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THE EFFECT OF DIFERENT LEVELS OF PLANT MINERAL NUTRTION WITH THE MANURE BACKGROUND ON YIELD OF SUGAR BEET AND ON TECHNOLOGICAL PROPERTIES OF BEETS THAT WARE GROWN ON MEDOW-CHERNOZEMIC CALCAREUS SOIL

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Different levels of mineral nutrition of sugar beet on manure back ground influenced positively on growth and development of plant sinearly growth stages. They increased growth of leave and of beets during vegetation. Maximal yield was got in the variant with $N_{210}P_{27}K_{255}$and in variant with $N_{140}P_{180}K_{170}$ and in variant with calculated rate $N_{130}P_{70}K_{150}$. It was 67.8-59.1 t per ha. These rates decreased sugar contentin beets and its technologic properties.

Fertilizers, sugar beets, plant weight, yield, sugar content

Sugar beet has leading place between crops through high it yield. It yield can be 28 t per ha of dry matter in optimal conditions. It is 90 t per ha beets and 35-40 t per ha leave [3].

In last period beet yield was 18-23 t per ha in Ukraine. The modern farm in Ukraine get 40-50 t per ha beets. This level of yield is caused inobservance damages of growth technology of this crop and nutritive conditions especially. For forming 1 t beet yield and proper leave yield sugar beet takes up 120 kg of nitrogen and 45-55 kg of phosphorus and 150-170 kg potassium [1, 5]. Natural soil fertility can not supply sugar beet with nutrients for high yield. Just areas under sugar beet were decreased in 6-7 units but necessity in these products is very big. The methods of yield increasing in intensive growth technology of this crop based scientific fertilizer application according to soil conditions and climatic conditions and according to crop biology.

The goal of our investigation is determination of effect of different nutritive levels with manure background on physiological processes in plants and on beet yield formation and on technological properties of beets.

The methods of investigation. The field trials were placed in long-time field experiment of Department of agrochemistry and plant products. The field

cultivated under sugar beet was arranged in cereals-beet rotation in Agronomic research organization in National university of life and environmental sciences of Ukraine.

The soil is medow carbonatic chernozem. Humus content was 4.6 %. pH is 7.3. The supply with nitrogen and supply with evadible phosphates were middle. The supply with exchangeable potassium was low. The presiding crop was winter wheat. The scheme of experiment included variants: 1. control (without fertilizer application); 2. background (manure aftereffect 12 t/ha); 3. background and $N_{140}P_{180}K_{170}$; 4. background and $N_{210}P_{270}K_{255}$; 5. background and calculated rate ($N_{130}P_{70}$ K_{150}); 6. $N_{140}P_{180}$ K_{170}. The hybrid named "Krokodyl" was grown. The growth technology of sugar beet was used typical for Forest-Steep of Ukraine.

The results of the field trials.

In the our investigations was determined that mass seed germination of sugar beet and intensive growth of young plants influenced on yield formation and qualitative indexes of beets considerably. Different rates of fertilizers effected on weight of 100 plants during forming density (table 1).

1. **The effect of different rates of fertilizers on weight of 100 plants in density formation**

Treatments	Weight of 100 plants, g	Root weight (100 plants), g	Leave weight from 100 plants, g	Relation between leave weight and beet weight
Control (without fertilizers application)	54,8	6,9	47,9	6,94
Manure aftereffect – background	76,7	9,0	67,7	7,52
Background + $N_{140}P_{180}K_{170}$	174,3	14,4	159,9	11,10
Background + $N_{210}P_{270}K_{255}$	211,5	27,3	194,2	11,23
Background + $N_{130}P_{70}K_{150}$)	152,2	14,2	138,8	9,77
$N_{140}P_{180}K_{170}$	136,7	12,1	124,6	10,30

Invariant with recommended fertilizer rate ($N_{140}P_{180}K_{170}$) this index was greater on119,5 g.In variant with $N_{210}P_{270}K_{255}$it was increased on156,2 gin comparative to control. Calculative rate of fertilizer influenced positively on weight of 100 plants. According to researches of M.I. Orlovskiy[6] на час утворення першої пари листків головний корінь рослин буряків цукрових

проникає на глибину до 30 см, що дає можливість поступово використовувати поживні елементи основного удобрення, впливаючи на наростання маси гички і коренів.

The fertilizers influenced on growth of sugar beets (table 2). The weigh to fleave increased in first period of plant vegetation intensively. This index was in 3.92 bigger in the variant with $N_{210}P_{270}K_{255}$ application in comparative to control. The usding of cslculstive rate was effective too. The beets grown in the next period of the plant vegetation. In the variants with fertilizers rates $N_{140}P_{180}K_{170}$ and $N_{210}P_{270}K_{255}$ weight of beets was652 g and746 g. It was bigger in 2-2.5 to control. Correlation the weight of leave to weight of beets was 0.82 with $N_{210}P_{270}K_{255}$application. It was the best result in field trials. In control variant this index was 0.54 and it was lowest index.

2. The effect of different fertilizer rates on weight accumulation of leave and weiglt accumulation of beets, g

Variants	Clousing up leave between rows			Intensive growth			Harvesting		
	Beet weight	Leave weight	Correlation leave weight to beet weight	Beet weight	Leave weight	Correlation leave weight to beet weight	Beet weight	Leave weight	Correlation leave weight to beet weight
Control (without fertilizers application)	24	114	4,73	195	308	1,58	259	140	0,54
Manure aftereffect – background	32	173	5,40	233	348	1,65	327	199	0,61
Background + $N_{140}P_{180}K_{170}$	49	364	7,42	395	778	1,97	652	496	0,76
Background + $N_{210}P_{270}K_{255}$	56	447	7,98	456	980	2,15	746	612	0,82
Background + $N_{130}P_{70}K_{150}$)	45	299	6,64	402	748	1,86	622	435	0,70
$N_{140}P_{180}K_{170}$	42	282	6,72	361	625	1,73	580	383	0,66

Thefertilizerapplicationindifferentratesinfluencesonbeetyieldandsugaraccum ulation (table 3). Manureaftereffectincreasedbetyieldon 8.7 tper ha in comparative to control. Fertilizer application in rate $N_{140}P_{180}K_{170}$increased beet yield on 32.6

t/ha. this fertilizer rate on manure aftereffect in creased beet yield on 38.6 t/ha. the best beet yield was got in the variant with fertilizer application in rate $N_{210}P_{270}K_{255}$.

The same scientist determined that increasing of fertilizer rates under sugar beets influenced on sugar accumulation in beets negatively [2,4,5,7,8,9]. The sugar content in beets was lowest in variant with fertilizer rate $N_{210}P_{270}K_{255}$ (16,26%) and the best sugar content was in control variant (17,75) (table 3). But refined sugar yield was increased in the variants were sugar content was decreased.

3. The effect of fertilizers on beet yield and sugar content in beets (2009-2013)

Variants	Beet yield, t per ha	additional yield, t per ha	Sugar content, %	Sugar yield, t per ha	Refined sugar yield, t per ha
Control (without fertilizers application)	31,1	8,7	17,75	5,52	1,51
Manure aftereffect – background	61,0	38,6	16,92	10,32	6,31
Background + $N_{140}P_{180}K_{170}$	67,8	45,4	16,26	11,02	7,01
Background + $N_{210}P_{270}K_{255}$	59,1	36,7	17,21	10,17	6,16
Background + $N_{130}P_{70}K_{150}$)	55,0	33,6	16,69	9,8	5,70
$N_{140}P_{180}K_{170}$	22,4	-	17,94	4,01	-

The fertilizer application under sugar beet increased a-amino-N content and content of Na and K amount in beets (table 4). Its decreased good sugar quality and increased sugar losses in molasses.

4. The effect off ertilizer application on technological value of beets

Variants	Sugar content,	a-amino-N, mg-eq./100	Amount of Na and K,mg-eq./100 gsap	Sugar losses in	Good quality

	%	gsap	K^+	Na^+	molasses, %	of sugar, %
Control (with out fertilizer sapplication)	17,94	3,18	4,05	1,81	2,04	90,2
Manure aftereffect – background	17,75	3,46	4,33	2,02	2,15	90,0
Background + $N_{140}P_{180}K_{170}$	16,92	4,28	4,97	2,60	2,69	88,9
Background + $N_{210}P_{270}K_{255}$	16,26	4,81	5,26	3,12	3,03	88,1
Background + $N_{130}P_{70}K_{150}$)	17,21	4,31	4,55	2,52	2,40	88,8
$N_{140}P_{180}K_{170}$	16,69	4,34	4,82	2,49	2,73	88,4

Conclusions

Therefore, mineral fertilizer son the manure after effect increased leave growth and beet growth and beet yield level. The higher fertilizers rates decreased sugar content and increased content of harmful compounds and sugar losses in molasses.