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UDK 633.16:631.523

Vira BOROVYK,
Candidate of Agricultural Sciences,
Veniamin VEGERCHUK,
Postgraduate
Institute of Climate-Smart Agriculture of NAAS,
c. Odesa, Ukraine

MICROFERTILIZER AS A FACTOR OF ACCELERATION OF PLANT GROWTH AND DEVELOPMENT ON NEW SOY VARIETIES UNDER IRRIGATION

An important reserve for increasing soybean productivity is the application of microfertilizers. They make it possible to better realize the potential productivity of modern intensive soybean varieties, improve the development of the root system, increase the activity of photosynthesis, and increase the number of nodules, beans and seeds.

In the selection department of the Institute of Climate-oriented Agriculture of the National Academy of Sciences, microfertilizer was studied - a complex preparation that includes elements that improve the growth of the root system, the passage of the photosynthesis process, protein synthesis, etc.

The calculation of the density of plant stands in the phase of the second three-leaved leaf indicates that the use of microfertilizer had a positive effect on the germination of soybean plants. The best density of plants was observed in two variants - when only soybean seeds were treated with microfertilizer and combined treatment of seeds and application of the drug during crop vegetation, regardless of the variety. The density of plant stands in these areas was 758 and 761 thousand units/ha and 536 and 552 thousand units/ha, respectively. While with the application of microfertilizer only during the growing season, the density of standing soybean plants of the Panna variety was 755,000 units/ha, and Svyatogor – 525,000 units/ha, which is by 3–6,000 units/ha, 11–27 thousand units/ha, respectively, less. This can be explained by the content of zinc sulfate microfertilizer, which stimulates the growth of the root system. An important feature of soybeans is their ability to endosymbiosis with nitrogen-fixing subbacteria - rhizobia. Thanks to nitrogen fixation, which takes place in nodules formed in symbiosis with rhizobia, soybean can significantly or even completely satisfy its nitrogen needs through symbiotrophic nutrition. In the variant with treatment of soybean seeds with microfertilizer, applying microfertilizer during plant vegetation (before flowering), one plant accumulated a greater mass of nodules

by 18.8% in the Ravita variety and by 17.7% in the Svyatogor soybean variety than, respectively, in the control variant.

The correlation analysis of the obtained indicators made it possible to obtain the equation of the dependence of the seed yield of the early-maturing soybean variety Ravita and the medium-maturing soybean variety Svyatohor on the value of the mass of nodules on the plant, where their correlation coefficients are equal to r = 0.72, r = 0.86, respectively, which confirms a close relationship the relationship between these indicators.

In our studies, the application of microfertilizer did not suppress the activity of microorganisms in the soil. Their maximum number was observed in the flowering phase of soybeans, regardless of the studied variety. Analysis of the data shows that the application of microfertilizer had a positive effect on the number of microorganisms involved in the transformation of nitrogen compounds in the soil in soybean crops of the Ravita variety. In the option of treatment of soybean seeds with microfertilizer before sowing + application of the drug during crop vegetation, the lowest activity of microorganisms was observed in the phase 3 leaf of plants, the maximum - during flowering of soybeans, the number of which was greater by 4.0–3.7%, compared to the control . The number of ammonifying microorganisms in the soil decreased in the phase of full maturity of plants, nitrifying ones, on the contrary, increased by 20.3%, compared to the control variant.

The use of microfertilizer contributed to better growth of soybean plants in height and higher attachment of the lower bean in both the Ravita and Svyatogor soybean varieties. Thus, the height of soybean plants of the Ravita variety in variants with the use of microfertilizer was on average 72.0 - 81.1 cm in the two years of research, in Svyatogor - 81.3 - 83.3 cm, in the control 69.5 cm, 78.6 cm, respectively. The excess over the control was 2.5–11.6 cm and 2.7–4.7 cm, respectively, which is explained by better plant uniformity and more balanced nutrition of the crop during its growing season.

The results of the structural analysis of soybean plants of different maturity groups showed that the methods of microfertilizer application had a positive effect on the formation of productivity elements. The data show that on the fertilized versions of the soybean plants, both the early-maturing variety Ravita and the medium-maturing variety Svyatogor had more shoots on the plant (by 0.1–1.0 and 0.5–0.7 pieces), beans (by 3, 2–8.4 and 4.7–9.5 pieces), the number of seeds (0.6–9.0 and 0.5–18.4 pieces) and their weight (0.4–1.5 g and 1.6–4.0 g), respectively, compared to the control. The areas where microfertilizer was used also differed in terms of a greater mass of 1000 seeds (by 2.2–5.3 and 0.8–2.0 g).

However, significantly higher indicators of the crop structure, such as the number of seeds per plant and their weight, were obtained in the variants with treatment of soybean seeds with microfertilizer before sowing + application of the drug during crop vegetation. The maximum number of soybean seeds of the Ravita variety in this area, on average over 2 years, was 51.2 pieces from a plant, Svyatogor – 69.7 pieces, seed weight – 4.0 g and 8.8 g, respectively.

Thus, in the conditions of the Southern Steppe of Ukraine, the maximum indicators of seed productivity of the Ravita and Svyatogor soybean varieties were

obtained in the variant where the treatment of soybean seeds with microfertilizer before sowing + application of the drug during the vegetation of the crop was used.

When applying microfertilizer, the maximum yield of soybean seeds of the Ravita (2.18– 2.20 t/ha) and Svyatohor (3.15–3.18 t/ha) varieties was obtained in the variant with soybean seed treatment before sowing and soybean seed treatment + application microfertilizers for plant vegetation.

УДК 551.583

Оксана ВОЛЬВАЧ,
кандидат географічних наук, доцент
Одеський національний університет ім. І.І. Мечникова
Сергій ЗАЄЦЬ,
доктор сільськогосподарських наук, професор
Інститут кліматично орієнтованого сільського господарства НААН, Одеса, Україна

ОЦІНКА РЕСУРСІВ ТЕПЛА ТА ВОЛОГИ ПЕРІОДУ АКТИВНОЇ ВЕГЕТАЦІЇ В ОДЕСЬКІЙ ОБЛАСТІ ЗА УМОВ РЕАЛІЗАЦІЇ СУЧАСНИХ СЦЕНАРІЇВ ЗМІН КЛІМАТУ

Ефективна адаптація сільського господарства до майбутніх змін клімату передбачає завчасну оцінку впливу очікуваних змін клімату на агрокліматичні умови вирощування сільськогосподарських культур. Дослідження проводилося з використанням даних, що очікуються за умов реалізації так званих “м’якого” та “жорсткого” сценаріїв (RCP4.5 і RCP8.5 відповідно [1]). Розрахунки виконані з використанням динамічної моделі оцінки агрокліматичних ресурсів А.М. Польового [2] для метеостанцій Любашівка (північна частина Одеської області), Одеса і Сарата (характеризують центральну частину області) та Ізмаїл, що є найбільш південною станцією в Одеській області. Розрахунки за сценаріями були деталізовані по десятиліттям, а саме до 2030, 2040 та 2050 рр. Порівняння виконувалося з фактичними середньобагаторічними даними по кожній станції, що містяться в Агрокліматичному довіднику по Одеській області.

Результати розрахунків за “м’яким” сценарієм показали, що у перший і другий сценарний періоди по всій досліджуваній території очікуються суми температур дещо менші за базові, особливо це стосується першого періоду – до 2030 р. Різниця між базовими і сценарними сумами становить у цьому випадку від 74°С в районі Ізмаїла до 122°С в районі Одеси. Суми температур другого періоду – до 2040 р. відрізняються від базових набагато менше, різниця становить від 4°С в районі Ізмаїла до 73°С в районі Любашівки. Такі малі різниці дозволяються говорити, що температурні умови другого періоду за умов реалізації сценарію RCP4.5 будуть майже такими, як і