.4	12.0	3.4	16.4
B2	8.4	7.4	0	0	1.4		.4	2.6	0	11.8
38-11	2.4	3.8	.4	0	1.4	.4		2.6	1.4	3.2
P8	10.0	3.2	.2	.4	12.0	2.6	2.6		2.4	12.2
07		1.0	0	.2	3.4	0	1.4	2.4		4.8
N6	5.0	17.6	.2	6.2	16.4	11.8	3.2	12.2	4.8	
Ave.	5.14	5.13	.13	1.18	6.02	3.56	1.73	5.07	1.65	8.60

TABLE 5.—Percent aphid infestation, hybrid corn test, Wooster, 1943.

Hybrid	Pedigree	R1	R2	R3	R4	R5	Mean*
US 13	(WF9 x 38-11)(Hy x L317)	8	6	11	12	7	8.8
M.34	(51 x 26)(40B x 02)	11	20	6	15	18	14.0
Pfister 280		21	20	22	23	19	21.0
Experimental	(WF9 x 07)(51A x 40B)	7	11	8	11	19	11.2
Experimental	(07 x 159L1)(38-11 x L317)	4	9	1	0	5	3.8
Pfister 4817		15	15	14	13	6	12.6
Iowa 4316	(I205 x L289)(WF9 x M14)	8	16	20	44	31	23.8
DeKalb 450		29	23	28	20	18	23.6
C 12	(WF9 x 07) (Hy x L317)	10	9	4	17	16	11.2
M 20	(15 x 26) (33 x 40B)	1	7	6	13	5	6.4
Experimental	(040B x 04) (28 x 28A)	6	11	5	4	21	9.4
Iowa 4297	(I205 x WF9) (187-2 x M14)	26	32	28	30	30	29.2
Experimental	(33 x 40B) 51A	3	2	2	0	1	1.6
W. Va. B 17	(Ldgk x WF9) (5 x 7)	1	1	6	5	9	4.4
Experimental	(051A x 61-67)(40B x 07)	5	2	2	2	10	4.2

*A difference in means of 10.4 required for significance at 19 to 1 odds.

TABLE 5. —Percent aphid infestation, hybrid corn test, Wooster, 1943. — Continued

Hybrid	Pedigree	R1	R2	R3	R4	R5	Mean*
Experimental	(40B x cc28) (051A x 028)	0	0	1	3	0	.8
Experimental	(38-11 x 15-6) (07 x 03)	16	21	10	11	18	15.2
Pioneer 314		0	7	5	4	8	4.8
Pioneer 317		7	8	8	11	23	11.4
Pioneer 330		9	7	9	4	5	6.8
Experimental	(051A x 28) (40B x 187-2) B	8	3	6	2	2	4.2
W. Va. B 12	(1205 x L289) (7 x OS420)	18	32	42	3	15	22.0
Cook		8	4	20	24	4	12.0
Pfister 360		20	11	19	15	35	20.0
Experimental	(40B x 04) (CC5R x CC5R)	0	10	2	5	5	4.4
Experimental	(028 x 40B) (51A x WF9)	3	4	3	3	4	3.4
DeKalb 404A		4	0	8	21	33	13.2
W 36	(51A x WF9) (40B x 02)	23	21	18	41	33	27.2
K 24	(51A x WF9) (33 x 40B)	0	8	10	7	5	6.0
C 38	(WF9 x Hy) (40B x 02)	10	25	4	50	40	25.8

*A difference in means of 10.4 required for significance at 19 to 1 odds.

TABLE 6.--Corn leaf aphid infestations on 27 three-way crosses involving the common female parent Oh26D x Oh26A -- Wooster, Ohio -- 2 x 10 hill plots, planted May 24, 1957. Record taken August 25.

Entry	Pedigree	R1	R2	R3	R4	Total	Mean[1]	Percent Infestation
1	(Oh26D x Oh26A) x Pa54	22	21	9	10	62	15.5	26.3
2	(Oh26D x Oh26A) x A257	10	12	13	10	45	11.2	19.0
3	(Oh26D x Oh26A) x A297	12	14	13	5	44	11.0	18.4
4	(Oh26D x Oh26A) x W64A	10	13	16	2	41	10.2	17.6
5	(Oh26D x Oh26A) x WF9	8	10	8	12	38	9.5	15.9
6	(Oh26D x Oh26A) x Oh5	11	9	10	7	37	9.2	15.6
7	(Oh26D x Oh26A) x W126	6	11	9	10	36	9.0	17.5
8	(Oh26D x Oh26A) x A73	13	7	5	11	36	9.0	15.4
9	(Oh26D x Oh26A) x B14	8	5	6	16	35	8.8	15.4
10	(Oh26D x Oh26A) x M14	8	5	11	19	43	10.8	13.9
11	(Oh26D x Oh26A) x Oh65	9	3	15	2	29	7.2	13.9
12	(Oh26D x Oh26A) x Oh28	8	9	4	9	30	7.5	12.9
13	(Oh26D x Oh26A) x A296	9	6	7	8	30	7.5	12.8

[1]Difference in means required for significance at 5 percent level = 4.78.

TABLE 6.–Corn leaf aphid infestations on 27 three-way crosses involving the common female parent Oh26D x Oh26A – Wooster, Ohio – 2 x 10 hill plots, planted May 24, 1957. Record taken August 25. – Continued

Entry	Pedigree	R1	R2	R3	R4	Total	Mean[1]	Percent Infestation
14	(Oh26D x Oh26A) x 401	2	8	10	3	23	5.8	12.8
15	(Oh26D x Oh26A) x Oh7K	9	7	4	7	27	6.8	11.3
16	(Oh26D x Oh26A) x Oh56A	3	7	6	8	24	6.0	10.1
17	(Oh26D x Oh26A) x W10	5	7	6	5	23	5.8	9.7
18	(Oh26D x Oh26A) x 427	2	10	4	3	19	4.8	8.0
19	(Oh26D x Oh26A) x Oh32	5	5	2	6	18	4.5	7.5
20	(Oh26D x Oh26A) x Pa32C	5	5	2	6	18	4.5	7.5
21	(Oh26D x Oh26A) x Pa70	5	6	1	4	16	4.0	6.8
22	(Oh26D x Oh26A) x W22	2	3	6	3	14	3.5	5.9
23	(Oh26D x Oh26A) x A568	5	8	0	0	13	3.2	5.9
24	(Oh26D x Oh26A) x W182-D	2	4	0	0	6	1.5	2.5
25	(Oh26D x Oh26A) x B8	0	3	1	1	5	1.2	2.1
26	(Oh26D x Oh26A) x Pa32	0	0	2	1	3	0.8	1.3
27	(Oh26D x Oh26A) x Oh43	1	0	0	1	2	0.5	0.8

[1]Difference in means required for significance at 5 percent level = 4.78.

TABLE 7.—Corn leaf aphid infestation on miscellaneous Ohio hybrids and experimental three-and four-way crosses, Wooster, Ohio. 2 x 10 hill plots, planted May 24, 1957. Record date August 25.

Pedigree	No. aphid colonies				Mean	Percent Infestation
	R1	R2	R3	R4		
(Oh28 x Oh43) (B14 x WF9)	20	19	4	0	10.8	18.0
(M14 x 187-2) (Oh26A x Oh26D)	18	11	3	6	9.5	15.8
Ohio K62	13	3	15	6	9.3	15.5
(Oh28 x Oh29) M14 x Oh5)	18	2	5	5	7.5	12.5
(Oh26A x Oh26D) (Oh51A x Oh26F)	11	6	4	7	7.0	11.7
Ohio M53	6	4	7	5	5.5	9.2
(Oh28 x Oh29) (M14 x 187-2)	8	6	7	1	5.5	9.2
(Oh45 x Oh5) x Oh43	7	2	1	1	2.8	4.7
Ohio C54	3	0	2	2	1.8	3.0
(Oh45 x Oh29) x Oh43	3	1	1	1	1.5	2.5
Ohio W64	2	0	0	1	.8	1.3
(Oh45 x C103) x Oh43	0	1	1	0	.5	.8

TABLE 8.—Corn leaf aphid infestations on three-way crosses involving 19 inbred lines in combination with two common pollinators. Wooster, Ohio. 2 x 10 hill plots, planted May 25, 1957. Record taken August 25.

Female Parent	Male Parent: WF9 x M14 R1	R2	Mean[2]	Percent Infestation	WF9 x Oh51A[1] R1	R2	Mean[1]	Percent Infestation
W202	12	8	10.0	16.8	5	3	4.0	6.8
A257	12	3	7.5	12.6	7	3	5.0	8.4
Oh26D	8	3	5.5	9.2	2	1	1.5	2.6
A569	4	3	3.5	5.9	1	0	0.5	0.8
B47	4	3	3.5	5.9	0	1	0.5	0.8
W136A	5	1	3.0	5.1	7	1	4.0	6.8
A296	3	3	3.0	5.1	0	0	0.0	0.0
R172	4	1	2.5	4.3	0	0	0.0	0.0
R165	3	2	2.5	4.2	0	1	0.5	0.8
A568	2	3	2.5	4.2	0	0	0.0	0.0

[1]WF9 x Oh51A singlecross included in this test had 1.7 percent of plants infested.

[2]Difference in means required for significance at 5 percent level = 3.40.

TABLE 8.–Corn leaf aphid infestations on three-way crosses involving 19 inbred lines in combination with common pollinators. Wooster, Ohio. 2 x 10 hill plots, planted May 25, 1957. Record taken August 25.–Continued

Female Parent	Male Parent: WF9 x M14 R1	R2	Mean[2]	Percent Infestation	Male Parent: WF9 x Oh51A[1] R1	R2	Mean[1]	Percent Infestation
MS111	5	0	2.5	4.2	0	1	0.5	0.8
MS121	3	2	2.5	4.2	1	2	1.5	2.5
MS126	4	1	2.5	4.2	4	1	2.5	4.1
R168	2	0	1.0	1.7	0	0	0.0	0.0
MS109	1	1	1.0	1.7	0	0	0.0	0.0
Ia 24-3-1-2-1-2	2	0	1.0	1.7	0	0	0.0	0.0
Ia 6-2-2-1	2	0	1.0	1.7	1	4	2.5	4.2
W20R	1	0	0.5	0.8	0	0	0.0	0.0
MS125	0	1	0.5	0.8	0	0	0.0	0.0
			Average	4.96				2.03

[1]WF9 x Oh51A singlecross included in this test had 1.7 percent of plants infested.

[2]Difference in means required for significance at 5 percent level = 3.40.

TABLE 9.--Corn leaf aphid infestations on 37 three-way crosses involving two common pollinators. Columbus, Ohio. 2 x 10 hill plots, planted May 10, 1957. Record date August 29.

Female Parent	Male Parent: WF9 x 38-11 R1	R2	Mean[1]	Percent Infestation	WF9 x Hy R1	R2	Mean[1]	Percent Infestation
Mo11662	17	16	16.5	34.4	19	9	14.0	25.5
R166	14	19	16.5	32.7	4	17	10.5	18.6
R113	19	8	13.5	30.3	3	2	2.5	4.5
R168	14	18	16.0	29.4	10	5	7.5	13.2
CI31A	10	8	9.0	27.3	4	4	4.0	6.6
K800	10	9	9.5	18.3	18	9	13.5	24.3
R154	12	7	9.5	17.4	1	7	4.0	7.2
Oh3F	6	7	6.5	13.8	5	9	7.0	11.9
Oh4G	9	8	8.5	13.8	25	14	19.5	34.2
Oh7N	9	4	6.5	11.8	5	4	4.5	8.0
Mo11276	5	9	7.0	11.6	14	3	8.5	14.3

Tester Parents: WF9 x 38-11 18.9 percent infested
Tester Parents; WF9 x Hy 5.6 percent infested

[1]Difference in means required for significance at 5 percent level = 8.22.

TABLE 9.--Corn leaf aphid infestations on 37 three-way crosses involving two common pollinators. Columbus, Ohio. 2 x 10 hill plots, planted May 10, 1957. Record date August 29.--Continued

Female Parent	Male Parent: WF9 x 38-11 R1	R2	Mean[1]	Percent Infestation	Male Parent: WF9 x Hy R1	R2	Mean[1]	Percent Infestation
B44	1	11	6.0	11.4	3	3	3.0	5.0
R154	5	6	5.5	9.9	8	0	4.0	7.0
R153	7	1	4.0	7.0	15	5	10.0	17.1
K799	3	1	2.0	3.6	5	5	5.0	8.8
U. S. 13	7	6	6.5	11.7				
Hy	2	2	2.0	3.9				
Oh7K					16	14	15.0	25.6
Oh7P					12	5	8.5	16.2
L317					8	1	4.5	8.5
Oh3C					5	4	4.5	8.3
38-11					4	4	4.0	7.3

Tester Parents: WF9 x 38-11 18.9 percent infested
Tester Parents: WF9 x Hy 5.6 percent infested

[1]Difference in means required for significance at 5 percent level = 8.22.

This page intentionally blank.

This page intentionally blank.