FURTHER EVIDENCE ON THE FACTOR FOR BITTERNESS IN THE SWEET ALMOND

MYER J. HEPPNER

Division of Pomology, University of California, Davis, California

Received June 29, 1926

In the July 1923 issue of GENETICS in an article entitled "The Factor for Bitterness in the Sweet Almond," the writer presented data from an almond breeding experiment started in 1916 which seemed to show that as far as their genetic constitution for bitterness and sweetness is concerned, all varieties of sweet almonds are hybrids. This assumption was based on the fact that out of 243 seedlings derived by crossing different varieties of sweet almonds which came into bearing in 1922, 184 possessed sweet nuts and 59 possessed bitter nuts, or in terms of four in the ratio of 3.028 : 0.972, a very close approximation to the theoretical Mendelian monohybrid ratio of 3 : 1.

Since the report referred to above was first made, 480 additional trees have come into bearing so that at the present time data are available from a total of 723 trees. The following table shows the crosses made and the number of trees bearing sweet or bitter nuts in each cross:

	Cross	Sweet trees	Bitter trees
Lewelling	× IXL	21	4
California Paper Shell	× Nonpareil	20	5
Ne Plus Ultra	× Drake	2	0
Ne Plus Ultra	× IXL	34	10
Nonpareil	× Peerless	9	4
California Paper Shell	× IXL	4	5
Lewelling	× Ne Plus Ultra	5	3
California Paper Shell	× Ne Plus Ultra	2	1
Reams	× Ne Plus Ultra	5	1
Nonpareil	× California Paper Shell	27	6
Reams	× California Paper Shell	8	0
Nonpareil	× Texas	21	4
Nonpareil	× Ne Plus Ultra	13	8
Drake	× Jordan	7	0
Drake	× Ne Plus Ultra	43	17
Reams	× Nonpareil	4	3
Reams	× IXL	2	2
Languedoc	× Drake	14	7
Reams	× Texas	5	3
Ne Plus Ultra	× Lewelling	29	6
Drake	× IXL	23	5
California Paper Shell	× Jordan	9	0

Ne Plus Ultra	×	Harriott	12	0
Lewelling	×	Nonpareil	4	0
Nonpareil	×	IXL	17	7
I×L	×	Ne Plus Ultra	7	4
King	×	Ne Plus Ultra	10	0
Drake	×	Languedoc	9	1
Nonpareil	×	Drake	13	12
Ne Plus Ultra	×	Nonpareil	17	7
Drake	×	Peerless	19	14
Languedoc	×	Ne Plus Ultra	2	1
Peerless	×	California Paper Shell	1	0
Golden State	×	Sellers	2	0
Drake	×	Texas	25	4
Drake	×	California Paper Shell	51	13
Texas	×	Drake	2	2
California Paper Shell	×	Drake	15	7
Harriott	×	Big White Flat	10	0
Nonpareil	×	Eureka	4	0
Drake	×	Eureka	2	0
Sellers	×	Drake	3	1
Lewelling	×	California Paper Shell	5	3
Ne Plus Ultra	×	California Paper Shell	3	2
I×L	×	Reams	2	1
Languedoc	×	IXL	1	0
			<hr/>	<hr/>
Total			547	176

An examination of the above table shows that there is no uniform outstanding proportion between trees possessing sweet almonds and those possessing bitter almonds in all the crosses. However, when the totals are examined, it will be noticed that there is nearly a perfect 3 : 1 ratio, the actual ratio being 3.108 : 1. It will also be observed that in only one case are there more bitters than sweets; namely, in the California Paper Shell×IXL cross in which 5 trees out of 9 possess bitter nuts. It will also be seen that in some of the crosses no bitter nut bearing trees have appeared.

With the larger population of trees available for study the assumption made in the first report that all sweet almonds are probably heterozygous for sweetness as the dominant character and the factor for bitterness as the recessive seems to be substantiated with the possible exceptions of the case mentioned above and the two crosses having the Harriott as one of the parents, in one case Na Plus Ultra×Harriott and the other Harriott×Big White Flat in neither of which any bitter nut trees appeared. The total of twenty-two individuals in these two crosses, all of which possess sweet nuts is a fairly good indication that Harriott is possibly homozygous for sweetness.