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THE EFFECTIVENESS OF PEANUT CULTIVATION DEPENDING ON APPLIED AGRICULTURAL MACHINERY

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The purpose of the research is to test the cultivation of valuable peanut oil crop in the Republic of Artsakh for the first time. For this purpose we had to reveal the impact of such important agro technical activities on the growth, development and yield of peanut and oil content in peanut seeds considering the biological demands of peanut to climatic conditions by research experimental method in the conditions of dark brown gravel, medium sandy clay lowland soils of medium capacity and foothill forest brown carbonated soils as fertilization with mineral fertilizers and fight against weeds which are competitors of crops. It has been found out that additional weeding mellowing and mineral nutrition, both individually and in combination, have had a significant effect on the number of weed plants in peanut crops, the reduction of their biomass, the improvement of nutritional and water regimes of the soil, plant growth, development of crop elements, high yield and rise of the oil content in peanut seeds.

Key words: mellowing, mounding, feeding, water supply, yield, oil content.

Introduction

Peanut cultivated in Artsakh Republic for the first time is a valuable oilseed crop. It contains about 60% fat and more than 35% protein. Peanut oil is used in caning, margarine and soap production and in medicine. The cake that remains after extraction contains 45% protein and 8% fat. It is used for making canned food, paste, cakes and other pastries. Whole-grain baked seeds are highly demanded in food production. The stem together with its leaves contains 0,62 feedstocks and is used as valuable animal feed [1].

Peanut oil is a valuable herbal product that competes with meat and cheese for its energy and nutritional value. It was first introduced in the early twentieth century in America, after which oil has become widespread worldwide.

The pure fresh oil has the highest nutritional value which is obtained without extraction as a result of cold pressing and it is preferable to use that type of oil for medical purposes.

The excellent flavors of peanut oil and its high nutritional value are due to its fats which are easily digested by the human organism, its irreplaceable amino acids that support immunity, improve hormone balance and improve the activity of nerve system and genital system. Vitamin - antioxidants A-E help to improve the functioning of the eyesight, they have anti-inflammatory, immune-stimulating and wound-healing effects. Vitamin B4 plays a preventive role in the development of fat infiltration and gallbladder disease in liver. Vitamins in Group B improve the health of hair, nails, skin and eyesight and immunity. The most important components of peanuts are also macro and microelements including iodine, magnesium, potassium, calcium, copper, iron, phosphorus, zinc, cobalt etc. Besides, peanut oil contains a number of nutrients (phospholipids, polyphenols, beta, phytosterols) that have a good effect on the cardiovascular, nervous, immune and digestive systems. Peanut oil also features improved body activity and muscle tonus, reduced cholesterol in the blood, rapid recovery after prolonged illness or hard work, it also regulates sleep, prevents diabetes and regulates the function of liver and helps to keep fit.

In addition to its nutritional and therapeutic purposes, peanuts also have a great agronomic significance. Due to its symbiosis with tuber bacteria, it fixes free nitrogen in the air and enriches the soil with this important nutrient in addition to satisfying its nitrogen demand. In this respect peanut is a good predecessor for many crops [1].

As a result of the radical changes in the agrarian sector in recent years, many rural farmers have passed to turn less cultivation of crops and vegetables which resulted in annual decrease of soil fertility and lower crop yields. So the investment of peanut as a high-yield papilionaceaus crop in crop rotation gets more importance.

Although the soil and climatic conditions of the lowland and foothill zones of Artsakh are quite favorable for the cultivation of peanuts, the lack of relevant studies hinders its wide distribution.

It should be noted that peanut is considered to be a photophilous, thermophilic and moisture loving plant. Seeds begin to germinate at 12-14°C. Seedlings are very sensitive to frost. They die at -1°C. Autumn frosts (-1,5-2°C) damage the vegetative mass, and at -3 °C seeds on the soil surface lose their fertility. The best temperature for growth and development of peanuts is 25-30°C, there are no fruit below 12-13°C. Peanuts are moisture loving especially from the beginning of blossoming to the end of fruit formation. Peanuts are sown when the average temperature over the soil is not less than 14-15°C on 10 cm of soil. The time for tillage coincides with the end of April in the lowland zone of Artsakh and the beginning of May in the foothill zone.

Conflict setting

Taking into account the fact that the first attempt is being made to start peanut cultivation in the Republic of Artsakh, we set out to study the effectiveness of the use of such important agricultural measures which both plant growth, development and crop yield and the extracted oil amount greatly depend on.

For this purpose, dark brown, gravel and clay sandy soil conditions with pH = 7,5 medium capacity and humus content of 3,5-4,0% of Askeran region and light brown, carbonated, gravel and clay sandy soil conditions with pH = 7,9 and humus content of 2,7-3,1% of Martakert region a number of field and laboratory studies were conducted in 2017.

Field studies have been made for three times repeated. The following variants have been studied:

1. Machine cultivation-mounding twice (checking),
2. Machine cultivation-mounding twice + 1 hand weeding – mounding ,
3. Machine cultivation-mounding twice + P60N40 feeding,
4. Machine cultivation- mounding twice + 1 hand weeding – mounding + P60N40 feeding.

Nutrition was provided during the formation of sets followed by cultivation-mounding.

The surface of the tested furrows comprised 100 m^2. The other agricultural activities were the same in all variants except for the deviations from the experiment scheme.

Irrigation was carried out in the furrow sowing method with watering norm of 12000 m^3/hectare and irrigation norm of 400 m^3/hectare.

The following methods and techniques were used in field and laboratory studies: soil moisture was determined by weight method, crop yield was estimated by total harvesting method by B. A. Dosppekhov, the amount of oil obtained from seed crop was determined by percentage of XiBA- 1000 instrument.

We also have tried to develop wasteless technologies for the production of food and animal feed from peanut raw material first obtained in Artsakh [2].

Research results

Like all crops, the growth of peanut and the quantity and quality of the crop depend not only on the biological characteristics of the species or variety, but also on the environmental conditions under which it individually develops. Under field conditions, crop yields and the quality of the product obtained depend on the relative minimum factor. Taking into consideration the fact that humidity and nutrients are the most frequently occurring factors in the lowland and foothill climatic zones of Artsakh, it is necessary first of all to apply those agrotechnical measures which will affect the factors being in relative minimum at certain period of time. Impacts of additional mounding and feeding over

general agricultural atmosphere on crop weeding, regulation of water regime of soil, the development of peanut crop elements, crop yield and oil content in the crop are presented in Table 1-3.

As the data of the table show, each of the additional measures individually contributed to the reduction of the number of weed plants competing for crops and their biomass and the increase of the supplies of effective soil moisture during vegetation. However, as can be seen from the data in the same table, the efficiency of additional agronomic measures increases with their combined use. On the one hand, as a result of weeding and soil crust destruction, effective soil moisture is increased and on the other hand, phosphorus-nitrogen fertilizers, introduced into the soil, both provide nutrient demand in plants and reduce transpiration thus improving the water regime of the plants [3; 4].

It can be seen from the data in Table 2 that both manual weeding mounding and nutrition with mineral fertilizer have contributed to the growth of peanut and the development of crop elements. As the data of the table show the average growth of crop elements in the lowland area was 22,3% due to weeding mounding, in the foothill zone it comprised 34,3% and crop growth comprised correspondingly 8,3 c/hectare or 36% and 7,9 c/hectare or 53,0%. The average growth of crop elements towards the checker was 34,8% in the foothill zone and 28,7% in the lowland zone due to the influence of phosphorus fertilizer. The impact of each of these measures on crop growth is more evident in foothill conditions. This is explained by the fact that the brown carbonate clay sandy soils of weak capacity of the foothills zone where the field experiments were implemented compared with the dark brown clay sandy soils of medium capacity of the lowland zone are poorer with humus content, vivid nutrients for plant growth, and due to the lack of mechanical composition and humus, the moisture content of these soils and the ability to raise water by capillaries is also poorly demonstrated [5]. That is why the effectiveness of the additional measures applied to these lands is higher.

The efficiency of nutrition and weeding mounding is more increased (as the results of the experiment show) by their combined use. According to the control, in this case the average increase of crop elements in the lowland zone was 44,3% and in the foothill zone it comprised 50,6%, additional crop yield was 11,3 and 12,2 c/ha respectively or 49,1 and 81,8%.

An important factor in increasing the efficiency of agricultural production is also the improvement of the quality of produced products which depends not only on the various characteristics of the crop sorts but also on the climatic conditions of the place of cultivation and on the agro-technology used. This is also evidenced by the results of our experience.

Since peanuts are generally considered to be an oily crop, one of our tasks has been to find out the impact of the climatic zone and the applied agrotechnical measures on the oil content of peanut seeds (Table 3).

Based on the data presented in the table, we can conclude that both the climatic conditions and applied agrotechnical means have a significant effect on the oil content of peanut seeds. It was especially high in lowland region where the plants were grown under high agrotechnical measures in the field.

In laboratory conditions, 270 kg of dried peanut seeds were pressed at 50-60^{0}C by rolling extractor to obtain peanut oil. The obtained 127 kg turbid oil mass was filtered. As a result we have obtained 110 kg pure peanut oil which made up 40,7% of the raw material. Pure oil has been studied in the laboratory of food safety of the Republic of Artsakh and the data have satisfied all the presented qualitative criteria.

The remaining waste which contained 30-35% protein and 5% oil were used in the laboratory to obtain other nutrients and animal feed.

Thus, the climatic conditions of the lowlands and foothill zones of Artsakh are quite favorable for peanut cultivation under water irrigation conditions. With the use of high agro technology, the yield of this valuable crop can be increased to 45 - 50 c/hectare. And new technologies for the processing of raw peanut will contribute to root peanut cultivation and increase the income of crop fileds, to provide the local market with fresh food and animal breeding with additional feeds. The introduction of peanuts in crop rotation will increase soil fertility as it enriches the soil with nitrogen.

If you choose the best time for tillage, peanuts can be a good predecessor for autumn tillage under irrigated farming.

Table 1

The content of moisture in the soil depending on the applied farm machinery

Climatic zone	Variant	Weediness before harvest, 1ml ^{2}		Soil moisture (%) in 0-40 cm layer			
		Piece	Gram	Before tillage	Mid summer	Before harvest	Average
Lowland	Cultivation 2 (checker)	145	340	18,68	20,46	18,60	19,24
	Cultivation 2 + 1 weeding mounding	75	170	18,20	25,70	20,21	21,37
	Cultivation 2 + $P_{60}N_{40}$	131	294	18,49	21,80	18,67	19,65
	Cultivation 2 + 1 weeding mounding + $P_{60}N_{40}$	72	165	18,65	26,35	21,22	22,07
Foothill	Cultivation 2 (checker)	129	330	17,60	19,65	19,30	18,85
	Cultivation 2 + 1 weeding mounding	73	120	17,25	22,37	20,18	19,93
	Cultivation 2 + $P_{60}N_{40}$	118	225	18,03	21,45	19,36	19,61
	Cultivation 2 + 1 weeding mounding + $P_{60}N_{40}$	84	117	17,47	22,00	19,65	20,70

Table 2

The dependence of peanut crop on the applied farm machinery

Climatic zone	Variant	Number of plants before harvest 1m^2	One plant					Yield, c/hectare
			Number of stems	Number of achenes, psc.	Weight of achenes, g.	Number of grains, psc.	Weight of grains, g.	
Lowland	Cultivation 2 (checker)	5.6	14.3	48.6	79,8	61,7	41,2	23,0
	Cultivation 2 + 1 weeding mounding	6.0	18.4	55.3	95,8	75,5	52,3	31,3
	Cultivation 2 + $P_{60}N_{40}$	5.6	20.3	58.4	99,8	76,0	55,2	30,9
	Cultivation 2 + 1 weeding mounding + $P_{60}N_{40}$	5.8	22.6	65.8	115,6	86,2	59,3	34,3
Foothill	Cultivation 2 (checker)	5,0	12,0	35,4	58,1	44,9	29,9	14.9
	Cultivation 2 + 1 weeding mounding	5,6	18,4	42,3	78,9	56,4	40,8	22,8
	Cultivation 2 + $P_{60}N_{40}$	5,6	18,6	44,0	75,1	57,2	41,5	23,2
	Cultivation 2 + 1 weeding mounding + $P_{60}N_{40}$	5,8	20,2	48,6	85,0	65,1	46,8	27,1

Table 3

The content of oil in peanut seeds depending on applied farm machinery

Climatic zone	Variant	Oil content in seeds, %	Oil extraction from $1m^2$ surface, g	Oil extraction, c/hectare
Lowland	Cultivation 2 (checker)	54.21	125,0	12,5
	Cultivation 2 + 1 weeding mounding	54.55	171,1	17,1
	Cultivation 2 + $P_{60}N_{40}$	54.65	168,9	16,8
	Cultivation 2 + 1 weeding mounding + $P_{60}N_{40}$	54.68	188,0	18,8
Foothill zone	Cultivation 2 (checker)	54.00	79,3	7,9
	Cultivation 2 + 1 weeding mounding	54.45	124,3	12,4
	Cultivation 2 + $P_{60}N_{40}$	54.47	126.5	12,6
	Cultivation 2 + 1 weeding mounding + $P_{60}N_{40}$	54.50	147,9	14,7

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ՀՏԴ - 635:631.51

ԳԵՏՆԱՆՈՒՇԻ ՄՇԱԿՈՒԹՅԱՆ ԱՐԴՅՈՒՆԱՎԵՏՈՒԹՅՈՒՆԸ՝ ԿԱԽՎԱԾ ԿԻՐԱՌՎՈՂ ԱԳՐՈՏԵԽՆԻԿԱՅԻՑ

Ս.Բ. Գալստյան, Գ.Հ. Ներսիսյան, Ա.Կ. Միքայելյան
Շուշիի տեխնոլոգիական համալսարան

Հետազոտության նպատակն է Արցախի հանրապետությունում առաջին անգամ, փորձարկել արժեքավոր յուղատու մշակաբույս համարվող գետնանուշի մշակությունը: Այդ նպատակով հարթավայրային գոտու մուգ շագանակագույն խճաքարային, կավավազային միջին հզորության և նախալեռնային գոտու անտառային դարչնագույն կարբոնատային խճաքարային ավազակավային թույլ հզորության հողային պայմաններում, հաշվի առնելով նաև գետնանուշի կլիմայական պայմաններին ներկայացվող կենսաբանական պահանջները, փորձարարահետազոտական ճանապարհով պարզել այնպիսի կարևոր ագրոտեխնիկական միջոցառումների ազդեցությունը գետնանուշի աճի, զարգացման, բերքատվության և սերմերում յուղի պարունակության վրա, ինչպիսիք են հանքային պարարտանյութերով սնուցումը, և մշակաբույսերի համար մրցակից հանդիսացող մոլախոտային բույսերի դեմ տարվող ագրոտեխնիկական պայքարի միջոցառումները: Պարզվել է, որ լրացուցիչ կատարված քաղհան փխրեցումը և հանքային սնուցումը ինչպես առանձին-առանձին, այնպես էլ համատեղ կիրառելիս զգայի ազդեցություն են ունեցել գետնանուշի ցանքերում մոլախոտային բույսերի թվաքանակի, դրանց կեսազանգվածի նվազեցման, հողի ջրային և սննդային ռեժիմների բարելավման, բույսերի աճի, բերքի տարրերի զարգացման, բերքատվության բարձրացման և սերմերում յուղի պարունակության ավելացման վրա:

Բանալի բառեր. Փխրեցում, բուկլից, սնուցում, ջրապահովվածություն, բերքատվություն, յուղի պարունակություն:

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ЭФФЕКТИВНОСТЬ ВОЗДЕЛЫВАНИЯ АРАХИСА В ЗАВИСИМОСТИ ОТ ПРИМЕНЯЕМОЙ СЕЛЬСКОХОЗЯЙСТВЕННОЙ ТЕХНИКИ

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Цель исследования-впервые опробовать выращивание ценной культуры арахисового масла в Республике Арцах. Для этого нам предстояло выявить влияние таких важных агротехнических мероприятий на рост, развитие и урожайность арахиса и содержание масла в семенах арахиса с учетом биологических требований арахиса к климатическим условиям экспериментальным методом исследования в условиях темно-бурых гравийных, среднепесчаных глинистых низинных почв средней мощности и предгорных лесных бурых карбонизированных почв, как внесение минеральных удобрений и борьба с сорняками-конкурентами сельскохозяйственных культур. Установлено, что дополнительное прополочное рыхление и минеральное питание, как индивидуально, так и в сочетании, оказали значительное влияние на численность сорных растений в посевах арахиса, снижение их биомассы,

улучшение питательного и водного режимов почвы, рост растений, развитие элементов растениеводства, высокую урожайность и повышение масличности семян арахиса.

Ключевые слова: рыхление, насыпь, кормление, водоснабжение, урожайность, масличност.

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