



PRODUCTIVITY OF HETEROSIS IN SELECTED TOMATOES AT RATE

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Annotation

The state presents the results of studies from the study of the use of the phenomena of heterosis in the breeding of early maturing hybrids F1 tomata. Hybrid combinations, promising in terms of complex economically valuable features, have been identified for the conditions of southern Uzbekistan.

Keywords. Heterosis, hybrid, degree of dominance, heterosis effect, ripening amicability, hybrid combinations, inheritance.

The effectiveness of using heterotic F1 hybrids has been proven by scientists around the world in many vegetable crops. The greatest success has been achieved in obtaining heterotic F1 hybrids in cucumber, tomato, pepper, eggplant, pumpkin, cabbage, onion, etc.

An important direction of using heterosis is the creation of heterotic F1 hybrids for open ground, characterized by early maturation, high productivity, and resistance to abiotic factors. In 80% of cases, F1 hybrids show heterosis in productivity and up to 88% in early maturity. F1 hybrids, as a rule, are characterized by cold resistance, high fruit set in unfavorable conditions, and friendly fruit formation and ripening (Kravchenko, 1981).

In order to study the use of the phenomenon of heterosis in the breeding of early maturing F1 hybrids, we carried out special studies.

Material and methods. The research material was 16 hybrids obtained by us from crossing of promising early ripening varieties of tomato.

The studies were carried out according to the Methodological Guidelines for the selection of varieties and hybrids of tomato for open and protected ground (Pivovarov, Dobrutskaya, 1986), the Method of field experiment (Dospekhov, 1985), Methodological requirements for the establishment of experiments (M., 1987).

The effect of heterosis was determined by the formula proposed by Academician A.V. Alpatiev (1981):



$$X = \frac{F_1}{P_{max}} \times 100$$

X - efficiency of heterosis, %

F1 is a hybrid indicator;

Pmax is a measure of the best parent component.

According to this formula, the effect of heterosis is defined as a significant increase in the best parent hybridomas.

The degree of dominance of traits in hybrids was calculated using the DZ formula.

Bruebaker (1966):

$$hp = \frac{X_{F1} - \frac{X_{P1} + X_{P2}}{2}}{\frac{1}{2} (X_{P1} - X_{P2})}, \text{ где}$$

X_{F1}, X_{P1}, X_{P2} - the average value of the features for F1, X_{P1}, X_{P2}, respectively

As you can see from the formula, the degree of dominance can take any value from $-\infty$ to $+\infty$. In this case, the following cases can be observed:

- 1) $-\infty \leq hp < -1$ - negative overdominance;
- 2) $-1 \leq hp < -0.5$ negative dominance;
- 3) $-0.5 < hp < +0.5$ - intermediate inheritance;
- 4) $+0.5 < hp < +1$ - positive dominance;
- 5) $+1 < hp < +\infty$ positive overdominance.

Studies have shown that yield heterosis manifested itself in hybrid combinations Novichok x Perseus, Ion-N x Perseus, VIR-100 x Perseus, Argo x Slava Moldova, Liana x Persei, Dar of the Volga region x Slava x Moldova, Novichok x Glory of Moldova. The aforementioned hybrids in terms of the total yield exceeded the most productive parent by 21.6-33.6 t / ha. The effect of heterosis was 39.6-64.0%, tab. one.

Table 1.

... Manifestation of economically valuable traits in hybrids of the first generation of tomato



Hybrids and their parent forms	Productivity, t / ha		Heterosis effect by		Amicability ripening,%
	General harvest	early harvest	harvest to the general	early harvest,%	
Ion-N	28,7	21,7			76
Liang	63,7	30,5			48
Ground Gribovsky 1180	58,3	24,6			42
Glory to Moldova	54,6	17,1			31
Morning-2	53,8	28,3			53
Perseus	52,5	17,8			34
Shuttle	51,4	18,0			35
Newbie	45,3	17,3			38
VIR - 100	39,9	26,8			67
Argo	37,4	19,9			53
Gift of the Volga region	64,4	26,7			10
Newbie x Perseus	86,1	28,7	164,0	161,2	33
Ion - N x Perseus	80,0	34,2	152,4	157,6	43
Gift of the Volga region x Glory to Moldova	90,8	26,3	141,0	153,8	29
Gift of the Volga region x Newbie	60,4	24,5	93,8	141,6	40
Liana x Ion - N	61,1	32,8	96,2	107,5	54
VIR - 100 x Perseus	78,0	25,8	149,7	96,2	33
Ground Gribovsky 1180 x Liana	77,8	27,6	122,5	90,5	35
Gift of the Volga region x VIR - 100	53,7	22,6	83,4	84,3	42
Ion - N x Argo	45,1	18,7	120,6	82,0	28
Ion - N x VIR - 100	45,9	21,7	115,0	81,0	47
Liana x Perseus	89,5	24,5	140,9	80,3	27
VIR-100 x Dar Zavolzh.	65,6	20,8	101,9	77,6	32
Shuttle x Beginner	63,7	13,5	123,9	75,0	21
Soil Gribovsky 1180 x Morning-2	67,0	18,4	114,9	65,0	28
Morning-2 x Gift of the Volga Region	62,2	13,1	96,8	46,3	21
Newbie x Glory of Moldova	76,2	7,0	139,6	40,5	9

Hybrid combinations Ion-N x Perseus, Novichok x Perseus, VIR - 100 x Perseus, Dar of the Volga region x Glory of Moldova, Ground Gribovsky 1180 x Lyana, Lyana x Ion-N are distinguished by a high early harvest, in which the yield for the first three harvests is 25, 8-34.2 t / ha.

Not all F1 hybrid combinations turned out to be fruitful early ripening. The yield of some of them was at the level of the more productive parent, and some were inferior to the parental forms both in early maturity and in yield. As noted by A.V. Alpatiev (1981), not every hybrid combination is high-yielding or in general practically valuable.

In hybrids of the first generation, characterized by increased productivity and power, positive qualities are manifested only in certain soil and climatic conditions. Therefore, for each specific zone, it is necessary to create hybrid combinations that are most adapted to the conditions of this zone. This is of particular importance in dry subtropics.

According to such an important indicator as ripening amicability, Ion-N, VIR-100, Argo, Liana, Slava Moldova stand out from the parental forms.

According to this indicator, only three combinations of Ion-N x Perseus, Ion-N x VIR-100, Lyana x Ion-N stand out the most, with 43-54% fruit ripeness, tab. 2.

Table 2 The degree of dominance of the amity trait maturation in F1 tomato hybrids

Hybrid combinations	Ripeness,%			Degree of dominance
	P ₁	P ₂	F ₁	
Ion-N xVIR-100	76	67	47	-5,40
Ion-N x Perseus	76	34	43	-0,57
Liana x Ion-N	48	76	54	-0,57

Analysis of the manifestation of the degree of inheritance of fruit ripening amicability in three distinguished F1 tomato hybrids showed a large variability in the degree of dominance of this trait. So, if in the combination Ion-N x VIR-100 according to this feature, negative overdominance was noted, then in the combinations Ion-N x Perseus and Lyana x Ion-N - negative dominance. Despite this, in order to obtain more likely amicably ripening hybrids of F1 tomato, cultivar Ion-N should be used as one of the parental forms.

Table 3 shows the morphobiological characteristics of tomato F1 hybrids.

From the data table. 3, it can be seen that promising tomato hybrids in terms of plant height are included in the group of low and medium-sized. Only the combination Novichok x Perseus (102) stands out with large fruits.

Other studied hybrid combinations turned out to be medium-fruit with a fruit weight of 54 to 89 g. The fruits of the first generation hybrids with the participation of the Slava Moldovy variety turned out to be orange-red, which to some extent reduces their value.

Table 3 Morphobiological characteristics of promising F1 tomato hybrids.

Hybrid combination	Height plants, sm.	fetal characteristics		
		weight, g	coloring	form
Newbie x Perseus	65	102	к.	о.
Liana x Perseus	62	89	к.	о.
Shuttle x Beginner	58	71	к.	о.
Vir- 100 x Perseus	51	66	к.	п.-о.
Ion-N x Perseus	55	64	к.	о.
Newbie x Glory of Moldova	85	63	о.- к.	о.
Gift of the Volga region x Glory to Moldova.	84	60	о.-к.	о.
Soils. Gribovsk. 1180 x Liang	48	54	к.	п.-о.
Argo x Glory of Moldova	56	54	о.- к.	о.

Note: k - red, o-k - orange-red, o-round p-o - flat-round.

In general, in terms of the complex of economically valuable traits, the hybrid combinations of tomato we identified are promising for the conditions of southern Uzbekistan.

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