

Chapter 10

Placement Plants on the Field Area by Seeding Machines: Methodical Aspects Assessment Rationality

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ABSTRACT

Any harvest is primarily the realization of the potential productivity of plants in certain conditions, depending on the parameters and operating modes of the sowing machine. The result of the operation of mechanized sowing will be the parameters of the nutrition area of each plant is the shape and numerical value of these area. The resulting schemes of plant placement on the field correspond to certain characteristics and parameters of the areas of plant nutrition, determining the availability of all elements of mineral nutrition, photosynthetically active radiation, and the relationship of units of agrophytocenosis. This is one of the decisive conditions for the harvest. The development of theoretical ideas about the uniformity of plant placement and the use of appropriate criteria and characteristics will create the necessary understanding of the role of the sowing machines in crop production during cultivated plants in the framework of mechanized technology.

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INTRODUCTION

In the next decade, humanity will enter a new stage of technological development, which is characterized by a focus on the use of high technologies. In crop production, these technologies will be characterized by high productivity, efficiency, creation of comfortable working conditions, but first of all they will overcome the main drawback of previous technologies – the lag in the growth of crop yields from the growth of costs for their production. Modern technologies make it possible to realize 30-40% of the potential productivity of plants and for this indicator came to the limit of saturation of their efficiency. In high technologies the level of potential realization should be not less than 70% (Krasnoshchekov, 2002; O’Leary et al., 2018).

One of the ways to solve the problem of increasing the efficiency of crop production is the creation of new varieties and hybrids, as well as genetically modified plants. It is believed that the use of GM plants has its advantages: they are resistant to diseases and weather ripen faster, stored longer, independently produce insecticides against pests (De Vita, 2017; Ewbank, 2002). On the other hand, experts identify three main threats posed by the use of GM plants: a threat to the human organism, a threat to the environment, global risks. The noted inconsistency in the use of GM plants limits the scope of their application.

A great contribution to the development of agricultural technologies is made by the creation of new varieties. The development of new varieties and the production of hybrids is not a quick process, so it is not possible to achieve the required increase in crop production efficiency at a rapid pace. It takes 10 to 12 years to create a new variety.

These ways make possible increase the biological potential of cultivated plants, but do not create conditions for its implementation. All achievements of geneticists, breeders, biologists, agronomists, agrochemists, and soil scientists can be implemented in wide practice only with the use of developed machines complexes that make up the mechanized technologies base.

The solution problem of increasing the efficiency of crop production involves the creation of high technologies. All technologies of crop production should provide plants with optimal conditions for the formation of the crop. One of the main roles in the formation of such conditions belongs to the sowing machine, the modes and parameters of which determine the size and shape of the nutrition area of each of the plants in the sowing. Thus, the parameters and characteristics of the processes performed by sowing machines should meet the biological requirements of cultivated plants to yield conditions. The main direction should be the creation of a new generation of machines, rather than modernization and improvement of the produced ones. Development of new equipment and technologies are possible only on the basis of new and improvement of existing methods of research, testing and quality management of sowing machines for intensive and high technologies in crop production (Bespamyatnova, 2010; Bespamyatnova, 2002). In turn, the development of such methods should be based on the latest achievements of engineering science and practice, which are based on solutions aimed at maximum satisfaction of the vital needs of plants for the most complete realization of their biological potential yield.

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