

REACTION OF HYBRIDS AND STRAINS OF CORN TO VIRUS
DISEASE IN BRACKEN AND LEWIS COUNTIES, KENTUCKY
1964

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Three groups of material were grown in the Ohio River bottom in Bracken and Lewis counties and evaluated for reaction to the virus disease complex in 1964. The virus(s) were present at both locations in 1963 and 1964 and caused severe losses.

Commercially available hybrids entered in the 1964 Kentucky Hybrid Corn Performance Test were compared in three replications per location. Established inbred lines and S_4 lines derived from Corn Belt X Mexican crosses were also grown in two replications at each location. Segregating breeding populations involving germ plasm from the Corn Belt crossed to other sources, including several Mexican sources, were grown in 10-row 350-plant populations.

The tests, located on the Gerhard Brothers farm in Bracken county and the Alex Waters, Jr. farm in Lewis county, were planted on May 19 and 20, respectively. Plants did not develop normally during the early part of the growing season because of lack of moisture and competition from Johnsongrass. This complicated the evaluation of reaction to the virus disease complex.

First symptoms indicating virus infection in plants were noted July 10, seven weeks after planting. No symptoms were observed on June 23.

A scale of 1 to 9 was used in rating plants, with 1 indicating no symptoms of the virus and 9 indicating complete susceptibility. Plants in the segregating breeding populations were rated on an individual plant basis and in the replicated material on a plot basis. Observations on reaction to the virus were made August 21 and on the S_4 and established inbred lines and on August 25 and 26 on the remainder of the tests. A high degree of association between ratings made independently by Loeffel and Shane on

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the commercially available hybrids was shown by a correlation coefficient of 0.87 for Bracken county and 0.85 for Lewis county. The correlation coefficient for ratings between counties was 0.51.

The distribution of hybrids grouped by visual rating classes are presented in Table 2. The combined rating and the rating from individual locations for each hybrid are presented in Table 1. Percentage of plants infected and visual ratings of the inbred lines are presented in Table 3. Visual ratings of S_4 and established inbred lines are given in Tables 4 and 5 and show the distribution of plants by class on a plant and percentage basis, respectively. These ratings indicate that S_4 lines ranging from a high degree of tolerance to complete susceptibility may be obtained from a given breeding population not previously selected for reaction to the virus complex.

Plants in the segregating breeding populations were rated on an individual plant basis on August 25. The material and the percentage of infection present on July 21 are given in Table 6. Progeny from approximately 750 selfed plants from these populations will be grown in 1965 to determine parent-progeny relationships.

The results presented in this report should be treated with caution since they were obtained from only one year's observation. Differences in the rating of certain hybrid entries between locations suggest that additional information is needed before definite conclusions can be made. Data from replicated yield trials conducted in virus infected areas are needed, as well as visual injury ratings, to assess fully the reaction of specific genotypes to the virus complex.

Table 1. - Visual Rating of Corn Virus Reaction of Commercially Available Hybrids
 Evaluated in Bracken and Lewis Counties of Kentucky in 1964. ^{1/}

Hybrid	Endosperm Color	Average	Bracken County	Lewis County
Pioneer 511W	W	2.5	2.7	2.3
Princeton 790-AA	W	2.7	2.0	3.3
Ky 105	Y	3.0	2.0	4.0
Stull 800W	W	3.0	2.7	3.3
PAG SX19	Y	3.2	3.3	3.0
PAG SX29	Y	3.2	1.7	4.7
S.S. Catawba	Y	3.3	1.3	5.3
Stull 400W	W	3.4	2.7	4.0
Hagan H-9	Y	3.5	3.7	3.3
Pioneer 509W	W	3.5	2.3	4.7
DeKalb XL-385	Y	3.7	4.0	3.3
Princeton 890-AA	Y	3.7	3.3	4.0
DeKalb 1006	Y	3.8	3.3	4.3
Ken-Bred F20W	W	3.8	4.3	3.3
PAG SX59	Y	3.9	2.0	5.7
Hagan H-2	W	4.0	4.3	3.7
Ky 5921W	W	4.0	4.0	4.0
AES 809	Y	4.2	2.7	5.7
Princeton 990-A	W	4.2	4.0	4.3
Stull 444W	W	4.2	3.7	4.7
S.S. 909E	Y	4.3	5.3	3.3
S.S. 979		4.3	4.3	4.3
Meacham M-33YB	Y	4.4	4.0	4.7
Pioneer 309AA	Y	4.5	3.0	6.0
Pioneer X-2280	Y	4.5	6.0	3.0
Kamp 913 BRK	W	4.7	5.7	3.7
Stull 101YB	Y	4.8	4.3	5.3
PAG SX63	Y	4.9	4.7	5.0
S.S. 860		5.0	4.3	5.7
Stull 807YA	Y	5.0	6.0	4.0
Crib Filler 183W	W	5.2	5.0	5.3
Meacham MX-50	W	5.2	5.0	5.3
Pioneer 3304	Y	5.2	4.7	5.7
Schenks-96W	W	5.2	4.7	5.7
S.S. Matoaka	Y	5.2	5.0	5.3
Ky 5901W	W	5.3	5.0	5.7
PAG 437	Y	5.4	5.0	5.7
Crib Filler 66	Y	5.5	5.0	6.0
DeKalb XL-390	W	5.7	6.0	5.3
Kamp 910B	W	5.7	5.3	6.0
Pioneer 310	Y	5.7	6.0	5.3
S.S. Munsee	Y	5.7	6.3	5.0

(Continued)

Table 1. - Continued

<u>Hybrid</u>	<u>Endosperm Color</u>	<u>Average</u>	<u>Bracken County</u>	<u>Lewis County</u>
DeKalb 633	Y	5.8	7.3	4.3
Schenk S-73A	Y	5.8	6.3	5.3
Ky 6001	Y	5.9	6.0	5.7
Pioneer 312A	Y	5.9	6.7	5.0
Hilligoss 9X3L	Y	6.0	6.0	6.0
Princeton 888-A	Y	6.0	6.0	6.0
S.S. 820S	Y	6.0	5.7	6.3
Crib Filler 55	Y	6.2	5.7	6.7
Dixie's 99-Y	Y	6.2	6.0	6.3
Hilligoss 84M	Y	6.2	6.7	5.7
Ken-Bred E-20YA	Y	6.2	7.0	5.3
Meacham MX-30	Y	6.2	6.7	5.7
Princeton SX-800	Y	6.2	5.7	6.7
Stull 807Y	Y	6.2	6.0	6.3
DeKalb 824	Y	6.3	7.3	5.3
Crib Filler 123	Y	6.4	7.7	5.0
Ken-Bred Sx20Y	Y	6.4	5.7	7.0
Princeton 8-A	Y	6.4	8.0	4.7
Crib Filler 78	Y	6.5	6.0	7.0
DeKalb 640Y	Y	6.5	6.3	6.7
Princeton 8-X	Y	6.5	6.0	7.0
DeKalb 805	Y	6.7	6.7	6.7
DeKalb XL65	Y	6.8	7.3	6.3
Stull 100YB	Y	6.9	6.7	7.0
Princeton 840-A	Y	7.0	7.7	6.3
SS. 755		7.0	6.7	7.3
Pioneer 321	Y	7.2	8.0	6.3
U.S. 523W	W	7.2	7.0	7.3
Meacham M-5	W	7.4	7.0	7.7
Schenk S-73	Y	7.4	7.0	7.7

$\frac{1}{2}$ 1 = No injury, 9 = Very susceptible

Table 2. - Corn Virus Visual Ratings, Commercial Hybrids

<u>Av. Rating Range</u>	<u>Number of Hybrids</u>
2.0 - 2.9	2
3.0 - 3.9	13
4.0 - 4.9	13
5.0 - 5.9	18
6.0 - 6.9	20
7.0 - 7.9	6

Table 3. - Virus Reaction of Inbred Lines Evaluated in Kentucky in 1964

Inbred	% Infection	Visual Rating ^{1/}
H 49	40	3.5
H 55	100	8.0
B 37	100	4.5
CI 21 E	0	1.0
C 103	80	4.0
Ky 36-11	100	9.0
Ky 59-3445-1	100	6.0
Ky 59-3613	100	9.0
Ky 59-3617	80	1.0 to 9.0 Segregating
Oh 7 A	17	
Ky 201	100	7.0
Ky 211	75	7.5
Ky 216	91	7.0
Ky 217	22	4.0
Ky 218	100	8.0
Ky 219	62	5.5
Ky 62-2488	100	8.5
F 163	100	8.0
CI 64	100	8.0
CI 66	37	4.5

^{1/} 1 = No injury, 9 = Complete susceptibility

Table 4. - Corn Virus Visual Rating

Material	No.	<u>1.0</u>	<u>2.1</u>	<u>3.1</u>	<u>4.1</u>	<u>5.1</u>	<u>6.1</u>	<u>7.1</u>	<u>8.1</u>	
		2.0	3.0	4.0	5.0	6.0	7.0	8.0	9.0	
N. C. Ia. D. D. C. X										
Cuba 38 #3 S ₄	52	8	4	5	12	8	6	6	3	
S. L. P. 20 #3 S ₄	36	6	6	3	5	7	5	4	-	
Coah 8 #3 S ₄	10	3	1	4	-	-	1	1	-	
Tamps 3 #3 S ₃	2	1	-	-	-	-	-	-	1	
Ver 15 #3 S ₄	4	1	1	1	-	1	-	-	-	
T 2 #3 S ₃	3	1	-	1	-	1	-	-	-	
Inbreds	20	2	-	3	2	3	2	5	3	

Table 5. - Percentage of Infection

Material	No.	<u>0</u>	<u>11</u>	<u>21</u>	<u>31</u>	<u>41</u>	<u>51</u>	<u>61</u>	<u>71</u>	<u>81</u>	<u>91</u>
		10	20	30	40	50	60	70	80	90	100
N. C. Ia. D. D. C. X											
Cuba 38 #3 S ₄	52	4	3	3	1	7	3	3	7	8	13
S. L. P. 20 #3 S ₄	36	5	2	3	1	3	2	2	2	5	11
Coah 8 #3 S ₄	10	3	-	-	-	2	-	-	2	-	3
Tamps 3 #3 S ₃	2	1	-	-	-	-	-	-	-	-	1
Ver 15 #3 S ₄	4	1	-	-	-	-	-	-	1	-	2
T 2 #3 S ₃	3	-	-	-	-	-	-	1	-	-	2
Inbreds	20	1	1	1	1	1	-	1	3	-	11

Table 6. - Segregating Breeding Populations, Bracken County. 1964

Material	Infection July 21 %
Gourd Seed x Salzers White Flint #3 gen	21
Gourd Seed x Mandan White Flint #3 gen	70
Gourd Seed x Longfellow Flint #3 gen	39
Composite of USDA So. African Syn x A188, A305, A308, A312 #3 gen	19
Composite of Neal Paymaster x A188, A305, A308, A312 #3 gen	28
Lancaster x Mexican Synthetic (White Composite) #3 gen	22
Lancaster x Mexican Synthetic (Yellow Composite) #3 gen	14
Lancaster Stalk Rot x S. C. Composite White (X) #3 gen	41
USDA Blight Resistant Synthetic (X) #3 gen	24
N. C. Ia. D. D. C. x Coah #3 gen (X) #1 gen X #2 gen	14
N. C. Ia. D. D. C. x Ver 15 #3 gen (X) #1 gen X #2 gen	21
N. C. Ia. D. D. C. x Tamps 3 #3 gen (X) #2 gen	9