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MORPHOGENETIC REACTIONS AND LIFE STRATEGIES OF CULTURAL POINTS (YULDUZ variety) UNDER THE HERBITSIDES

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Annotation
This article provides information on the morphogenetic reactions and strategies of peas (Yulduz variety) under the influence of herbicides. Stresses occurring in the pea variety have also been studied to evaluate life strategies and the morphogenetic reactions caused by herbicides.

Keywords: Herbicide, octapone, morphogenetic reaction, stress, herbicide stress, ontogeny

Introduction

The use of herbicides is one of the important conditions for increasing crop yields. Most researchers believe that the main reason for increasing the productivity of cultivated crops is the reduction of pollution, thereby improving the light regime, water and mineral nutrition of plants [1,2]. we consider it urgent to develop an approach that treats herbicides as a chemical stress, revealing the potential of strategic protection and increasing the seed productivity of cultivated plants.

Research Material and Methods

The work is based on a systematic approach to studying the effects of herbicides on the morphogenesis of cultivated plants and the manifestation of life strategies. Work planning, experimental research and analysis of results are based on a nationwide methodology and systematic approach.

Field experiments with herbicides were conducted in accordance with the Guidelines for Field Testing of Herbicides in Botany (1981). The structure of morphological variability as a ratio of total and adjusted variability indices was N.S. It was studied according to the Rostov methodology [3].

The theoretical and methodological basis of the research was laboratory and field research using generally accepted morphological, population, ecological and statistical methods. Laboratory tests were performed according to generally accepted methodologies and guidelines. Data processing was performed using mathematical statistical methods using the computer program Statistica Microsoft Excel.

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Results Obtained And Their Analysis

Experiments using octapone extra herbicide were conducted to determine the reaction of cultivar pea crop structure characteristics under herbicide stress conditions. The uterine solution of the herbicide was dissolved in 0.2 ml of the herbicide in 300 ml (0.67 ml / l) of water. By mixing the herbicide twice in a row at a dose of 0.67 ml / l, we obtained a series of test doses (ml / l): 0 (control) - 0.08 - 0.17 - 0.33 - 0.67. Fresh water without herbicide was obtained as a control. Star type tested. Character variability.

Table 1.Character variability is shown in Table 1 for experimental options.

Dynamics of variability of stellar cultivar pea traits in increasing herbicide stress.

Herbicide concentrate, ml / l	Signs			
	Plant height	Number of fruits	The weight of the seeds of a plant	The weight of one fruit seed
0	4,0	5,6	12,9	13,5
0,08	13,4	21,5	17,7	35,9
0,17	15,7	21,9	21,7	23,5
0,33	18,4	16,0	11,4	17,6
0,67	11,6	15,0	18,0	24,8

In the control variant, the plant height and the number of fruits in the plant have a very low variability [4]. With a low modification variability, these selectively attached traits positively characterize the Star variety of pea - which can be considered to increase the stability of the characters, especially the crop structure traits - to predict crop yields and control yields.

The weight of one plant seed and the weight of one fruit seed have low and medium variability, respectively.

At different levels of herbicide stress the variability of all traits increases: low and medium in plant height, medium and increased - in the number of fruits and weight of seeds of one plant, increased and high - in one fruit seed weights (Table 1).

Figure 1 shows the dependence of pea plant characteristics on herbicide concentrate.

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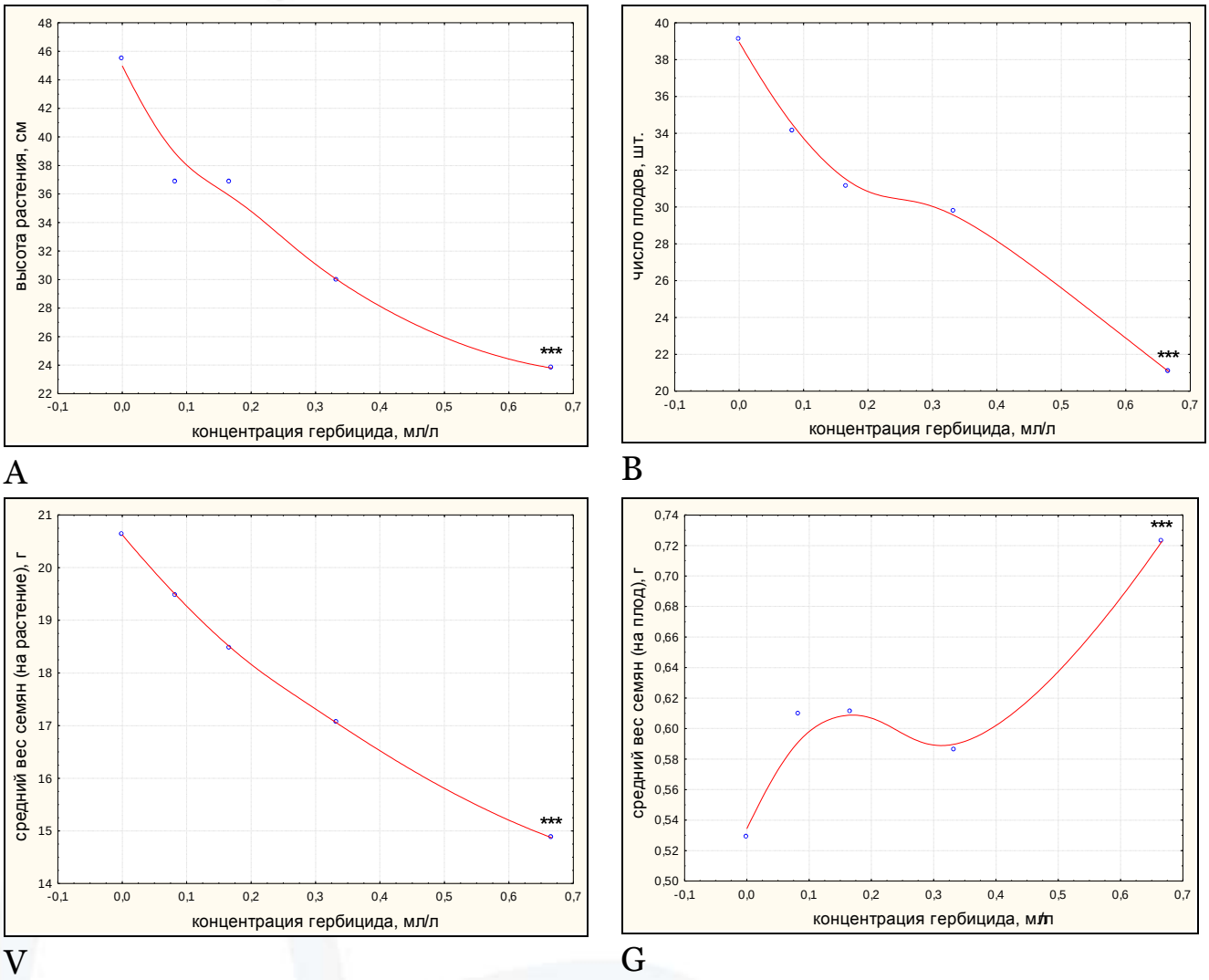

Figure 1. Dynamics of the mean values of the star cultivar pea traits in increasing herbicide stress.

Note: *** - statistically significant difference from the control variant (a≤0,001)

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A statistically significant negative correlation of the mean values of the mark from the herbicide concentrate for plant height, number of fruits, and weight of one plant seed was determined (Fig. 1, A-V).

A positive and statistically insignificant correlation was found from the herbicide concentrate for the weight of one fruit seed (Fig. 1, G). The statistical uncertainty of the relationship is due to the nonlinearity of the parameters. However, for the weight of one fruit seed, as well as for all other such characters, a significant significant difference (a≤0,001) of the mean values of the mark at maximum stress (0.67 ml / l) was found from the control variant.

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The different directional correlations of the characters from the herbicide concentration level show differences in the mechanisms of adaptation of the pea plant to chemical stress. At the point of stress, there is a distribution of forces aimed at increasing the seed yield and individual seed size under stress conditions: chemical stress causes a decrease in the total number of seeds in the plant and an increase in individual seed weight produces. In this case, the manifestation of a ruderal strategy (reduction in size and decrease in seed yield) can be seen as a sign of change (exchange) to the manifestation of a competitive strategy (increase in individual seed weight). Both strategies are aimed at leaving a guaranteed generation, either by increasing the number of plants being regenerated, or by increasing the guarantee of survival (survival) of a small number of generations. Such a relationship has been established for soft wheat under herbicide stress [3].

The Structure of Morphological Variability

The structure of the morphological variability of the pea plant shows two opposite groups of traits (Figure 2): genotypic indicators (plant height and number of fruits per plant) and systemic indicators (seeds per plant) s weight and weight of seeds per fruit).

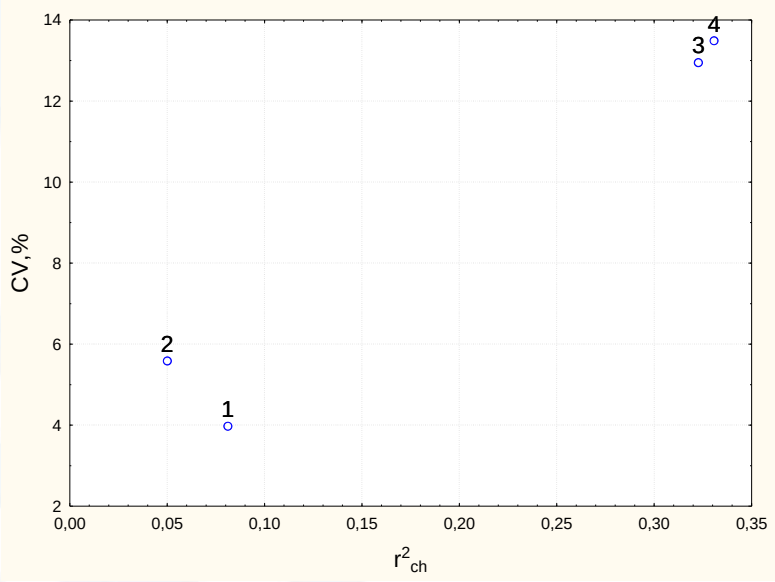

Figure 2. The structure of morphological variability of star-shaped cultivated pea plants in the control variant.

Note: 1 is the height of the plant, 2 is the number of fruits in the plant, 3 is the weight of the seeds in the plant, and 4 is the weight of the seeds in one fruit.

As herbicide stress increases, there is a shift in the role of indicators as an indicator. Thus, for example, at the height of the plant, the dependence on external factors increases, and the sign changes in the direction of the field of environmental indicators. The role of a systemic indicator for the weight of seeds in one plant and

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one fruit is increasing. The number of fruits in a plant varies from the field of genotypic indicators to the field of systemic indicators (Figure 3). Thus, as the herbicide stress increases, the genetic determination of the “plant height” and “plant fruit number” traits weakens.

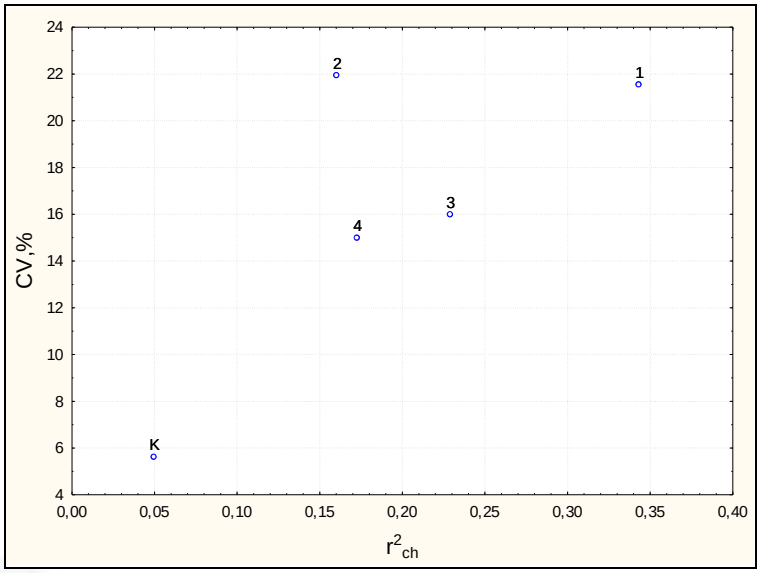

Figure 3. The change in the role of the indicator "number of fruits in the plant" as an indicator of increasing herbicide stress.

Note: K-1-2-3-4 is a sequential increase in herbicide dose.

Ontogenetic tactics and strategies. Figure 4 shows the change in the morphological integrity of the pea plant at the gradient of the increasing concentration of the herbicide.

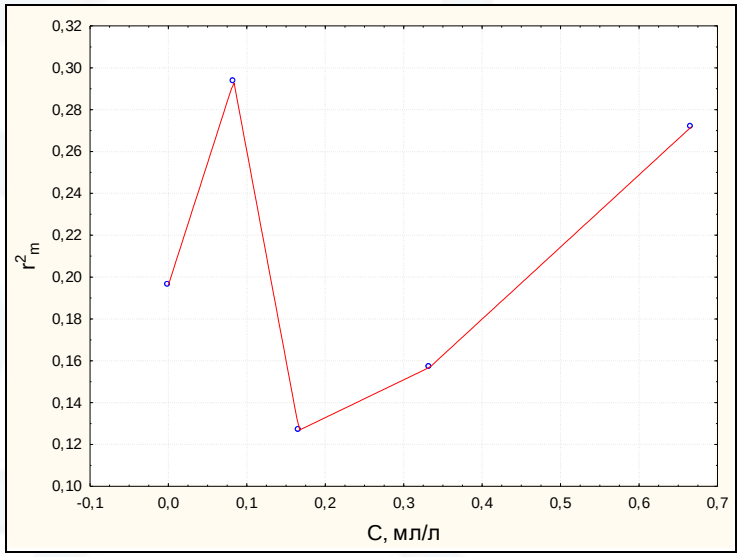

Figure 4 The trend (change trend) of ontogenetic strategy of Star cultivar pea in increasing herbicide stress.

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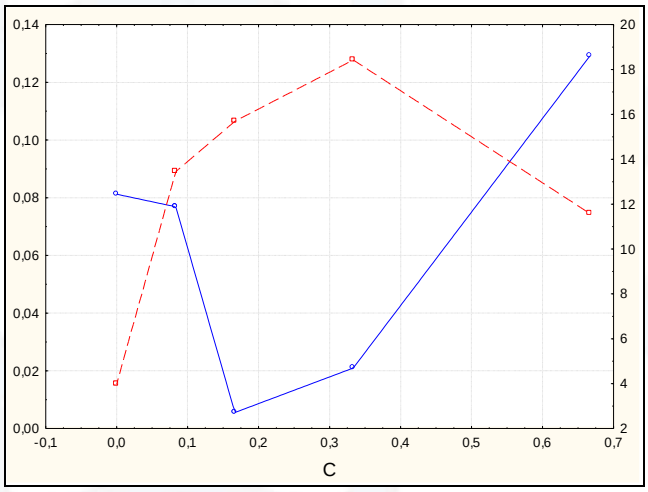
The ontogenetic strategy can generally be assessed as stress-protective. At a minimum dose of herbicides (0.08 ml / l) the morphological integration of plants increases, but further increase in chemical stress leads to the end of the protective potential directed to the coordination of traits in the development of the constituents of plant morphological structure. Further increase in herbicide stress leads to increased morphological integration of plants.

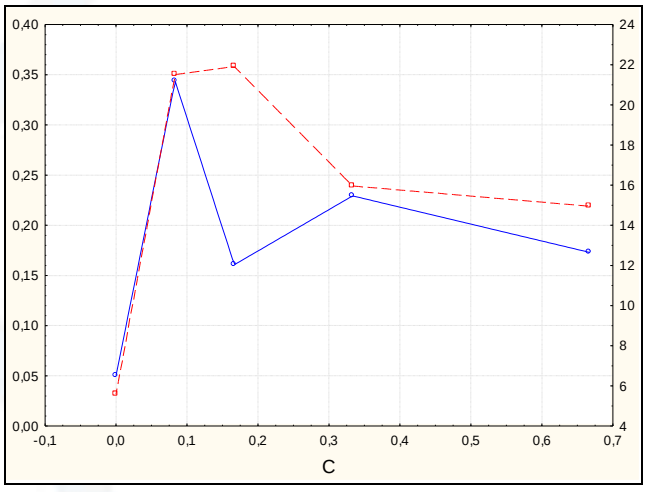
The ontogenetic strategy of formation of the "weight of one fruit seed" sign repeats the general strategy of the whole morphological structure of the plant to the last detail (Fig. 5, G). This is the result that the weight of one fruit seed is most integrated with the other characters studied (Table 2). The weight of a single fruit seed also has a high degree of determination. This includes strategies to support population and genetic sequencing by increasing the sustainability of seed reproduction.

The ontogenetic tactics of cultural pea traits (legitimate changes in the level of trait variability) are mainly divergent-convergent in nature. This ontogenetic tactic is clearly expressed in the symbols "plant height" and "weight of one plant seed" (Fig. 5, A i V). The number of fruits is characterized by the appearance of divergent-convergent ontogenetic tactics (Fig. 5, B).

According to the ratios in the directions of development and determination of general variability, the characters can be differentiated according to their role in the implementation of individual and population strategies of plant survival at different levels of herbicide stress. At low and medium values of such herbicide concentrate for plant height there is a decrease in the morphological integration of the label (degree of determination) and an increase in the degree of variability - the manifestation of stress-inducing effect of the drug and the absence of protective morphogenetic reaction. Strong herbicide stress then results in increased morphological integration and decreased character variability.



A



B

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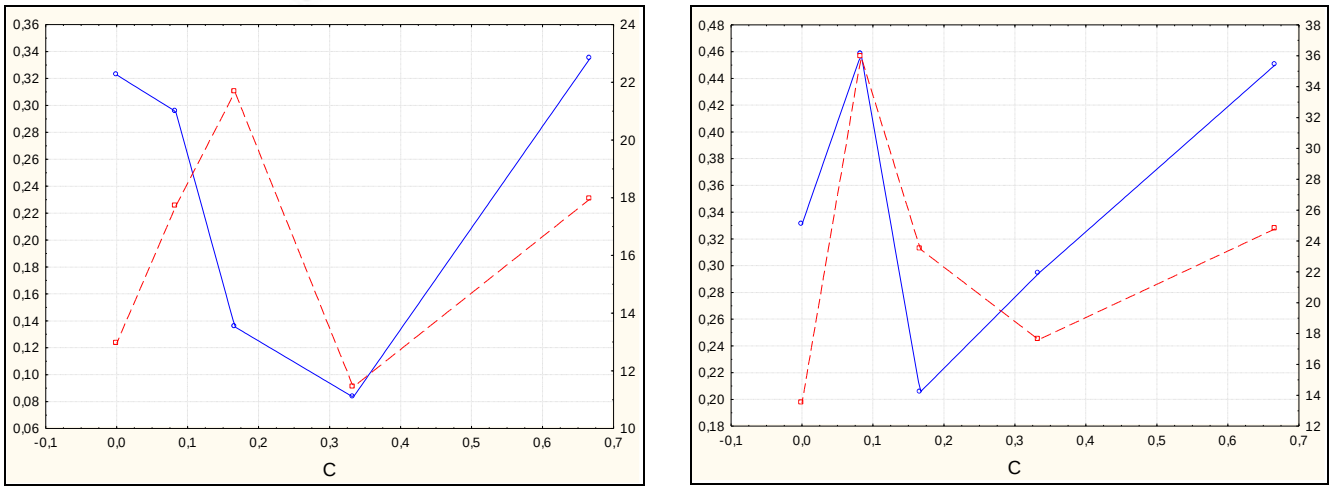

V G

Figure 5. The degree of morphological integration of stellar cultural pea characters (r^2ch; solid line, left axis) and the dynamics of character variability (variability) (CV,%; ring line, right axis).

Note: A is the plant height, B is the number of fruits, V is the weight of one plant seed, and G is the weight of one fruit seed.

Table 2. The degree of determination of the individual features of the morphological structure (r2ch)

Herbicide concentrate, ml / l	Characters			
	Plant height	Number of fruits	Weight of a plant seed	The weight of one fruit seed
0	0,08	0,05	0,32	0,33
0,08	0,08	0,34	0,30	0,46
0,17	0,01	0,16	0,14	0,21
0,33	0,02	0,23	0,08	0,29
0,67	0,13	0,17	0,33	0,45
Average index of determination	0,06	0,19	0,23	0,35

Conclusion

It is difficult to imagine the development of botany without the use of highly effective and affordable chemical preservatives that ensure reliable protection of plants from weeds at all stages of its development [5].As herbicide stress increases, the genetic determination of “plant height” and “number of fruits per plant” in the star variety weakens. This reflects the protective strategy in the formation of traits during morphogenesis - the overall reduction of the herbicide stabilizes plant size (height) and increases the degree of interaction with other morphological structural traits.

In combination with the increase in the weight of seeds in individual fruits (in their decrease in number), this survival strategy forms a population mechanism, which

contributes to the integration of plant morphological strategy and individual fruit seed weight into more vegetative growth of smaller seeds and can be illuminated as a compromise distribution of energy under extremely stressful conditions, undermining the increase in number.

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