INHERITANCE OF THE QUANTITY OF GRAINS IN FIRST GENERATION DURUM WHEAT HYBRIDS

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ABSTRACT

In the article, the degree of dominance of parental pairs in the inheritance number of grains in the F₁ hybrid generation was determined and the degree of high index dominance of varieties was suggested for create new varieties of high yield of durum wheat for irrigated areas.
В статье определена степень доминирования родительских пар в наследовании количества зерен в гибридном поколении F₁ и предложена степень доминирования сортов с высоким индексом для создания новых высокоурожайных сортов твердой пшеницы для орошаемых земель.

**Keywords:** Durum wheat, F₁ hybrid generation, hybrid combination, number of main spike, inheritance, dominance.

**Ключевые слова:** Твердая пшеница, F₁ поколение, гибридные комбинации, количества зерен, наследование, доминантность.

**Introduction.** When creating new varieties based on hybridization in the selection process, it is important to choose the right parent pairs. Parental pairs are selected depending on the purpose and direction of selection. One of the main methods of selecting parent pairs for breeding in breeding work is selection based on fertility elements [1,2].

Indicators such as the length of the spike and spikes in the spike, the number of grains in one spike, are important in the formation of the harvest of autumn grain crops. The most important indicator in determining the harvest is the number of grains in the ear. If samples are selected based on the number of grains in the ear, the chance of selecting high-yielding samples will increase. This indicator depends on the genetic potential of the variety and the environmental factors in which the plant is grown [3,4].

**The purpose of the research:** to study and select varieties of durum wheat resistant to heat and rust diseases, with high grain quality for irrigated areas, and to create high-yielding varieties by crossing them with local varieties.

**Material and methods.** Scientific research works were carried out in 2019-2021 in the irrigated fields of the experimental field of Lalmikor Agricultural Research Institute.

Hard wheat varieties and lines created at the Lalmikor Agricultural Research Institute, regionalized durum wheat varieties cultivated in the Republic, and durum wheat varieties and samples from the global collection of the international organization IKARDA were used as research objects.

The seeds of 12 hybrid lines of durum wheat (F₀) were sown together with parental pairs in the field of the first generation joint (F₁).

Harvesting of wheat ears was carried out by the method of Yurev et al. (1950), and pollination was carried out by the Twell method developed at the International Center of CIMMYT (Merezhko et al. 1973). The following results were obtained when determining the degree of dominance of the selected parent pairs in the inheritance of the number of grains in the ear. In the study, the level of dominance was determined based on the formula of P. Petr, K. Frey (1966).

**Research results.** When hybridizing between varieties, the number of grains in the main spike from 52 to 69 grains was used.

In the results of the study conducted in 12 hybrid combinations of durum wheat, the degree of deviation of the parental pairs in terms of the number of grains in the main ear was determined in the F₁ generation (Table 1). The number of grains in one spike can be from 10 to 50 and more [5,6].

According to the scientific research of N.B. Beknazarov, R.O. Katkova, the number of grains in the ear depends on heredity, and it is effective to carry out selection work on this component [7].

Accordingly, in 9 hybrid combinations (♀Azeghar-2 x ♂Mingchinor, ♀Makuz-3 x № 576, ♀Icamilmus-2 x ♂Istikbolli, ♀Icamilmus-2 x ♂Mingchinor, ♀Makuz-3 x ♂Mingchinor, ♀Azeghar-25 x № No. 576, ♀Ouasloukos 1 x № 576, ♀CM 829/Candocross H 25 x № 576, ♀CM 829/Candocross H 25 x ♀Mingchinor) heritability higher than +1 (N>1) high dominance, in 1 hybrid combination (♀Ouasloukos 1 x ♀Promising) the level of heritability is from 0 to +1 (trait deviation towards the parental variety with a higher number of grains in the main spike), in 2 hybrid combinations (♀Omarbi x ♀Makuz- 3, ♀Makuz-3 x ♀ICAMOR TA 04) partial dominance was observed with heritability higher than -1 (N>-1).

**Table 1.**

| № | Name of hybrids         | The number of grains in the main spike, piece | The difference | Heritability index (Hp) |
|---|-------------------------|---------------------------------------------|----------------|-------------------------|
|   |                         | ♀ | F₁ | ♂ | ♀ | ♂ |                       |                           |
| 1 | ♀Omarbi x ♀Makuz-3     | 56 | 50 | 62 | 6  | 12 | -3                     |                           |
| 2 | ♀Azeghar-2 x ♀Mingchinor | 58 | 69 | 65 | -11 | -4 | 2.1                    |                           |
| 3 | ♀Makuz-3 x № 576      | 62 | 71 | 66 | -9 | -5 | 3.5                    |                           |
| 4 | ♀Icamilmus-2 x ♂Istikbolli | 57 | 73 | 68 | -16 | -5 | 1.9                    |                           |
| 5 | ♀Icamilmus-2 x ♀Mingchinor | 55 | 67 | 63 | -12 | -4 | 2                      |                           |
| 6 | ♀Makuz-3 x ♀Mingchinor | 61 | 67 | 64 | -6 | -3 | 3                      |                           |
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| №  | Name of hybrids                  | The number of grains in the main spike, piece | Heritability index (Hp) |
|----|----------------------------------|---------------------------------------------|-------------------------|
| 7  | ♀Azeghar-2/5 x ♂ № 576          | ♀ 59 ♂ 75 ♀ 68 ♂ -21 ♂ -7                  | 2                       |
| 8  | ♀Ouasloukos 1 x ♂ № 576         | ♀ 54 ♂ 73 ♀ 66 ♂ -19 ♂ -7                  | 2,1                     |
| 9  | ♀Makuz-3 x ♂ ICAMOR TA 04       | ♀ 60 ♂ 48 ♀ 66 ♂ 12 ♂ 18                  | -5                      |
| 10 | ♀CM 829/Candocross H 25 x ♂ № 576 | ♀ 61 ♂ 74 ♀ 67 ♂ -13 ♂ -7                  | 3,3                     |
| 11 | ♀Ouasloukos 1 x ♂ Istikbolli    | ♀ 52 ♂ 67 ♀ 69 ♂ -15 ♂ 2                   | 0,7                     |
| 12 | ♀CM 829/Candocross H25 x ♂ Mingchinor | ♀ 62 ♂ 66 ♀ 63 ♂ -4 ♂ -3                  | 7                       |

**Conclusion.** According to the obtained results, ♀Azeghar-2 x ♂ Mingchinor, ♀Makuz-3 x ♂ № 576, ♀Icamilmus-2 x ♂ Istikbolli, ♀Icamilmus-2 x ♂ Mingchinor, ♀Makuz-3 x ♂ Mingchinor, ♀Azeghar-2/5 x ♂ № 576, ♀Ouasloukos 1 x ♂ № 576, ♀CM 829/Candocross H 25 x ♂ № 576, ♀CM 829/Candocross H25 x ♂ Mingchinor combinations were found to have a high dominance in the inheritance of the number of grains in the main spike in the F₁ hybrid generation. These ridges serve as a starting source for the development of high-yielding varieties of durum wheat for irrigated areas.

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