European Journal of Research Development and Sustainability (EJRDS)
Available Online at: https://www.scholarzest.com
Vol. 2 No. 4, April 2021,
ISSN: 2660-5570

PERCENTAGE OF POTATOES FERTILIZATION AND NITRATE AND AMMONIUM NITROGEN DYNAMICS IN SOIL UNDER THE INFLUENCE OF CRYOPROTECTORS

Nazarov Orzikul Mamatovich,
Senior teacher, Samarkand veterinary medicine institute, Uzbekistan.
orzikul@bk.ru.
Khoshimov Farkhod Khakimovich,
C.Ag.Sci., Prof., Samarkand state university, Uzbekistan

Article history:
Received: April 1th 2021
Accepted: April 11th 2021
Published: April 30th 2021

Abstract:
The article describes when different amounts of nitrogen fertilizer are applied in field experimental options and potato seed protection coat from low temperature and nitrogen uptake by mulching with a half-rotten fertilizer on the field using cryoprotective agents, nitrogen reserves in the soil and the assimilation dynamics by yield

Keywords: Nitrate nitrogen, ammonium nitrogen, cryoprotectors, potatoes, fertilizer, yield, mulching.

INTRODUCTION.

Global climate change on a global scale, a sharp drop in temperature leading to large losses as a result of adverse effects on plant growth and development.This damage is mainly in the agro-industrial association. Natural changes such as climate change, increased rainfall, early spring cold, summer drought has a negative impact on the yield and agricultural crops quality [5; 35-36-6.]. According to many scientists, the climate change impact on nature cannot be completely prevented, however, some situations can be avoided: in this regard, scientific work is being carried out in targeted areas. One of the scientific innovative ideas is being conducted research to application of organic-mineral fertilizers in potato growing in botany, increase the cold resistance of the plant under the cryoprotective substances influence, to grow high yields tomorrow and increase soil fertility [1; 3-5-p., 2; 209-210-p., 3; 249-250-p, 4; 5-6-p].

MATERIALS AND METHODS.

Field experiments were conducted on the basis of generally accepted methods in the meadow gray soils conditions of Taylak district of Samarkand region farms. In the first experiment, the same fertilizer rate influence and different concentrations of cryoprotective substances in potato cultivation was studied and 11 options were conducted in 6 repetitions. The second field experiment examined the different aqueous concentrations influence of different fertilizer standards and the most acceptable cryoprotectant type on the nitrogen nutrition of potatoes, and 9 options were conducted in 6 repetitions. Aqueous polyethylene oxide, propandiol, polyethylene glycol solutions were used as cryoprotectors. In the experiment, it was grown the potato variety "Cardinal".

OBTAINED RESULTS AND THEIR ANALYSIS.

In the research of nitrogen dynamics in the experiment, when the experimental area was analyzed by taking a soil sample before fertilization and planting potatoes, in all options min and max ($N\text{-}NO_3$) nitrate amount is 19,32-21,55 mg/kg, min and max ($N\text{-}NH_4$) ammonium amount is 27,53-29,03 mg/kg. In the options mulched with a semi-rotten fertilizer, a fertilizer at the 2.5 kg rate per 1 m of furrow was applied. The obtained analysis results are presented in Table 1. In the control (autumn) option, a slight decrease in nitrogen nutrition was found. If $N\text{-}NH_4$ is 19,51 mg/kg, $N\text{-}NO_3$ amount was 28,01 mg/kg. No significant change was observed in the control (spring) option either. The amount of ammonium and nitrate increased depending on the fertilizer amount used in the experimental option. If in 25 t/ha fertilizer+N200P160K100 (1,2-PD-0,01 %) the option used the $N\text{-}NH_4$ amount is 19,55 mg/kg, $N\text{-}NO_3$ amount increased to 28,13 mg/kg. It was found that ammonia and nitrate increased by 0.21% and 0.43%, respectively, compared to the autumn control. If in 40 t/ha fertilizer +N180P120K60 (1,2-PD-0,05 %) option the $N\text{-}NH_4$ amount is 19,58 mg/kg, $N\text{-}NO_3$ amount increased to 28,01 mg/kg. It can be seen that ammonium increased by 0.36% and nitrate by 0.64% compared to the fall control option. Because part of the fertilizer was used as mulch, the fertilizer produced less nutrient reserves than the option used at 40 t/ha. There is a correlation between the fertilizer and plant assimilation amount to changes in the amount of ammonium and nitrate in the soil. The prescribed nitrogen fertilizer rate is divided into two feedings. When applied to the soil layer, the amount of nitrate and ammonium in the soil driving layer solution increased as a result of the fertilizer dissolution. If theoretically the first feeding was given

nitrogen fertilizer at an average rate of 100 kg/ha, the average nitrogen content per kilogram of soil increased by 13-15 mg/kg. Over time, the nutrients are assimilated by the plant, a certain part is washed away, at the expense of there is a decrease. The transition rate of nitrogenous nutrients to the plant depends on the plant development and climatic-soil conditions. By the time of budding, nitrogen nutrition had become more active, while the nitrogen content in the control option had decreased.

Table 1
Influence of mineral and organic fertilizer norms on changes in nitrate and ammonium nitrogen in soil composition (2015-2018)

№	Experiment options	Cryoprotector concentration, %	The amount of mobile nitrogen, мг/кг									
			In the autumn before planting		Sprouting		Budding		Flowering		withered whip	
			$N\text{-}NH_4$	$N\text{-}NO_3$	$N\text{-}NH_4$	$N\text{-}NO_3$	$N\text{-}NH_4$	$N\text{-}NO_3$	$N\text{-}NH_4$	$N\text{-}NO_3$	$N\text{-}NH_4$	$N\text{-}NO_3$
1.	Control without fertilizer (planting in the fall)	—	19,51	28,01	19,45	28,01	15,15	23,65	8,7	17,2	3,37	11,87
2.	Control without fertilizer (planting in the spring)	—	19,41	29,03	20,6	29,03	15,27	23,35	7,16	14,94	0,53	8,01
3.	40 t fertilizer+N180 P120 K60 (planting in the fall)	1,2-PD-0,01	19,55	28,13	23,93	30,28	28,78	40,63	34,28	48,38	27,68	41,78
4.	40 t fertilizer+N180 P120 K60 (planting in the fall)	1,2-PD-0,05	19,58	28,19	23,83	30,38	25,05	37,11	25,19	39,5	14,17	28,47
5.	25 t fertilizer+N200 P160 K100 (planting in the fall)	1,2-PD-0,01	19,35	27,53	22,21	30,09	30,47	42,37	37,74	52,14	31,37	45,77
6.	25 t fertilizer+N200 P160 K100 (planting in the fall)	1,2-PD-0,05	19,35	27,53	22,19	30,09	28,17	40,07	32,03	46,43	22,84	37,25
7.	10 t fertilizer+N250 P180 K120 (planting in the fall)	1,2-PD-0,01	19,32	27,43	20,85	28,45	31,82	45,66	43,66	60,63	37,96	54,93
8.	10 t fertilizer+N250 P180 K120 (planting in the fall)	1,2-PD-0,05	19,36	27,45	20,89	28,47	29,65	43,48	38,21	55,17	29,81	46,77
9.	N200 P160 K100 (planting in the fall)	1,2-PD-0,05	19,37	27,49	19,37	27,49	25,12	38,24	30,12	45,74	21,87	37,49

The main reason for this is that it is assimilated by the plant and no fertilizer is applied. In the fertilized option, nitrogen nutrient reserves increased due to fertilizer. It was found that the nitrogen dynamics in the period after potato germination changes depending on the cryoprotector type and concentration. This is due to the fact that under the cryoprotectors influence, the seeds, which have increased frost resistance, grew a healthy stem from the tuber and formed a strong pod. Due to this, the increase in yield and nitrogen content in the soil was inversely proportional to each other. The $N\text{-}NH_4$ amount was 27,68 mg/kg and the amount of $N\text{-}NO_3$ was 41,78 mg/kg in the 1,2-PD-0.01% option of 40 t/ha manure+ N180P120K60 (planting in the fall) during the wilting period. At 40 t/ha fertilizer+N180P120K60 (planting in the fall) in the 1,2-PD-0.05% option, the $N\text{-}NH_4$ content was found to be 14.17 mg/kg and the $N\text{-}NO_3$ content was 28.47 mg/kg. In comparison, the $N\text{-}NH_4$ amount in the 1,2-PD-0.05% is 13.52 mg/kg, the $N\text{-}NO_3$ amount is 13.31 mg/kg less than in the 1,2-PD-0.01%. The main reason for this is the efficient use of fertilizers by the potato plant. In each option, it was found that the increase in frost resistance of potatoes under the cryoprotectors influence had an influence on the nitrogen dynamics. 25 t/ha fertilizer+N200P160K100 (planting in the fall) in the 1,2-PD-0.01% option, the amount of $N\text{-}NH_4$ before sowing was 19.35 mg/kg and the amount of $N\text{-}NO_3$ was 27,53 mg/kg. In the spring germination phase, the $N\text{-}NH_4$ content was found to be 22,19 mg/kg and the $N\text{-}NO_3$ content was 30,09 mg/kg. In the period before budding, the amount of nitrogen increased due to fertilization.

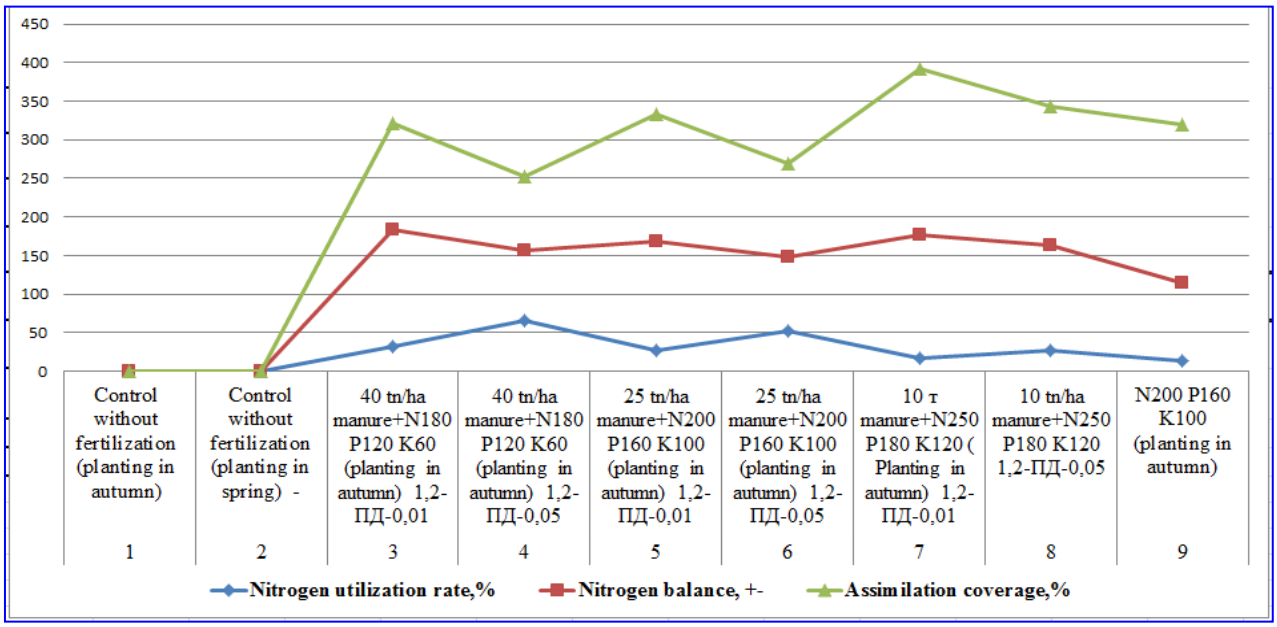

Figure 1. Use of nitrogen in experimental options, nitrogen balance and correlation of coverage, 2015-2018.

By the end of the growing season, the $N\text{-}NH_4$ content was 31.37 mg/kg and the $N\text{-}NO_3$ content was 45.77 mg/kg. In the N200P160K100 (planting in the fall) option, the growth phase was as follows; the amount of $N\text{-}NH_4$ before planting is 19.37 mg/kg, $N\text{-}NO_3$ amount is 27,49 mg/kg, in the germination phase $N\text{-}NH_4$ amount is 19,07 mg/kg, $N\text{-}NO_3$ amount is 27,10 mg/kg. Nitrogen depletion was detected at the end of the growing season. The correlation between the nitrogen dynamics in the soil in the experimental field, nitrogen balance, coverage, and use of applied nitrogen can be seen in Figure 1.

CONCLUSION.

Changes in nitrogen nutrition in the experimental field depending on the amount of $N\text{-}NH_4$ and $N\text{-}NO_3$ present in the soil during the growing season of potatoes, varies depending on the fertilizer applied and the cryoprotective concentration. In the option with increased frost resistance using cryoprotectors and mulch buddingrials, it was found that the yield increased due to the increased germination of potato tubers and efficient assimilation of available nitrogenous nutrients. The rate of increase in nitrogen demand of potato plants was determined by the decrease in the $N\text{-}NH_4$ and $N\text{-}NO_3$ in the soil due to the efficient assimilation of nutrients in the soil. On the basis of the scientific activity studied in the study, the influenceive use of nitrogen fertilizers applied from the potato farms soil was achieved. In the experimental options, a correlation was found between nitrogen utilization, nitrogen balance, and coverage.

REFERENCES

1. Bolieva Z.A., Abaev A.A., Doeva L.Yu., Likhnenko S.V., Draeva L.B. Cryobiological bases of potato cultivation in the foothill zone of North Ossetia - Alania. Vladikavkaz, 2013. p. 4-30.
2. Yangibiev M.Ya, Khodzhaev G.Kh. Influence of cryoprotective treatment on germination and growth of maize exposed to low temperatures. UNESCO. Advances in modern cryobiology 2nd international conference.1992. Kharkov. p. 209-210.
3. Hejazi Mehrizi M., Sarcheshmehphour, Z.Ebrakhimi. The influences of some humic substrances and vermicompost on phosphorus transformation rate and forms in a calcareous soil. // Soil Science and Plant Nutrition, - 2015. - № 15 (1) - P. 249-250
4. Khamzaev A.X. Technologies for growing potatoes tomorrow.//Journal of Agriculture of Uzbekistan. - Tashkent. 2010. -№2. 5 p.
5. Khashimov F.Kh. Condition and ways of increasing soil fertility in the Zarafshan valley//Monograph. Samarkand. 2018. p.10-4, 65-70.