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EVOLUTION OF THE MODIFICATION AND STABILITY OF THE HEIGHT OF PLANTS WITH LINES AND VARIETIES OF THE ORIGIN CRUMOVGRAD

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I N T R O D U C T I O N

The genes determining the quantitative characteristics/traits of tobacco interact with the environment, as a result of which these traits change their values. A description of the general overall varying of genotypes in environments is given by the variance analysis (3). The regression analysis allows for the gene effects to be differentiated, including those which reflect the interaction between genotype and environment (2, 4, 5). In both these methods, the regression quotient characterizes the variability of the separate genotypes, while the mean-square deviation from the regression reflects the amplitude of the modification or stability.

MAIN PART

The research work and the trials were conducted over a three-year period - 1996 - 1998 in Tobacco experimental field of the town of Kardzhali, onto alluvial-delluvial soil, which is loamy and sandy in composition, sandy being the predominant fraction. The research and observation included the cultivars Krumovgrad 988 and Krumovgrad 90, and the lines 53/96, 69/95, 90/95, 123/95 and 313. The experiment was set up using the block method infour replications, on plots of 12,5 sq.m. in size, with a density of the plants of 45/12 cm. Data from 50 plants from each variant was gathered and the quantitative trait of 'plant height' examined.

The effects of the interaction between genotype and environment have been calculated by means of the methods of the variance and regression analyses (2, 3, 4, 5). The phenotype manifestation of the trait in genotypes and environments is determined by the formula P = m + di + ei + gd (2,5). The reliability of the regression factor (bi) is evaluated by means of the criterion of Student (t), using the standard error of the regression factor. The significance of the mean-square deviation from the regression is determined by the Fon reliability/validity criterion. The following equation is used to construct the regression lines: $\hat{X} = \overline{X} + b_i \, x \, e_i$.

E X P E R I M E N T

The values of the additive parameters (di) show that the range of the cultivars and lines under experimentation includes genotypes in which the trait 'plant height' varies within wide limits, and thus enables the analysis of the separate parameters in the genotype-environment interaction (Table 1). Cultivar Krumovgrad 90 and line 313 are with values for 'plant height' higher than the average in ther experiment, while line 90/95 and cultivar Krumovgrad 988 are with lower values. The regression factors have a higher positive value in line 53/95 and Krumovgrad 90, while lines 69/95, 90/95 and 313 are characterized by a smaller instability. The variability of the height of plants is the lowest in line 123/95 and cultivar Krumovgrad 988.

A difference is observed regarding the amplitude of varying in environments, with the exception of line 69/96. Higher proved values are detected for line 123/95 and cultivar Krumovgrad 90, i.e. those genotypes are the most unstable regarding of the trait under research. The

values of the mean-square deviation from the regression incultivar Krumovgrad 988 and lines 53/95, 90/95 and 313, are approximately the same and valid, in other words, they show a moderate degree of stability.

The graphics of the regression lines (Fid. 1) visualizes the differences in the height of plants of each cultivar and line from the average for the experiment. It confirms the data given in Table 1. The greatest inclination towards the abscissa demonstrate the regression lines of line 53/95 and cultivar Krumovgrad 90, which are charactrized by a higher variability of the trait under research; lines 313, 69/95 and 90/95 are less inclined.. The variability of plant height is the lowest in line 123/95, followed by Krumovgrad 988.

The statistical and genetic analyuses of the variability and stability of plant height in cultivars and lines of oriental tobacco of the origin Krumovgrad, make it possible it possible to draw the following.

CONCLUSIONS

•An examination and observation have been carried aut of a range of cultivars and lines of oriental tobacco of the origin Krumovgrad. They differ significantly in their quantitative trait "plant height", which enable us to make more generalized conclusions about their variability under different conditions of the environment.

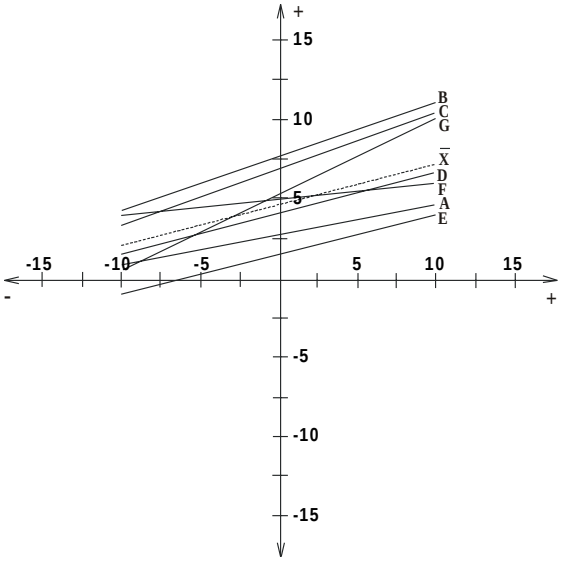
• Line 53/95 and cultivar Krumovgrad 90 are characterized by a higher variability of the trait, while line 123/95 and cultivar Krumovgrad 988 are with the lowest variability. There is evidence to prove the difference regarding the amplitude of varying in environments. In this respect, line 69/95 is an exception.

Табела 1 - Регресиона анализа на линиите и сортите за својството висина на растението
Table 1 - Regression Analysis of lines and cultivars for the trait "plant of height"

Cultivar, line Сорта/линија	$\bar{x}$	d_i	b_i	S_d^2	$S_d^2 / \bar{S}_e^2$
1. Krumovgrad 988 Крумовград 988	93.3	-10.8	0.502	15.18	4.85^{+}
2. Линия 90 Крумовград 90	117.8	13.7	1.668	29.56	9.44^{++}
3. Линия 53/95 Line 53/95	107.3	3.2	2.137	14.76	4.72^{+}
4. Линия 69/95 Line 69/95	100.9	-3.2	0.779	0.45	0.14
5. Линия 90/95 Line 90/95	88.6	-15.5	0.781	14.39	4.60^{+}
6. Линия 123/95 Line 123/95	104.7	0.6	0.290	40.13	12.82^{++}
7. Линия 313 Line 313	116.4	12.3	0.858	13.97	4.46^{+}

$\bar{S}_e^2 = 3.13$ $P_{5\%} = 3.8$ $P_{1\%} = 6.7$ $P_{0.1\%} = 10.9$

Сл. 1 - Графикон на регресионите линии што ја карактеризираат интеракцијата помеѓу генотипот и надворешната средина
Fig. 1 - Graphic of the regression lines, characterising the interaction between genotype genotype and environment



A - Cultivar Krumovgrad 988
Сорта Крумовград 988

B - Cultivar Krumovgrad 90
Сорта Крумовград 90

C - Line 53/95 - Линија 53/95

D - Line 69/95 - Линија 69/95

E - Line 90/95 - Линија 90/95

F - Line 123/95 - Линија 123/95

G - Line 313 - Линија 313

$\overline{X}$ - Average for the experiment - Просек

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ОЦЕНКА НА МОДИФИКАЦИЈАТА И СТАБИЛНОСТА НА ВИСИНАТА НА РАСТЕНИЈАТА КАЈ НЕКОИ ЛИНИИ И СОРТИ СО ПОТЕКЛО ОД КРУМОВГРАД

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Р Е З И М Е

Модификацијата и стабилноста на квантитативното својство висина на растението се одредени кај две сорти и пет линии тутун со потекло од Крумовград. Опитот е вршен во период од три години по методот на рандомизиран блок, во четири повторувања.

Математичкото толкување на податоците ги вклучува дисперзионата анализа и методот на Eberhart и Russell (1966). Генотиповите значително се разликуваат во однос на наведеното својство, при што линијата 123/95 и сортата Крумовград 988 се карактеризираат со најниска варијабилност.

Забележана е разлика во однос на варирањето во надворешната средина, со исклучок на линијата 69/95.

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