THE CREATION OF GENERAL AND ACTIVE SYMBIOTIC POTENTIAL OF BLUE LUPINE DEPENDING ON ELEMENTS OF CULTIVATION TECHNOLOGY

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The purpose of the article was to identify the dependence of the formation of the symbiotic productivity of lupine varieties of various economic use depending on variety, fertilizers, method of sowing, seeding rate and the conditions of mineral nutrition, taking into account the effect of foliar application in different phases of culture development.

As a result of calculations it was established that blue lupine plants at all experiment options form a rather large indicators of general and active symbiotic potential. So, during the first sowing period their values depending on the norms and methods of seed sowing were the following: Olympus variety – 10.7–31.5 and a 6.0–17.9 thousand kilos day/ha, Winner variety – 11.0–32.8 and 6.1–18.4 thousand kilos day/ha, Grozynsky9 variety – 14.1–40.6 and 7.9–23.1 thousand kilos day/ha respectively.

The experiment scheme included fertilization variants: without fertilizers, $P_{60}K_{60}$ – recommended in the cultivation area, $N_{30}P_{60}K_{60}$ and $N_{60}P_{60}K_{60}$ in combination with two foliar applications by nitrogen-phosphorus-potassium fertilizers with microelements in two terms (first – in the budding phase 10-45-15+0,5MgO+ME, the second – in the phase of beginning of seed formation 9-12-40+0,5MgO+ME). Crops are the predecessor. Varieties of blue lupine – Olympus, the Winner, Grozynsky 9, were sowed by the methods: a row (15 cm), skip one row (30 cm) and wide row (45 cm) with the seeding rate of 0.6, 0.9, 1.2 million pieces per hectare in three terms: the first term – time of sowing capability (PTP - 5^0C) (control), the second term – in 10 days after the first (PTP - 8^0C), the third period – in 20 days after the first (PTP - 10^0C).

Growth of indicators of general and active symbiotic potential was noted during the second sowing period, which increased by 0.2–3.6 and 0.2–1.6 thousand kilos

day/ha respectively at all experiment options in Olympus, Winner, Grozynsky9 varieties. During the third period the mentioned indicators were less by 1.9–9.0 and 0.7–5.2 thousand kilos day/ha compared with the first sowing period and by 2.3–12.6 and 1.0–6.8 thousand kilos day/ha compared with the second sowing period respectively. The trend was installed, which is evident in the reduction of indicators of general and active symbiotic potential with widening of row spacing from 15 to 30 and 45 cm.

The researches have found that the maximum rate of general symbiotic potential of blue lupine of the studied varieties is formed during the period (vegetation, full sprouts and physiological ripeness) due to application of mineral fertilizers in $P_{60}K_{60}$ norm and two foliar feedings, which depending on the norms, terms and sowing methods were the following: Olympus – 17.2-50.6 thousand kilos day/ha for the first sowing period, 17.6-55.1 thousand kilos day/ha for a second period and 13.6-39.3 thousand kilos day/ha for the third sowing period of seed; Winner – 17.6-52.1 thousand kilos day/ha for the first, 18.1-56.7 thousand kilos day/ha for the second and 14.0-40.6 thousand kilos day/ha for the third sowing period; Grozynsky9 – 22.7-64.8 thousand kilos day/ha for the first, 23.0-70.8 thousand kilos day/ha for the second and 18.2-50.6 thousand kilos day/ha for the third sowing period of seed.

In areas, where blue lupine was cultivated without the use of mineral fertilizers, the value of general symbiotic potential depending on the studied factors was 8.8-34.3 thousand kilos day/ha for the Olympus, which was on 3.2-13.9 thousand kilos day/ha less compared with phosphorus-potassium fertilizer. The Winner had 8.9-35.6 thousand kilos day/ha and Grozynsky9 – 11.2-44.2 thousand kilos day/ha; that was respectively 3.6-13.9 and 4.7-17.5 thousand kilos day/ha less compared with the highest value with the application of phosphorus-potassium fertilizers.

Also the application of mineral nitrogen inhibited the formation of symbiotic apparatus of blue lupine, and caused receiving of minimum indicators of general symbiotic potential in the experiment. Thus, the lowest rate of general symbiotic potential varieties of Olympus (7.4-30.1 thousand kilos day/ha), Winner (7.7-30.9) and Grozynsky9 (10.1-39.8 thousand kilos day/ha) was formed on the experiment options with $N_{60}P_{60}K_{60}$.

In areas where mineral fertilizers and foliar fertilizing were not used, the index of active symbiotic potential of blue lupine (Olympus, Winner and Grozynsky9), depending on the norms, terms and sowing methods, ranged within 4.8-24.7 thousand kilos day/ha, which exceeded the corresponding figures on 0.1-0.7 and 0.3-2.1 thousand kilos day/ha, where a complete mineral fertilizer with $N_{30}P_{60}K_{60}$ and $N_{60}P_{60}K_{60}$ doses and two foliar applications with nitrogen-phosphorus-potassium fertilizers with microelements were used.

In the process of research conducting the scientists revealed that the introduction medium (N_{30}) and high (N_{60}) norms of nitrogen fertilizers had a negative influence on the formation of rates of general and active symbiotic potential of blue lupine. It is noted that the creation of optimal conditions of mineral nutrition for the formation of the active legume-rhizobium symbiosis ensured the formation of the highest rates for general and active symbiotic potentials in agro phyto cenosis of blue lupine by $P_{60}K_{60}$ using in combination with two foliar applications by water-soluble nitrogen-phosphorus-potassium fertilizers with microelements (Novalon Foliar) in two periods (in the budding phase and in the beginning phase of seed ripening).