

**ASSESSMENT OF THE APPLICATION OF VARIOUS HERBICIDES IN THE TECHNOLOGY OF CULTIVATION OF FLOWER PLANTS OF THE ASTERACEAE FOR SEEDS ON THE EXAMPLE OF CALLISTHUS CHINENSIS L.**



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**Abstract**

The article reflects on the study of the national market of industrial floriculture. Seed growing is a highly professional, demanding modern technology. Flower seed production is one of the main conditions for the successful development of ornamental floriculture. Under the conditions of import substitution, the production of flowers is as important as the development of other branches of agriculture. Therefore, the study of optimization of elements of the technology of cultivation of flower plants for seeds is relevant nowadays.

**KEY WORDS**

flower seed, herbicides, cultivation technology, seed yield, optimization

**The introduction**

In the process of producing seeds of flowering plants in Russia the main task nowadays is the optimization of the technology of growing flowering plants for seeds, since this branch of the seed grower is very labor and energy intensive. Seed production is a highly professional branch demanding modern technologies, techniques and experts. Flower seed farming is one of the main conditions for successful development of decorative floriculture. In the conditions of import substitution, the production of flowers acquires the same significance as the development of other branches of the economy. In this regard, it is relevant to study the state of the domestic market of industrial floriculture and the features of the historical development of the industry in Russia.

High growth of domestic floriculture showed in the XX century, when a large number of flower farms and flower-decorative nurseries were created. For the successful development of industrial floriculture, the factor of the development of flower seed farming as one of the main factors was taken into account. A large number of flower farms and flower-ornamental nurseries were created, which produce millions of plants for improvement and decoration of the country's populated areas.

In connection with the organization of large seed farms, such as the trust of green building "Goselenstroy", in 1935 the import of both vegetable and flower seeds were discontinued. The flower plants were also grown for cutting, 917 million plants were produced in 1986, and in 1990 it was 1,203 million. According to the general scheme for the development of floriculture in the USSR by 2005 it was planned to increase the production of flowers to 3.5 billion pieces [1].

According to data for 2016, of all seeds sold in Russia, approximately 60% of vegetable and more than 90% of flowers are imported products [4]. In recent years, the market of seeds of vegetable crops and flowers has grown immeasurably and is annually updated both by domestic and foreign products. According to experts, in 2014 the Russian market of packaged seeds amounted to about \$ 2 million. A sharp increase in imports is the main problem for Russian companies [4, 3]. Seeds are imported from Holland, France, Germany, Great Britain and Denmark. Russian wholesalers buy these seeds, that's why domestic companies have a higher price. To reduce the cost of production, Russian companies are trying to develop their own production, but its share is still small, as Russian companies do not have enough money to develop competitive production: in the last decade, investments in the industry have not been made [2].

Nevertheless, more and more new sellers are entering the Russian market of seeds of vegetable and flower crops every year. Basically, these are small companies that already occupy 50% of the market. Unfortunately, these are packers who prefer to take the seeds for weight, lay them out in packages and sell them. The main market participants: the NC Corporation, the agricultural firm "Poisk", the holding "Russian Seeds", "Aelita", "Sedek", "Gavriush", "Semko", "Lilia" - are located in Moscow; Popular in St. Petersburg and Leningrad region, wholesalers - "Petersburg Seeds" (more than 500 names of flower crops, more than 800 names of vegetable seeds, more than 30 names of grasses and grass mixtures), PE Zhuravleva OE (2500 titles), "Russian vegetable garden" (more than 2000 items, including such new series as "Samrost", "Northern vegetables", "Russian size"), "Sluras" (about 5 thousand titles), etc.

Seed production is currently handled by few companies, for example, LLC "Allen." It grows seeds itself and imports the missing assortment from Germany, France and Poland. In 2006 the area of seed-growing crops exceeded 250 hectares. Here, experts produce both their varieties and hybrids included in the State Register, as well as the most popular varieties of domestic selection, which form the basis of the commodity production of vegetable products. This became possible thanks to the closest cooperation with the leading breeding centers of the country: VNISSOK, VIR, TSAA, a number of experimental stations.

## **Materials and methods of research**

The purpose of the research was to determine the effect of various types of herbicides on the weed infestation of crops and also to determine the yield of flower plants of the Asteraceae in the conditions of the Central Federal District.

An important feature of agro technical cultivation of flowering plants for seeds is their demands on the cleanliness of the site from weeds, which is due to the slow development in the first phases of growth, low resistance to weeds and the inability to apply treatments during the growing season [5].

As a result of research, it was established that the contamination of crops depended on the potential contamination of the soil by weed seeds and their vegetative reproductive organs. Accounting of weeds was carried out by a quantitative and weight method of accounting for littering of fields. The research was carried out in the agricultural company "The Oryol flowers" (Mtsensk city).

Currently, the list of herbicides recommended for use on seed plantings of flower crops is very limited, it includes herbicide formulations based on glyphosate (N- (phosphononyl) - glycine). In connection with non-selective systemic effect, recommended herbicides are used for cultivating fields for sowing various crops (spring crops, vegetable potatoes, technical, oilseeds,

melons), as well as annual flower crops (seed crops) are used only for spraying of vegetative weeds at the end of summer or autumn in the post-harvest period. In practice, seed production of flower crops requires the use of herbicides of selective action during the growing season, taking into account the biological, technological and other features of the cultivation of seed plants of flower plants of the Asteraceae.

### The results of the research.

In the field experiment during studying the effect of different types of herbicides on weed infestation and yield of flower plants of the Asteraceae — on the example of *Aster callistephus* used the following herbicides: Glider (300 g / l glyphosate acid), Chistogryad (360 g / l glyphosate acid), Agrokiller (500 g / l glyphosate acid): spraying vegetative weeds in the fall, the flow rate of the working fluid 120 l / ha. [6]

Accounting of weeds was carried out by a quantitative and weight method of accounting for littering of fields. The species of weeds were represented quite widely in the experimental plots: *perennial and annual dicotyledons, such as one-year dicotyledons*: *Lipandra polysperma*, *Polygonum aviculare*; *juvenile dicots (wintering, winter, biennial)*: *Capsella bursa-pastoris*, *Barbarea vulgaris*; *perennial dicotyledonous*: *Glechoma hederacea*, *Convolvulus arvensis*, *Rumex acetosella*, *Myosotis decumbens*, *Sonchus arvensis*, *Artemisia vulgaris*; *perennial cereals*: *Elymus repens*. [5]

From the variety of weeds, the most common were the *Elymus repens* and *Glechoma hederacea*.

Table 1-The influence of herbicides on the yield capacity of seeds of the flower plants of the Asteraceae (*Callistephus chinensis*)

Variants	Weed count		Weed weight, wet		Yield capacity, kg/ha
	pieces/square meter	death rate	g/square meter	% of reduction	
Control (without the herbicide)	3	-	1052	-	70
Glider (300 g/l glyphosate acid)	281	59,2	487	31,2	110
Chistogryad (360 g/l glyphosate acid)	338	70,7	437	58,6	170
Agrokiller (500 g/l glyphosate acid)	219	88,5	120	95,7	210

Using herbicides in cultivation of annual flower (seed crops) is an essential technique for increasing the quantity and quality of the crop. Our research has shown that the most effective action against weeds was shown by the Agrokiller herbicide (it consists a highest content of the active substance - 500 g / l of glyphosate acid), the reduction of weed infestation was 88.5%. The lowest decrease in weed infestation was observed after treatment with the Glider herbicide - 59%.

As a result of using herbicidal treatment, the increase in yield capacity was 40–140 kg/ha, compared to the control. This fact justifies the expediency and costs of protective measures.

It was established that the contamination of crops depended on the potential contamination of the soil with weed seeds and their vegetative reproductive organs.

### Conclusions.

The demands of annual flower plantings (seed crops) on the purity of the fields determine the high importance of carrying out herbicidal treatments. This contributes to better growth and development of plants, yield increase. In our research, the best results were obtained on variants with herbicidal treatment with the herbicide Agrokiller - spraying of vegetative weeds in the fall, the flow rate of the working fluid 120 l / ha.

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