

agroecological growth conditions and barley development (feeding area, dosages and methods of fertilization, irrigation techniques, and plant population, etc.) has effect on formation of cereal crops phytomers [4]. Our experiments revealed (figures 1-3) that internodes of the barley main stalk elongate significantly with increase in the fertilizer dosage. The same patterns are observed with the lateral shoots. Thus, the length of the main stalk's first internode length of the non-fertilized (control) crop was equal to 19.3 cm and that of the second internode was 10.7 cm, while those of the crops treated with nitrogen fertilizers were 27.0 cm and 13.8 cm correspondingly. The same consistent pattern was noted for the lateral shoots (figure 1). Fertilization splitting resulted in biological life prolongation and boosting photosynthetic activity of barley leaves thus having significant effect on the crops formation (figure 2, 3).

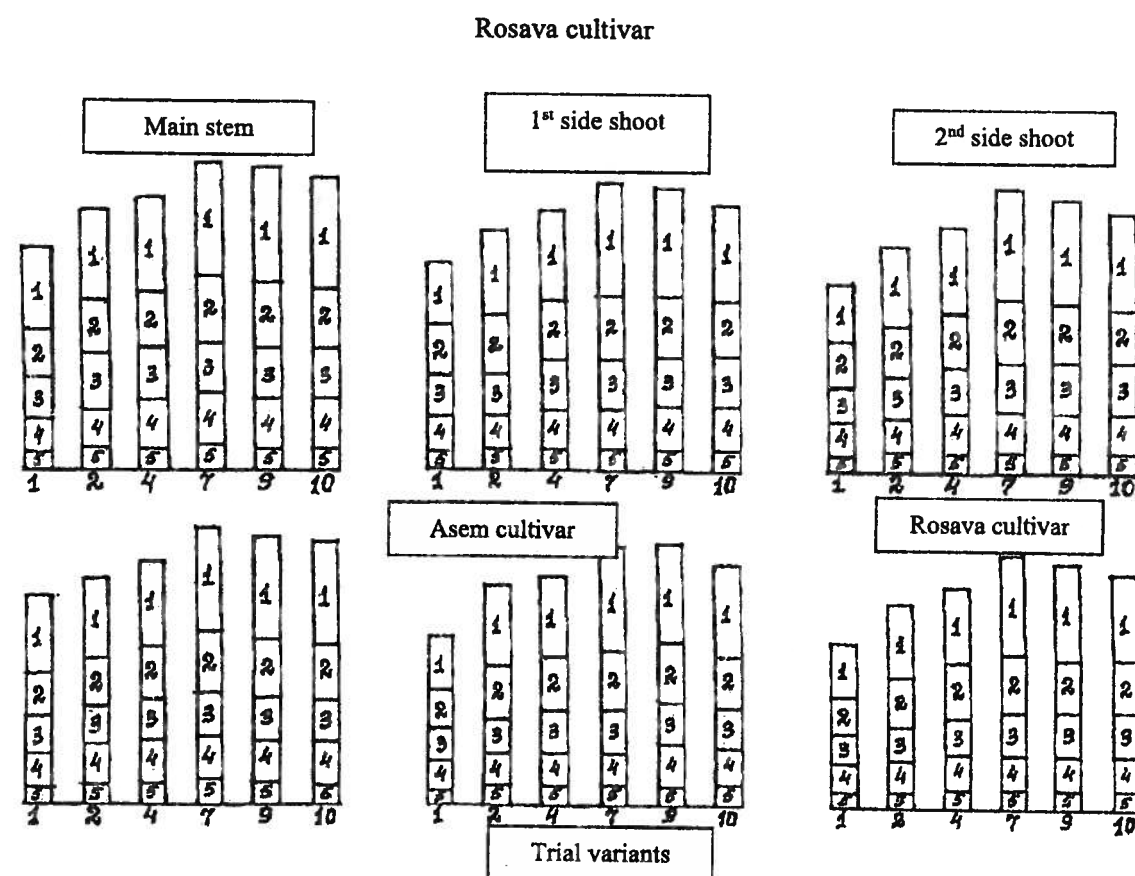


Figure 1 - Length of barley internodes (cm) depending on dosages and methods of mineral fertilizers treatment.

Legend: stalk internodes (from to downwards); Experiment options:

1 - N0P0; 2 - P90; 4 - N90P90; 7 - N90P90+N30+N30; 9 - N120P90+0+N30; 10 - N120P90

Barley cropping capacity depends to a large degree on the area of the leaves assimilating area [4,10]. Thus, fertilization splitting increases barley tillering capacity, number of yielding stalks and leaves area on every stalk, especially 2nd and 4th leaves on top (table 1 and figure 2,3). Area of the second and the fourth leaves of the main stalk of the control crops was 7.4-8.5 cm², and those of the lateral shoot - 5.8-8.0 cm² and partial nitrogen fertilization application resulted in the main stalk's second and fourth leaves area of 11.2-11.5 cm², i.e. increase by 35.4-51.4% and those of the lateral shooting - 8.5-10.2 cm², i.e. increase by 27.5-46.6%. This contributed to formation of the high cropping capacity (table 1, figure 2,3). The highest yielding capacity of barley grain was formed by the method of mineral fertilizers applying N90P90 + N30 + N30 kg/ha a.a. Fractional fertilizer application resulted in increase in plants tillering capacity from 1.27 to 1.30 pcs/plant to 2.73 to 2.83 pcs/plant (i.e. times 2.1) and increase in the number of productive stems from 277 to 308 pcs/m² up to 638 to 672 pcs/m², i.e. 2.3-2.5 times (table 1).

Table 1 - Effect of Dosages and Methods of Mineral Fertilizers Application to Formation of Barley Crops Agrocoenosis and Yielding Capacity

Mineral Fertilizer Application Dosages and Methods, kg/ha	Number of Plants before Harvesting, pcs./m ²	Number of Productive Stalks, pcs./m ²	Tillering Capacity, pcs./plant	Share of Lateral Shoots in Crop For-mation, %	Grain Yield, hundr. centner/hectare
Rosava Cultivar					
1. N0P0 (control)	241	308	1.28	21.8	14.1
2. P90	245	326	1.33	24.8	15.8
3. N60P60	255	490	1.92	48.0	19.0
4. N90P90	248	513	2.07	51.7	23.6
5. N60P60+N30+N30	257	637	2.48	59.7	30.8
6. N90P60+N30+N30	252	645	2.58	60.8	32.3
7. N90P90+N30+N30	249	672	2.70	62.9	35.4
8. N90P90+0+N30	251	565	2.25	55.6	26.8
9. N120P90+0+N30	253	633	2.50	60.0	30.7
10. N120P90	246	615	2.50	60.0	30.0
HCP ₀₅ - pcs./m ² or hundr. centner/ hectare	12.3	15.4	-	-	3.05
Assem Cultivar					
1. N0P0 (bakylau)	225	277	1.23	18.8	12.8
2. P90	231	300	1.30	23.0	14.1
3. N60P60	236	432	1.83	45.4	16.0
4. N90P90	232	464	2.00	50.0	19.5
5. N60P60+N30+N30	241	605	2.51	60.2	26.4
6. N90P60+N30+N30	238	638	2.68	62.7	29.5
7. N90P90+N30+N30	243	634	2.69	62.9	33.1
8. N90P90+0+N30	237	548	2.31	56.8	22.0
9. N120P90+0+N30	240	614	2.56	60.9	26.1
10. N120P90	235	611	2.60	61.5	25.8
HCP ₀₅ - pcs./m ² or hundr. centner/ hectare	14.8	13.1	-	-	2.91

Note: N30 - additional fertilizing in the beginning of the tillering period;
N30 - additional fertilizing in the beginning of the ear formation period.

Therefore, when barley is cultivated on saline and nutrient-poor soils of rice crop rotation system, application of fertilizers N90P90 and N60P60 kg/ha prior to sowing and additional treatment with nitrogen fertilizers at the dosage of N30 kg/ha in the beginning of tillering stimulates plants tillering. As a result, number of productive stalks increases same as the total area of the leaves on each stalk resulting in increase in the grain yielding capacity (yield increase of 17.7-21.3 h. centner/ hectare). Additional fertilization (N30 kg/ha) in the beginning of ear emergence does not lead to increase in productivity but contributes to good grain formation. To find this out, research (experiments) was conducted in reduced form (table 2) in 2007-2010. Results of the research (table 2) revealed that split application of nitrogen fertilizer (option 4, N90P90+N30 kg/ha) contributed to the greatest grain yield (36.7 h. centner/ hectare) but additional fertilizer application in the beginning of ear emergence period (option 5) did not contribute to increase in the crop yield.