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Formation of productivity of seeds of winter rape in short crop rotations depending on precursors and different fertilizer systems in zone of Ukrainian Polisya

Goal. Improvement of agrotechnology of winter rape cultivation due to balanced fertilization, selection of the most productive precursors in adaptive short-rotation crop rotations. Methods. Field, laboratory, statistical. Results The application of technology, which involves the application of nitrogen fertilizer rape in a dose of N80P60K80, ensures a significant increase in the yield of the crop, depending on the precursors, at 0.84 - 1.07 t / ha (68.6 - 69.5%) compared to unchecked control. It has been established that the highest seed yield (2.94-3.04 t / ha) of winter rape forms under favorable conditions when placed in short-rotation crop rotations after corn on silo or clover rayon against the background of mineral fertilizer application at a dose of N40P60K80 under pre-planting of soil and N40 in early spring supplementation. Conclusions Measures are being taken to increase the winter crop rotational quality for growing it on drained sod-podzolic sandy soils.

Key words: soddy podzolic soils dehumidified, winter rape, weather conditions, precursors, fertilizer rates, yield, oil collection, economic efficiency.

Formulation of the problem. One of the effective factors in increasing the production of crop production that would be market-oriented and would ensure economic efficiency in modern conditions is the progressive growth of rape seed production [2, 3, 9]. Comparing the yield of winter canola in Ukraine with productivity in neighboring European countries, it can be noted that on average it is almost twice lower [5, 6, 11]. This indicates that the potential of this culture is not fully revealed. Growth and stability of the production of rapeseed depends primarily on the intensification of the factors of the technological process of its cultivation, which have a positive effect on the implementation of the productivity potential of agrophytocenoses [4, 7, 8, 10, 12]. In the conditions of concentration of crops of the leading commodity crops, in the near future, there was a need for rape growing in scientifically grounded, highly specialized short-breeding farms with advanced cultivating technologies that would ensure its stable yield [1]. In view of this, there was a need to develop new models of formation on the sod-podzolite for the conditions of Polissya Sustainable dehydrated soil of highly productive agrocenoses of winter rape due to the selection of the best precursors and optimization of its fertilizer.

The purpose of the research is to improve the agro-technology of growing rape of winter due to the balanced application of fertilizers, the selection of the most productive precursors in adaptive short-rotation crop rotation, aimed at optimizing the production process, taking into account the specificity of the soil-climatic conditions of Polissya.

Research methodology. The study of the influence of predecessors and different fertilizer systems on the winter productivity of winter rape was conducted in 2007-2009 at the research field of the Institute of Agriculture of the Polissya National Academy of Sciences. A long field experiment was laid on drainage (pottery drainage) in the turf-mid-podzolic sandy soils. In accordance with the classification N.A. Kachinsky soil with granulometric composition - dust-and-sandy: in the arable layer 0 - 20 cm there is physical clay (particles 0,05 - 0,01 mm) 12,2 - 13,1%, which indicates its low content . The ornamental layer (0-20 cm) of

this soil was characterized by the following agrochemical parameters: humus content - 1.19 - 1.26% (by Tyurin), total nitrogen - 0.063 - 0.065% (by Kjeldahl), rolling phosphorus - 69-84 and exchangeable caliber - 73 - 101 mg / kg soil (according to Kirsanov), pH of salt - 5,6 - 6,0 (potentiometrically).

Winter rice was grown in short rotation crop rotations with the following alternation of crops: 1 - corn on green feed - winter rape - winter rye; 2 - corn on green fodder - winter wheat - winter rape; 3 - oats + cranberry racine - clover raccoon on two slopes - winter rape; 4 - barley + + clover racine - clover racetrack for one slope - winter rape.

The study of the effectiveness of doses of mineral fertilizers under winter rape was carried out according to the scheme: 1 - without fertilizers (control); 2 - the standard fertilizer norm - N80P60K80; 3 - N40P60K80 + N40 in spring rejuvenation for vegetation renewal; 4 - straw (2.5 t / ha) + + N80P60K80; 5 - straw (2.5 t / ha) + N40P60K80 + + N40 in spring rejuvenation for the restoration of vegetation. Applicable doses of fertilizers under apron and directly under the rape culture are given in the table. 1, 2, 3. The postbreak lupine (7 t / ha of green mass) was used on the sideloader. According to the experimental scheme, an approach is presented that is characterized by the optimal distribution of nitrogen fertilizers for their optimization by the ratio, which will allow to achieve higher productivity of culture at minimum economic costs.

Research results. Optimization of food conditions in a specific agro-climatic zone is one of the most important components of the technology of cultivating culture. The winter rye is rather evident in the availability of available forms of mineral nutrition in the soil, therefore the impact of fertilized fertilizers was crucial in shaping the yield of this crop. The analysis of harvest data showed that, on average, over 3 years, winter rape provided yields depending on fertilizer systems at the level: for placement in short-rotation crop rotation after the corn on silage - 1.56 - 3.01 t / ha; wheat winter - 1,23 - 2,41; cranberries for one slope - 1,54 - 3,0 t / ha; Clover for two slopes - 1,76 - 3,04.

The lowest level of winter rape crop was noted for uncontrolled control of all predecessors (1.23-1.76 t / ha). The application of technology, which involves the introduction of rape minerals in a dose of N80P60K80 at the background of the aftereffect of straw, provided an increase in its yield compared to unchecked control: for cultivating it after corn silage - by 1.07 t / ha (68.6%); winter wheat - at 0.78 t / ha (63.4%); cranberries for one slope - 1.07 t / ha (69.5%); Cranberries for two slopes - 0.84 t / ha (47.7%). Payback of 1 kg of fertilizer per crop yielded for such a dose of fertilizers, depending on predecessors, ranged from 3.5 to 4.9 kg (Table 1).

It was established that when using directly under the rape of winter mineral fertilizers at a dose of N80P60K80 on the background of the aftereffects of salts and siderates, which were used under the apron - corn silage, there was a significant increase in yield compared to non-fertilized control - 1.22 t / ha (78.2%).

The cultivation of winter wheat after winter wheat led to a significant reduction in winter crop yields by 0.5-0.8 t / ha, in comparison with the crop yields for the cultivation of this crop after corn silage (Table 2).

The presence of short-term crop rotations of legumes perennial grasses significantly affects the productivity of winter rape productivity. Due to the impact on the size of the crop rape crop, the raccoon and corn silage were almost equivalent to the predecessors of this crop. For mineral fertilizers at a dose of N80P60K80, the yield of winter wheat rape increases: for cultivating it after raisin shellfish for one slope - by 1.07 - 1.21 t / ha (69.5-78.6%); after the clover of the ray for two slopes - by 0.84 - 0.76 t / ha (43.2 - 47.7%), in comparison with the uncooled background. The payback of 1 kg of fertilizer per year was the highest for growing rape after the crested sunflower rays for one slope and amounted to 4.9 - 6.7 kg, whereas after the red clover it decreased to 3.8 - 5.8 kg (Table 3 and 4).

An extremely influential factor in increasing the productivity of winter rape was the introduction of mineral nitrogen into two receptions against the background of nutritional feeding N40P60K80: before sowing this crop at a dose of N40 and in the early spring feed N40 (var. 3 and 5). Growth of the crop, where nitrogen fertilizer was introduced in 2 receptions, was the largest of all predecessors and was: for the cultivation of rape after corn for silage - 1.38 - 1.45 t / ha (88.5 - 92.9%); winter wheat - 1,14 - 1,18 t / ha (92,7 - 95,9%); The cranberries of rayon on one slope - 1,43 - 1,46 t / ha (92,9 - 94,8%); The cranberries on the two slopes - 1,25 - 1,28 t / ha (71,0 - 72,7%). Regarding payback of 1 kg dp It should be noted that the yield of winter wheat was twice as high for rape as nitric fertilizers, and it was the highest: after corn on silage - 6.2 - 6.6 kg;

winter wheat - 5.2 - 5.4 kg; cranberries for one slope - 6,5 - 6,7 kg; after the clover of the ray for two slopes - 5.7 - 5.8 kg.

Thus, in the conditions of the Polissya, in the drained sod-podzolic sandy soils, the highest yield level - 2.94 tons - makes up 3,04 t / ha of winter wheat rape under favorable conditions when it is placed in the crop rotation after the corn on silo or ravenous clover on background of mineral fertilizers in a dose of N40P60K80 under pre-planting of soil and N40 in spring support for the restoration of vegetation.

It was established that the quality of winter wheat seedlings depended on the doses of mineral fertilizers. So, The use of mineral fertilizers was accompanied by a decrease in the fat content of winter wheat seeds, depending on their predecessors, by 0.9 - 3.6% compared with unchecked control (Table 5). On average, over three years of research, the fat content in winter rape seeds varied within the range of the following, depending on the background: for the cultivation of winter rape after corn - by 37.5 - 41.4%; winter wheat - 36.7 - 39.4%; Cranberries forests on one slope - 41.4 - 43.2%. There is an inverse proportional relationship between the amount of fat in winter rape seeds and fertilizer doses. The correlation coefficient r = -0.985. The highest fat content in the seeds was observed on the uncooled background for all the previous ones (39.4 - 43.2%). Despite the fact that the fat content in the seeds of winter rape from unhealthy variants was somewhat higher, however, its collection from the hectare due to increased yields on the fertilized variants increased by 320 to 460 kg for the cultivation of this crop after corn, at 230 - 350 kg - after the winter wheat and 300 - 480 kg - after the clover of the ray.

Analysis of the data on the economic efficiency of winter rape production has shown that the value of the gross output of this crop is directly correlated with its yield. Thus, the cost of growing winter rape on an uncooked background was the lowest and amounted to 1025 UAH / ha, which provided for a reduction in the cost price of seeds and increased profitability. When applied on rape of winter mineral fertilizers at a dose of N80P60K80, costs increased to 4249 UAH / ha. From the level of yield of the crop, the conditionally net income varied, the value of which on fertilized variants varied depending on predecessors of winter rape in the range from 2050 UAH / ha to 4870 UAH / ha. It has been established that the highest conditionally pure access is provided by the technology of growing winter rapeseed, which provides for its placement in short-rotation crop rotation after corn silage or clover, and introducing mineral fertilizers in a dose of N40P60K80 under pre-sowing tillage and N40 in early spring fertilization. The introduction of nitrogen fertilizers in two additions enables to increase the profitability of production of winter wheat seeds from 48 - 99 to 108 - 115% without additional expenses. The lowest level of profitability of winter rape seed production was noted for cultivating this crop after winter wheat. Therefore, it is most appropriate to place winter rape after the best predecessors, such as corn on green mass and perennial grasses (clover rayon).

Conclusions

The researches have established that in conditions of the Polissya of Ukraine on drier sod-podsola sandy soils the winter rape in short-rotation crop rotation provides yields depending on fertilizer systems at the level: for growing it after corn on silage - 1,56 - 2,94 t / hectare of seeds ; winter wheat - 1.23 - 2.41 t / ha; cranberries for one slope - 1,54 - 3,00 t / ha; Cranberries for two slopes - 1,76 - 3,04 t / ha of seeds.

The application of the technology, which involves the introduction of nitrogen fertilizer rape in the dose N80P60K80, ensures a significant increase in yields from 0.84 to 1.07 t / ha (47.7-69.5%), as compared to non-fertilized control.

The best conditions for the formation of the maximum level of winter crop yields were the technology that involves the introduction of mineral fertilizers in two doses of N40P60K80 in the preplant tillage and N40 in early spring feeding, which provides, depending on the precursors to increase the yield of this crops at 0.24 - 0.52 t / ha compared to a single dose of nitrogen fertilizer.

The best predecessor for winter rape turned out to be a raven clover. Due to the influence on the yield of winter wheat rape on silage, its predecessor was almost inferior to the cranberry ravens. The aforementioned predecessors give way as a precursor to winter wheat winter rape. The placement of winter rape in crop rotation after winter wheat reduces its yield by 0.5-0.8 t / ha of seed compared to the indicators obtained for growing it after corn for silage and raccoon clover.

The highest conditionally net profit (4780 UAH / ha) is provided by the technology of growing rape of winter after corn on silage and clover ravens for one slope, which involves the introduction of mineral

nitrogen in two steps in pre-sowing cultivation in the dose N40P60K80 and N40 in the early spring. The application of nitrogen fertilizers in two cases gives an opportunity to increase the profitability of winter rape without additional costs.

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