DEPENDENCE OF THE DURATION OF THE VEGETATIVE PERIOD OF PEANUTS FROM MINERAL NUTRITION

[1]Khudaikulov Jonibek Bozarovich, [2]Kholmurzaev Bobur Mansurovich
[1]DSc on Agricultural Sciences, professor
[2]PhD on Agricultural sciences,
Tashkent State Agrarian University
https://doi.org/10.5281/zenodo.10356989

Abstract. *Mineral fertilizing was one of the main agro-technical measures for increasing the yield of peanuts. Field experiments carried out in conditions in the typical gray soils of the Tashkent region and the result have shown that scientifically based application of mineral fertilizers positively affects the yield of peanut grains.*
Keywords: *oilseed, oilseed, peanuts, organic fertilizers, Calcium.*

Introduction. At present, it is observed that the world's population is increasing rapidly, which causes people's demand for daily food products, including edible oil and protein, and the growth rate of food shortage to increase day by day.

The edible oil and protein content of peanut seeds can compensate for such deficiencies and is of high importance in terms of economic efficiency. In the case of India alone, groundnut is mainly an oilseed crop *(because about 78% of the cultivated crop is for oil production)* is taken care of. In our country, this crop is grown every year on an average of more than ten thousand hectares in an amount that can fully satisfy the demand of our population. Not only in our country, but also in all countries that grow peanuts, the incomparable role of mineral fertilizers in obtaining abundant and high-quality harvests from peanuts has been proven in scientific sources.

Scientist G. Narasimhulu [4], who conducted scientific research on feeding peanuts with mineral fertilizers, said that a high yield of peanuts can be achieved only when the soil contains enough basic nutrients. Each quantal is a centner *(ing.=50,8 кг; amer.=45,36 kg*) 4.38 kg N, 0.40 kg P and 2.60 kg K are required for pod formation. R.V. Raghavaiah [6], C.Ranganayakulu, A.Raju and G.Sankara Reddy [7] found that 4.38 kg of N in the formation of one quantal of pods; 0.40 kg P; In addition to 2.60 kg of K, 1.23 kg of Mg and 4.0 grams of Zn are required.

According to F.J.Stevenson [8], the use of large amounts of organic fertilizers can be an additional source of nutrients for the optimal growth and development of the peanut crop. Organic matter reduces the density and hardening of the soil and improves its structure. Also, organic matter is a source of nutrients for the peanut crop and helps to accumulate nitrogen in the root of the plant with the help of microorganisms.

According to Y.Sollins, H.D.Morris [3], peanut is a demanding plant for various nutrients. According to scientists, for every 1 ton of beans and 2 tons of plant straw, 63 nitrogen; 11 kg of phosphorus, 46 kg of potassium, 27 kg of calcium and 14 kg of magnesium elements are absorbed from the soil, and on average 50% of nitrogen and phosphorus and 80-90% of potassium, calcium and magnesium elements are retained in plant straw.

M.Amanova, A.Rustamov, L.Allanazarova, J.Khudaykulov [1] stated that when peanuts are given more than normal nitrogen fertilizer, the yield increases by 0.2-0.4 t/h, but the accumulation of nitrogen bacteria in the root is observed in the experiments. Calcium, magnesium, boron, and zinc are also important for obtaining a high yield of peanuts, along with macroelements.

Lack of calcium in the soil causes blackening of the first leaf buds of the plant, very slow growth of grass, decrease in viability of grass, and stunting of plants. Microelements also act as catalysts in the absorption of other nutrients in the soil. The microelements in the soil are less than the norm, which has a negative effect on the growth and productivity of the plant.

The coefficient of absorption of nutrients from soil and fertilizer depends on the type of soil, temperature, amount of precipitation, type of fertilizer, form, and irrigation system.

According to A.V.Peterburgsky, field crops absorb 10% of NPK from soil, 25-30% of N, 30% of R205, 60% of K20 from manure in the year of fertilization. 40-88% of nitrogen will die. Especially in irrigated conditions and when the weather is hot, there is a lot of nitrogen loss.

The absorption of phosphorus and potassium depends on the moisture of the soil and the activity of symbiosis. If Typpoqni is in a neutral or slightly acidic environment and contains 80-140 mg/kg of moisture, 18-22% of phosphorus and 20-25% of potassium are absorbed. The absorption of phosphorus from mineral fertilizer is 35-40%, and potassium is 65-80%. If the conditions for biological symbiosis are not good, if there is not enough nitrogen, the absorption of phosphorus and potassium can be 3 - 7 and 5 - 10%.

Time and method of feeding with mineral fertilizers. When designing a fertilization system, it is necessary to determine the method and timing of fertilization. In general, fertilizers are applied in 4 periods.

1. The main fertilizer is applied before plowing. This fertilizer is intended to supply the crop with nutrients throughout the growing period. At the same time, organic and mineral fertilizers are used. It is necessary to mix certain fertilizers deeply into the soil with a harrow. Surface application of phosphorus fertilizers is useless, because phosphorus fertilizers are stored in the same layer as the depth of the soil. Fertilizer applied on the surface is not absorbed by the crop, because the upper part of the soil is always dry, so the root does not develop in this layer. If phosphorus fertilizers are in liquid form, they can be absorbed into the soil up to 10 cm.

Compared to phosphorus, potassium penetrates into the deep layer of the soil, the main part is absorbed in the absorbent complex of the soil, and part of it goes down with water. When the weather is hot, potassium remains in the soil layer. It is advisable to use potassium fertilizers as the main fertilizer before plowing the land.

2. Fertilize before planting. Phosphorus and potash fertilizers are applied before planting at a depth of 12-15 cm. This is done along with pre-sowing cultivation.

3 Fertilize at the same time as planting.

4. Fertilizing after planting. Fertilizing after planting is used only when the soil is not rich in nutrients, in crops planted in wide rows, when working between the rows, fertilizer is applied to a depth of 8-12 cm. Additional feeding with nitrogen fertilizers gives good results in the peanut crop.

Object and method of experiment

Scientific research work was carried out in the field of Agricultural Scientific Research and Educational Experimental Farm of Tashkent State Agrarian University. The experimental farm is located in the upper reaches of the Chirchik River, at an altitude of 481 m above sea level, $41^0\,11^{II}$ in the northern latitude and $38^0\,31^{II}$ It is located in the eastern distance in Qibrai district of Tashkent region.

The experimental farm is 1500 meters away from the university yard, it is bordered by the Salar stream on the east side, the Boz water channel on the west side, the hospital of Tashkent PTI on the south side, and the residential area on the north side.

The soil of the experimental farm is a typical gray loam that has been irrigated for a long time. This soil contains about 0.8-1.0% humus, about 0.058-0.089% nitrogen, about 0.141-0.184% phosphorus and about 0.154-0.148% potassium. The soil is not saline. It differs in soil water permeability, softening complexity.

Conducting field experiments: planting, crop care, harvest, calculation and analysis of the field developed by scientists of the State Commission for Testing New Varieties of Agricultural Crops, Plant Science ITI, International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) conducted on the basis of methods and methodical manuals of conducting experiments [1;2;5]. The statistical analysis of the results obtained in the field experiments was calculated using the WinQSB-2.0 and Microsoft Excel programs according to the B.A.Dospekhov method.

Experimental results

For the good growth of the peanut plant, softening the crop rows, avoiding excess moisture, raising the soil temperature, improving air exchange and eliminating weeds are very important agrotechnical measures. In our field experiments, the first mowing was carried out after the grasses had fully emerged to eliminate weeds and soften the rows. Special attention was paid not to damage the plant and not to bury it with soil.

Description of varieties studied in the experiment: "TASHKENT-112" variety belongs to the group of botanical varieties Fastirjiata, mid-early (vegetation period 140-150 days), average yield (15-17 t/ha), small red seeds (1000 seeds weigh 350-400 g). Suitable for consumption as a dry fruit and for oil production.

“MUMTOZ” variety description. The collection specimen "L-5 x ICGV-94088" (India) was created by gross selection.

Authors: M.E.Amanova, A.S.Rustamov, Sh.Nigam, R.F.Mavlyanova, Z.I.Holikulov.

Belongs to the Virginia variety, the plant is semi-erect, moderately branching. The pods are large, the shape of the pods is wavy, the surface is slightly deep, pale yellow, the skin is medium-rough, the middle is slightly narrow, and the seam is medium. The color of the seed is dark red, oblong oval shape. The variety is medium, ripens in 138-145 days. The average yield is 27-28 ts/ha. The weight of 1000 seeds is 686.0-710.0 gr. Suitable for mechanical assembly. Pod adhesion is high 5.0 points, ripeness is 80.0%. Fat content of grain is 48.5%, protein is 18.0%. The variety is resistant to agricultural diseases and insects. Entered into the State Register in 2006.

Fertilization. The rate of fertilizing the field was determined based on the results of the agrochemical analysis obtained from the selected field. According to the methodology of the experiment: option 1 control (fertilizer not applied); Option 2 background – $N_0P_{150}K_{100}$; 3-option – N_{100} + background; 4-option – N_{150} + background; 5-option – N_{200} + background; 6-option – N_{250} + background The use of mineral fertilizers at the rate of kg/ha was studied in field experiments. In this case, the annual rate of phosphorous and potash fertilizers was applied to the field by spraying methods before the preparation of the field for planting, i.e. chisel-fertilizing measures. Different standards of nitrogen fertilizers were applied twice during the growth and development periods of peanut cultivars, i.e. the first feeding was carried out after full germination of seedlings until flowering, and the second feeding with nitrogen fertilizer was carried out after peanut cultivars entered full bloom.

The following phenological observations were made during the growing season: 10% germination, 75% germination, 10% flowering, 75% flowering, 10% nut formation, 75% nut formation (by digging peanut bushes planted in protected areas determined by vision), harvesting (biometric measurements on isolated plants).

In the experiment, the "Tashkent-112" variety, which has been widespread in our country for several decades, was studied as a control variety, as well as important economic characteristics of the "Mumtoz" variety.

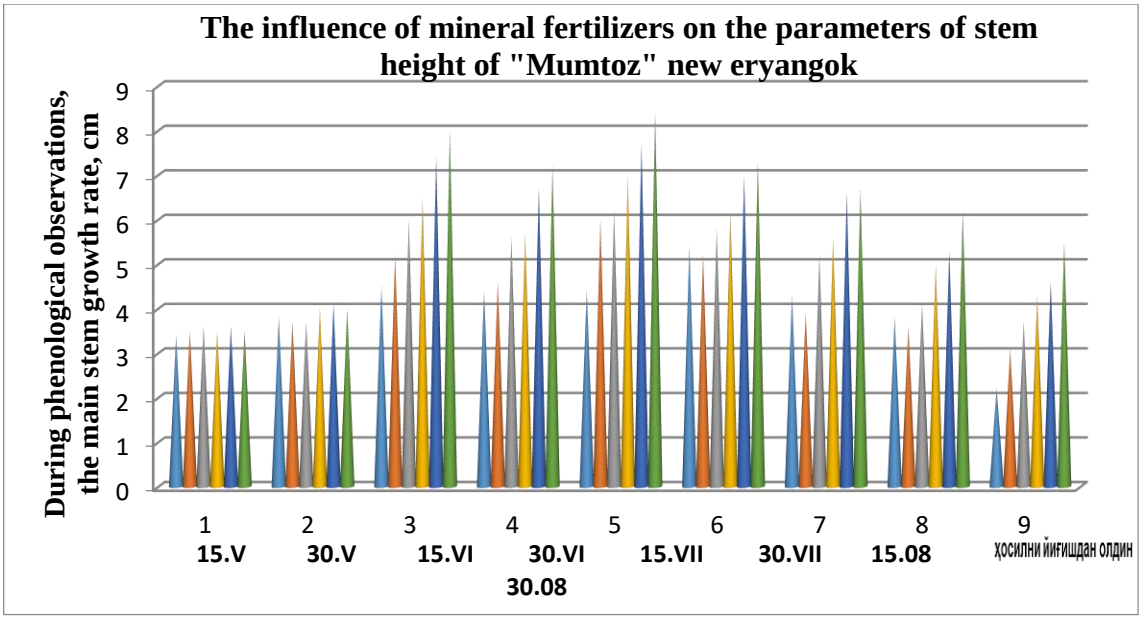
According to the methodology of the experiment: option 1 control (fertilizer not applied); Option 2 background – $N_0P_{150}K_{100}$; 3-option – N_{100} + background; 4-option– N_{150} + background; 5-option – N_{200} + background; 6-option– N_{250} + background It was found that the difference in the period of seed germination was close to each other in all the studied variants of application of mineral fertilizers at the rate of kg/ha, while the effective effect of phosphorus and potassium fertilizers was not observed. The seeds of "Tashkent-112" and "Mumtoz" varieties planted in the experiment were planted on April 20 in the 70x10x1 scheme. Seed water was given in order to produce similar seedlings. It should be noted that the large or small size of the seeds in the peanut crop affects the duration of seed germination in field conditions. In the variety "Tashkent-112", the average weight of 1000 grains is 360-400 grams, according to the studied varieties, on average 8-12% of the seeds germinated in the field by May 2nd, while the large-seeded variety, that is, the average weight of 1000 seeds is 620-645 grams. it was found that 2% of seeds germinated in the "Mumtoz" variety.

When the period of horizontal germination of seeds was observed, it was observed that by May 8-10, 62-74% of seeds planted in "Tashkent-112" variety and 64-82% of seeds in "Mumtoz" variety had germinated. According to the results of the continued phenological observation on May 10-12, 78-80% of the seeds planted in the "Tashkent-112" variety and 86-88% of the seeds in the "Mumtoz" variety have germinated. It can be seen that during the initial germination process, the large-seeded peanut variety "Mumtoz" germinates slowly, but at the end of the full germination period, when compared to the "Tashkent-112" variety in terms of germination duration and indicators, the germination rate is 8-10%. was a high indicator. In general, groundnut seeds germinate 12-14 days after planting due to adequate soil moisture and temperature.

Data obtained on the effect of mineral fertilizer feeding rates on main stem height parameters of peanut cultivars are presented in Table 1 below.

Although the growth of the peanut plant is slow compared to other types of crops, it was observed that the first flowers appeared in 25-30 days of vegetation. In the climatic conditions of our republic, plants belonging to the group of erect and semi-erect growing varieties produce on average 150-200 flowers during the growing season, and 60-65% of them form gynophores. However, 60-70% of these gynophores do not form nuts due to poor soil-climate conditions and low-quality cultivation between the rows (when the rows are not softened well, when the humming works are not carried out, the soil dries out for a long time, etc.).

In our field experiments, such negative conditions occurred received. Irrigation was carried out in the evenings on the day of feeding. In our experiment, 5-6 days after the flowering process, it was noted that a gynophore was formed as a result of the acceleration of cell division in the fruit node. The length of the gynophore is one of the main biological characteristics of varieties or samples.



Complete formation of gynophores

After the gynophore lengthens and penetrates the soil to a depth of 2-3 cm, the tip of the gynophore thickens and forms a nut.

And the number of seeds in the nut develops depending on the number of buds in the fruit node. The formed young nut is fed in several ways, through the leaves of the plant, with organic matter formed in the process of photosynthesis, and through the roots and the shell of the nut, with mineral substances dissolved in the soil. For this reason, soil moisture and fertility are very important during the growing season.

After 4-5 days after the gynophore is pricked into the soil, the tip of the gynophore begins to thicken, and after 60-70 days (if the soil moisture and temperature are sufficient), the nuts ripen. According to the experimental methodology: option 1 (control-fertilizer not applied) and option 2 (background-$N_0P_{150}K_{100}$) Nitrogen feeding was not carried out in the options. 3 (option–N_{100}+background; 4 (option–N_{150}+background); 5(option–N_{200}+background) and in the 6th option (N_{250}+background kg/ha), feeding works were carried out in the amount of 50% of the nitrogen fertilizer application rate. The second additional feeding at the same rate was carried out during the flowering-pod formation period of the development phase. According to the experiment, it was found that the control plants of the "Tashkent-112" variety entered the flowering phase by May 30, pods began to form by June 14, and ripened by September 10. The increase in the rate of application of mineral fertilizers leads to the extension of development periods, option 6 - N_{250}+ background kg/ha in the researched version of fertilizer application, it was observed that by June 4th, sorghum entered the flowering phase, by June 20th, pods began to form, and by September 24th, it entered the ripening period. It can be seen that by the time of ripening, the difference between the options was 12-14 days.

When the duration of development periods was observed in the "Mumtoz" variety, it was observed that, according to the variants, it went into the flowering phase from June 4-10, pods began to form by June 20, and it entered the ripening period by September 24.

Figure 1. The situation where the first humming was carried out in the peanut field

Seedlings were pollinated 5-6 weeks after flowering. By this time (50-60 days after seed germination), plant gynophores were strongly developed and it was observed that they were pricked into the soil. In the experiment, peanut varieties were fertilized 2 times during the growth period.

Burying of gynophores with soil during the humming process plays an important role in the formation of nuts in the underground part of the plant (Fig. 1).

Conclusions

Based on the results of the experiment, the following conclusions were reached:

- Maintenance of soil moisture during the growth period of peanut varieties fed with different rates of mineral fertilizers (preventing kernels from drying out and cracking) and keeping them free from perennial weeds has a positive effect on the even development of nuts on the plant, yield and product quality, as well as harvesting with the help of a harvesting mechanism made it possible to implement in short periods without losses.

- When comparing the varieties, it was found that the development period of the "Mumtoz" variety is 10-12 days later than the "Tashkent-112" variety studied in the control option.

- It was observed that increasing the rates of feeding with mineral fertilizers had an effect on the development periods of peanut varieties and extended the period of action by 4-6 days.

- 4 in terms of the appearance, growth and all morphological characteristics of the plants of peanut varieties studied in the control option; It was noted that it performed poorly compared to options 5 and 6.

- Local peanut cultivars in the option 6 - N_{250} $P_{150}K_{100}$ kg/ha fed with fertilizers led to an increase in vegetative mass and stunting of the plant. Also, a delay of 2-4 days of development periods was observed.

- It is recommended to use mineral fertilizers at the rate of $N_{150}P_{150}K_{100}$ kg/ha for the growth and development of the "Tashkent-112" variety and at the rate of N_{200} $P_{150}K_{100}$ kg/ha for the "Mumtoz" variety.

REFERENCES

1. Аманова М., Рустамов А., Алланазарова Л., Худайқулов Ж. Ерёнғоқ экинини етиштириш агротехникаси бўйича тавсиянома. “NISIM” Ч.К. 1,5 б.т. Тошкент -2016, 4, 6 ва 14 бетлар.
2. Азизов Б., Исраилов И. Худайқулов Ж. Ўсимликшуносликда илмий тадқиқот ишлари. Тошкент 2014 йил, 18;25; 44-67 бетлар.
3. Collins Y., Morris H.D. Soil Fertility studies with peanuts. Bulletin of North Carolina Agricultural Experiment Station. 1941. –P 230-330.

4. Narasimhulu G. Studies on split application of N, P, K fertilizers. M.Sc.(Ag.) Thesis, Andra Pradesh Agricultural University. Tirupati Campus. NARP-T. Annual Report 1981-1982. National Agricultural Research Project, Tirupati Centre. 1982. –P. 158-165.
5. Nigam SN, Giri DY and Reddy AGS. 2004.Groundnut Seed Production Manual. Patancheru 502 324, Andra Pradesh, India: International Crop Research Institute for the Semi – Arid Tropics.pp 4;6;8-11.
6. Raghavaiah R.V. Studies on the effect of Ca and S on growth, yield and nutrient uptake of TMV-2 groundnut. M.Sc. (Ag.) Thesis, Andra Pradesh Agricultural University, Tirupati Campus, Andra Pradesh 1982. -P. 78-80.
7. Ranganayakulu C., Raju A. and Sankara Reddi G. Optimum potassium doses for rainfed groundnut in Alfisols. Indian potash Jourmal 1982. 7(2) : 11-5.
8. Stevenson F.J. Organic matter and nutrient availability. (In) Non-symbiotic Nitrogen Fixation and Organic Matter in the Tropics. Symposia papers I. Vol. 2, 12th International Congress of Soil Science held at New Delhi on 8-16 February 1982.