VALUE OF CORN POLLEN FROM SUCKERS vs. FROM MAIN STALKS.

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The object of this paper is to present the results of an experiment performed for the purpose of throwing light upon the question as to whether the pollen from tillers, or suckers, in a corn field has a detrimental effect or whether it is as valuable as the pollen produced by the main stalks. Many advocate detasseling the suckers but no one has demonstrated the advisability of so doing.

The experiment was begun in 1903 by planting seed from one ear of Blount Prolific, a white dent variety that produces from one to four ears per stalk. This prolific variety was chosen so that several ears could be obtained from the same mother plant, thus overcoming to some degree the variation of individuals regarding production. The experiment was conducted by means of hand-pollinated ears, notes being kept of the characters of the two parents of each hand-pollinated ear. The comparative value of pollen from suckers and pollen from main stalks is obtained by testing the producing power of the seed ears fertilized with pollen from these two sources. If the ears fertilized with pollen from the main stalks produce better when planted than ears fertilized with pollen from suckers, the conclusion could be drawn that suckers should be detasseled in the seed patch before they discharge pollen.

The chosen parent stalks were numbered and the suckers were designated by the same number as that of the stalk on which the sucker grew. In cases where a stalk possessed more than one sucker, as for example stalk 4, the largest sucker was designated as sucker 4¹, the second largest sucker 4², etc. All the suckers used in this experiment branched from the main stalk at the ground or slightly below the surface of the ground. They attained a height of from 7 to 9 feet, being but one or two feet less than that of the main stalks. Stalks were chosen that possessed one or more suckers and two or more ear shoots. The majority of the stalks used produced three ears. The highest ear on each stalk is designated as "upper ear," the ear immediately below it as "second ear," the one immediately below the second as "third ear," etc.

The experiment was so planned as to have the parentage of the contrasted ears identical. The plan will be explained by taking stalk 1 and stalk 5 as an example. The upper ear of stalk 1 was pollinated with pollen from sucker 5, the second ear with pollen from stalk 5 and the third ear with pollen from sucker 5. In cases where it was possible, reciprocals were produced as follows: The upper ear of stalk 5 was pollinated with pollen from stalk 1, the second ear with pollen from sucker 1 and the third ear with pollen from stalk 1. This practice of placing the pollen from the main stalks on the upper shoots in half of the cases and the pollen from suckers on the upper shoots in the other instances was followed in order to equalize the results, should upper ears be found to be better producers than other ears of the same parentage.

If it could have been taken for granted that all the ears from a stalk when fertilized with pollen from one source would produce equally well, the experiment would have been simplified. In view of the opinions advanced in favor of upper ears for seed purposes, the precautionary methods above referred to were pursued so that the results would average correctly should there appear any difference in producing power between the upper and other ears when parentage was identical. By bringing together in a comparative manner the producing power of upper, second, and third ears as in Table I, we get the suggestion that, when parentage is the same, the producing power of the several ears of a stalk is equal. At least this experiment shows the producing power of "upper ears" and "third ears" to be equal. Whether the poorer production of the "second ears" is accidental and due to the small number of ears tested or whether it be true that "second ears" do not produce as well as "upper ears" and "third ears," should be proved by further experimentation.

TABLE I.—Comparison of power to produce of upper, second and third ears.
[Production given in pounds of ear corn.]

Upper Ears.			Second Ears.			Third Ears.		
Per stalk.	Per row	Calculated to a perfect stand.	Per stalk.	Per row.	Calculated to a perfect stand.	Per stalk.	Per row.	Calculated to a perfect stand.
Pound.	Pounds.	Pounds.	Pound.	Pounds.	Pounds.	Pound.	Pounds.	Pounds.
.796	156	161	.784	160	156	.856	160	159
.660	107	105	.651	110	108	.673	113	108
.876	148	138	.656	105	111	.811	137	125
.605	124	122	.660	124	117			
.701	122	113	.525	95	89	.694	125	114
.614	110	104	.630	102	102	.656	103	107
.759	123	112	.646	104	97			
.640	112	105	.640	119	112			
.584	129	126	.606	146	142	.580	138	125
.702	134	127	.582	92	102			
.636	103	100	.670	126	121	.628	86	137
.755	105	120	690	118	112			
.817	152	140				771	145	141
.715	123	111	.728	126	112			
.630	102	98	.567	102	97			
.719	125	113	.653	113	103	.675	104	95
.729	124	114	.742	121	115	.705	122	112
Average. 7022	123.47	118.2	.6481	116.44	112.25	.7049	123.3	119.3

On each horizontal line of the table is shown the production from the various seed ears that grew on the stalk. Thus, in the first line of figures, on the left, is given the performance of the "upper ear," in the middle, the performance of the "second ear," and on the right the performance of the "third ear." The male parentage of the three ears is the same; *i. e.*, the pollen used in fertilizing the "upper ear" came from the same plant as the pollen used in fertilizing the "second ear" and the "third ear." In no case was an ear fertilized with pollen from the stalk on which the ear grew. The parentage, therefore, of the three ears is identical, and, as they were planted on uniform soil, in adjacent rows, all of equal length—205 feet, it is a good test of their power to produce.

The column showing production "per row" gives the number of pounds of ears produced by each seed ear, and the column showing production "calculated to a perfect stand" gives the yield calculated to a perfect stand of 2½ stalks per hill at the time the corn was but one foot tall and before it had put forth any suckers. By this method of calculating it is seen that the rows that suckered most, might be expected to yield more, because some of the suckers produce ears. The column showing production "per stalk" gives the average fractional pounds of ear corn produced per stalk, suckers being included as stalks. In this column the rows that sucker most will show to a disadvantage since suckers do not produce as heavily as main stalks.

The corn was planted by hand, 3 kernels per hill in rows 3.3 feet apart each way. The germination was good and uniform so that the entire plat gave an average stand of 2.54 plants per hill, June 14, and 2.97 stalks per hill at harvest time. No row varied greatly from a stand of 2½ plants per hill consequently no plants were given much advantage by having a greater amount of space; neither was the yield reduced in any row because of too thick a stand. The production calculated to a perfect stand of 2½ stalks per hill varies but little from the actual production.

TABLE 2.—The producing power of ears fertilized with pollen from suckers compared with that of ears fertilized with pollen from main stalks.

Seed fertilized with pollen from suckers.				Seed fertilized with pollen from main stalk.			
Per stalk.	Per row.	Calculated to a perfect stand.	Suckers per row.	Per stalk.	Per row.	Calculated to a perfect stand.	Suckers per row.
<i>Pound.</i>	<i>Pounds.</i>	<i>Pounds.</i>		<i>Pound.</i>	<i>Pounds.</i>	<i>Pounds.</i>	
.796	156	161	46	.784	160	156	45
.660	107	105	4	.856	160	159	31
.876	148	138	3	.651	110	108	12
.811	137	125	0				
.605	124	122	48	.656	105	111	13
.701	122	113	7	.600	124	117	42
.614	110	104	15	.525	95	89	16
.656	103	107	8				
.646	104	97	0	.630	102	102	8
.640	119	112	21	.759	123	112	0
.584	129	126	62	.640	112	105	10
.580	138	125	67				
.702	134	127	27	.606	146	142	81
.636	103	100	2	.582	92	102	19
.628	86	107	13				
.690	118	112	8	.670	126	121	27
				.755	105	120	3
Averages .676	121.1	117.6	20.7	.670	120	118.7	23.6
Average per cent of suckers				Average per cent of suckers			
Average number stalks per row in fall				Avg. number stks. per row			
11.5				13.2			
179.9				179.5			

ear and also having the same male parentage, the difference being that the pollen that fertilized the two ears was produced by the main stalk and not by its sucker, as in case of the other ear.

The averages indicate that the pollen from a sucker is identical with that from the main stalk producing the sucker. In other words this small experiment indicates that if pollen is to be taken from a particular plant for breeding purposes, it matters not whether it be taken from the main stalk or from its sucker. The table shows that ears fertilized with pollen from suckers produced as well as ears fertilized with pollen from main stalks and did not produce any more. Of the progeny of the ears fertilized with pollen from suckers 11½ per cent were suckers and of the progeny of the ears fertilized with pollen from main stalks 13½ per cent were suckers. The stand of stalks in the fall in the alternating rows in which these two classes of seed ears were planted was equal.

As previously explained, both parents of the seed ears used in this experiment possessed one or more suckers. The progeny possessed 14½ per cent of suckers, or of every 100 stalks 14 were suckers. For comparison there were planted at one side of the plat occupied by the above experiment, 11 hand-pollinated ears neither parent of which possessed any suckers. These 11 seed ears were of the same variety and also progeny of the one ear planted in 1903. The progeny of these 11 ears possessed but 2½ per cent of suckers. While these 11 rows did not alternate with the others, they occupied the same kind of soil and were similarly treated. It is therefore safe to say that the great increase of suckers in the main plat is due to one year's breeding from parents possessing suckers.

TABLE 3.—*Progeny of 42 seed ears, the parents of which possessed suckers compared with progeny of 11 seed ears, the parents of which possessed no suckers.*

	Parent stalks possessing suckers,	Parent stalks possessing no suckers.
Average number of stalks per hill June 14	2.54	2.7
Average number of stalks per hill in the fall	2.97	2.77
Per cent of suckers	14.5	2.5
Yield in pounds of ear corn per row	125.4	112.3
Yield calculated to a perfect stand June 14	122.8	103.4
Average pounds of ears produced per stalk	.674	.686

As there were but 11 ears whose parents possessed no suckers and as the rows in which they were planted did not alternate with the other rows, they do not give a very reliable comparison regarding productiveness. The rather thin stand of plants in the rich soil on which the tests were made gave the rows that produced suckers a good opportunity to produce the greater number of pounds of ears.

The results of this one small experiment indicate: (1) That the various ears produced by a stalk are of equal value for seed; (2) that the pollen from the tassel of a sucker possesses all the value possessed by the pollen of the stalk that produces the sucker; (3) that the tendency to form suckers is hereditary and can be controlled by breeding.