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Effectiveness of 2-phase soil tillage against weeds in soybean cultivation technology

Objective. To develop and apply a system of weed control measures in production, based on a combination of agronomic and biological factors with the maximum possible limitation of chemical measures to increase the productivity of crops and to maintain environmentally sound agriculture. Methods. Field, laboratory, statistical. Results The application of 2-phase soil cultivation reduced the soybean saturation in continuous and broad-range seeding methods by 1.7-2 times, in combination with herbicide, at 2.7-3.4 times, soybean yields increased by 27 on a continuous sowing method, 7%, for broadband - by 29.4%. Conclusions The application of 2-phase soil cultivation contributed to the reduction of inbredness and ensured the increase of soybean yields in both continuous and broad-sowing methods of sowing.

Key words: agrotechnical measures, 2-phase soil tillage, weeds, crops, productivity.

High abrasion of arable land is one of the main obstacles to the introduction of modern technologies for the cultivation of major crops, in particular soybeans, aimed at implementing strategies for maximizing crop yields [10]. Losses of soybeans from inbredness are much greater than those from diseases and pests. As a result of the real loss of state and public control over agricultural lands and their use in Ukraine, over 4/5 of the arable land has been inoculated [3]. For weeds, high seed yields are characteristic, therefore, even a small amount of weed plants is able to form a large number of viable seeds and restore them to a ground seed bank [2]. The introduction of herbicides is a major measure of intensive technology for growing agricultural crops. The purpose of the research is the development and application of a system of measures to combat weeds based on a combination of agrotechnical and biological factors with the maximum possible limitations of chemical inputs to improve the productivity of agricultural crops and to maintain environmentally sound agriculture. . Research analysis. Chemical agents (herbicides) are used to control bulbs. Make them before sowing, after sowing to the stairs and after stairs, with solid and ribbon methods. The use of herbicides makes it possible to deal with annual carnivores and broadleaf weeds. Most modern herbicides effectively destroy broad-leaved or cereal weeds, but in practice it rarely happens when the same herbicide acts equally well on certain weeds. The most effective chemical control system for weeds never has 100% efficiency. Therefore, to obtain a high yield, the herbicide component should be necessarily combined or supplemented by other agrotechnical measures [4]. Almost every 3 or 4 years in Ukraine there are new active substances aimed at combating these or other weeds, since there is now no universal herbicide that could simultaneously and once destroy the weeds of all kinds [1] The results of large-scale studies of weeds growing in crops of crops and the determination of the stock of seeds of weeds in the soil indicate that the amount of weeds in the fields and their species composition depends on the climatic conditions and differ in zones (M. Carretero, 1978; PF Ionin, 1980; AV Voevodin, 1981; AV Fisyunov, 1982). According to some authors, the most critical period of soy can vary from 2 to 4 weeks from the appearance of seedlings of culture. Its longevity is influenced by: species composition, density of weed group and weather conditions. The method of sowing also influences the occurrence of a critical period of the harmfulness of weeds. Thus, in the

narrow-line method, the control period is trivial, and on broad-range crops it comes in the phase of the first true leaf in culture [9]. The lands of Prykarpattya are marked by intense thirst. This is due to the small (18 - 20 cm) depth of the humus horizon and the fineness of the fields adjacent to shrubs and scales - weed seedlings. Modern herbicides do not allow us to completely solve the problem of weed reduction, in addition, they are too expensive, and weeds also exhibit resistance to their action. Therefore, it is necessary to review the existing and develop new plant protection measures and to work out on the basis of research an integrated system based on a combination of agro-technical and biological factors with the maximum possible limitation of chemical measures for increasing the productivity of agricultural crops and ecologically safe agriculture . An important measure of protection of soybean crops from weeds in the early stages of growth and development of culture is the application of agrotechnical practices in combination with herbicides.

Materials and methods of research. Experimental part of field research was carried out in the field experiment of the soil cultivation, weed control and organic production of agricultural crops of the Precarpathian State Agricultural Experimental Station of the Institute of Agriculture of the Carpathian Region of the NAAS (Kolomyia district of Ivano-Frankivsk oblast).) During 2011 -2013. The soil of the experimental part of the soddy medium-podzolized surface-gelled, medium-loamy, arable layer (0-20 cm) of which had the following parameters: pH saline Its hoods - 4.9; Humus content - 3.1%, easily hydrolyzed nitrogen - 10.3, mobile phosphorus - 8.9, exchangeable potassium - 9.6 mg per 100 g soil. In the experiment, the effect of 2-phase soil tillage on soybean soybean and its pro-ductivity was studied. The research was conducted in two blocks: in the 1st, the effect of weed control measures on a continuous method of sowing with shi-ryna between rows of 15 cm, in the 2nd - on a broad-row method of sowing with a width of rows of 45 cm was studied. Two-phase cultivation The soil provides optimization of the physical conditions of growth and development of plants in 2 stages and distribution of the system of basic cultivation in 2 phases. The first of these is the preparation of a seedbed and, consequently, a non-deep pre-sowing cultivation, necessary to ensure seeding. The second phase, actually the main cultivation, in contrast to the conventional system, is carried out after sowing to a depth of 10 - 12 cm in the first stages of organogenesis of crops, while complying with the requirements of minimal injury of seedlings or stairs [5]. The results of the trimming (2-phase fertilizer) of the soil were carried out after sowing, 3-4 days before the appearance of soy seedlings for the formation of seedlings of a seedlings length of 1-1,5 cm at a depth of 10 - 12 cm cultivator KPS-4 along Strings Chemical processing was carried out with a bas-graside herbicide - 2 l / ha. After 3 days from the cereals 1 broad-leaved weeds were applied herbicide guard - 1.5 l / ha. In the control (option 1), no herbicide was applied and no trim, option 2 was followed by a trimming of the soil, option 3 was applied by the herbicide, in option 4, the effectiveness of the combined effect of the pre-cut trimming and herbicide during soybean vegetation was studied. The repetition in the experiment is 3 times, the area of the registration area is 100 m2. The technology of soybean cultivation of the Hoverla variety is commonly used in the zone, except for the investigated variants. Fertilizer system - I45R60K60, seeding rate per continuous sowing method - 700 thousand units / ha seedi, for a broad-based method - 600 thousand pieces / ha.

1. Soybean soybean in the flowering phase for various measures to control weeds on average for 2011 -2013, pcs / m2

Research results. Objective tendency towards ecologization of the field of agriculture determines the activity of studying the use of environmentally safe measures in the arsenal of weeds, constituent elements of the agricultural system, which includes 2-phase soil cultivation. For such cultivation, we can destroy vehement weeds and purify the soil from their seed and vegetative rudiments [7]. Therefore, according to O.V. Fisyunov and others. [8], all agrotechnical measures should be directed, first of all, to the destruction and depletion of the seeds of weeds in the arable layer of soil. In 2011 and 2012, at the time of sowing and the beginning of vegetation, the air temperature was low and rainfall was not sufficient. Under such weather conditions, the growth and development of both cultivated plants and weeds was delayed. An adequate amount of precipitation and a rise in the temperature during the spring during June contributed to the better growth and development of soy, but at the same time contributed to

the growth of cereal and broadleaf weeds. Dry and warm time was the sowing time (the first decade of May) and the beginning of the growing season in 2013. The increased air temperature and uneven rainfall distribution in May contributed to the germination of soybean and weed seeds, and the effect of the upfront loosening of the soil increased. Precipitation and air temperature in June contributed to the growth and development of soybeans and increased crop infestation. Under favorable conditions, the following common weeds were the most widespread on soybean crops: mossy blue, white loboda, wild radish, common cherry, bitter bitter, cypress and others. During research, the amount of weeds was reduced by the use of pre-flood loosening of soil, and also depended on weather conditions. Soybean saturation in a continuous sowing method on the average during the years of research (2011-2012) on the control was 24 pcs. / M2, for the application of post-sowing livestock yield decreased by 10 pcs./m2, or by 1, 7 times (Table 1). Due to the wide-spread method of sowing, soybean saturation was higher and in control was 31 pcs./m2. The use of lacunae loosening helped reduce the number of weeds by 16 pcs / m2, or twice. The introduction of the herbicide reduced soybean saturation by 2.5 times, and, in combination with the precipitate loosening, decreased by 3.4 times. Consequently, the decrease in perturbation was achieved due to loosening of the soil, which inhibits the development of small weed seedlings, damaged during pre-harvest cultivation, and does not prevent the emergence of stairs of cultivated plants. On the contrary, the latter have a larger supply of nutrients in the seeds, which ensures their higher resistance to damage. The effect of 2-phase cultivation was amplified by the fact that for a long time after the trimming did not precipitate and the seeds of weeds from the top of the over-dried layer did not sprout. It was determined that cutting the crops not only reduced the frustration, but also stimulated the soil, which contributed to better air flow to the roots of legumes, increased the number of bulbous bacteria and, accordingly, increased soy nutrition. According to research results, the yield of soybeans in the continuous method of seed control was 1.8 t / ha and was increased for application of 2-phase soil cultivation by 0.5 t / ha or by 27.7%. Combination of herbicide with trimming increased yields by 0.4 t / ha, or by 22.2% (Table 2). A similar pattern was found for the broad-row method of sowing, where the yield of the trimming contributed to an increase in the yield of soybeans by 0.5 t / ha, or by 29.4%. The combination of post-sowing pre-harvest trim and herbicide contributed to an increase in the yield of soybeans by 0.4 t / ha or by 23.5%. The cropping of perennial germplasms below the placement of sprouts cultivation achieves a short-term delay in the development of weeds. After the regeneration of their shoots, the conditions of competitive yields with cultivated plants change dramatically [6]. The possibility of using 2-phage soil tillage and checking its effectiveness as a way to reduce the harmful effect of weeds on crops of continuous crops is proved. Studies show the promise of 2-phase cultivation on turf-podzolic soils as a measure aimed at reducing the harmfulness of weeds, not only on pratsapnyh, which was proved earlier, but also in crops of continuous sowing.

2. Influence of 2-phase soil cultivation on soybean yield in a continuous sowing method (width of rows 15 cm)

Conclusions

As a result of the research, it was found that 2-phase soil cultivation contributes to a decrease in 1.7 m 2 inhibition of soybean crops. The loose top layer of soil does not prevent the appearance of strong soybean seedlings on the surface and, at the same time, is unfavorable to small weed seedlings. Conducting 2-phase cultivation provided for an increase in the yield of soya for a continuous sowing method by 27.7, for broad-row - by 29.4%.

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