SEED CHARACTERISTICS OF SOME ORIENTAL TOBACCO VARIETIES DEPENDING OF THE TRANSPLANTING DENSITY

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Abstract

The transplanting density is a very important factor when it comes to the acquisition of the planned yield of seed with appropriate quality taken from the certified tobacco seed plots. The main goal of this research was to establish tobacco seed yield and quality given by the tobacco planted with various transplanting density. The experiment was set in the Experimental Field of Scientific Tobacco Institute - Prilep. Further analyses of seed quality characteristics were performed in the accredited Laboratory for seed quality control of agricultural plants. The analyses were performed on two varieties of oriental tobacco type Prilep: P-66-9/7 and NS-72 in different transplanting variants: 50x15cm, 45x15 cm and 40x15cm. The area was prepared with the usual agro technical measures for tobacco seed plots for certification. The transplanting was performed manually in 5 repetitions. Morphological measures were performed on 10 plants of each tobacco varieties and variant of density of transplanting. The following morphological characteristics were analyzed: height and width of the stalk, height and width of fruit, and height and width of capsule. Also the weight of the fruit was analyzed together with the number of capsules in the fruit and the seed amount in the fruit of every stalk. After seed harvest and processing, the morphological measurement and laboratory analyses for seed quality were performed concerning the seed germination expressed in percentage and the apsolute weight expressed in grams. We can conclude that the seed given by a stalk which has growth on larger vegetation area produces better values concerning the yields and quality. The tobacco variety P-66-9/7 has average value of 13.68 g, NS-72 variety has 15.51 g. Which means that the stalks which growth on smaller vegetation for example P-66-9/7 has average value of 5.36 g and NS-72 has 6.76 g. Insignificant number of the results have shown a digression but it can be concluded that the seed obtained by the plants grown in larger vegetation area produce seed with better characteristics considering the quality and quantity of the seed.

Keywords: tobacco seed, vegetation area, transplanting density, variety P-66-9/7, variety NS-72.

Introduction

During the process of production of tobacco seed great influence have the conditions in which the stalks have grown because from them the seed material is obtained. As one of the most important conditions for successful production is the transplanting density. According to Uzunoski (5) the distance from one to another plant is very important factor for tobacco production due to the fact that the biological area of every plant is being set in this way. Once we have defined the goal of our research, the influence of the vegetative area (transplanting density) on some of the characteristics of the tobacco seed. The transplanting density is very important factor for planning a yield of tobacco seed which has adequate quality and it's given by tobacco seed plots for certification. The main goal of this research was to establish the tobacco seed yield and the quality of the seed material given by tobacco which has variable transplanting density.

Material and methods

The experiment was set in the Experimental Field of the Scientific Tobacco Institute- Prilep on soil which is usual for oriental tobacco type production. The basic soil processing was performed by one

plowing in autumn and two plowing in spring. Before the spring plowings the soil was fertilized with 300 kg/ha NPK (8:22:20). The seedling of the tobacco varieties which was examined was produced in cold beds, covered with polyethylene with usual agro technique, protection and care. The analyses were performed on two varieties of oriental tobacco type Prilep: P-66-9/7 and NS-72 in different transplanting condition. The transplanting was performed manually in 5 repetitions in accordance to the *random block system,* in which three variations of each tobacco variety: First variant (40x15cm), Second variant (45x15cm) and Third variant (50x15cm). During vegetation period two hoeing were performed. Also the experimental trial was treated for disease protection and pest protection. When required they were watered in order to prevail with preferable conditions for good tobacco seed quality and quantity. During vegetation period morphological measurements were performed on each variant on 10 stalks in each repetition. After the harvest the seed was sent for further processing. Seed harvest was performed once the seed has reached full ripeness, as recommended by Drazic (2) the harvest should be performed once the fruit, the capsule and the seed are dehydrated and have darker coloration. After seed has finished with further processing, each variety is left in separate spaces, according to Aceska (1) her analysis of the influence of tobacco seed ripeness towards the quality characteristics, have shown that good seed germination is given by leaving the seed to rest for several months. During this period the tobacco seed is subdued to complex biochemical processes which are established by Mladenoski (3) during his researches.

Results and discussion

The results from the analysis and morphological measurements are presented in the following table:

Table 1. Dimensions of stalk, the fruit and capsule in tobacco variety P-66-9/7

Variant	Research conditions (vegetative area)	Stalk		Fruit		Capsule	
		Height (cm)	Weight (cm)	Height (cm)	Weight (cm)	Height (cm)	Weight (cm)
1	Density 40x15 cm	70.0	39.5	12.6	7.8	1.6	1.1
2	Density 45x15 cm	75.0	40.0	17.9	8.8	1.7	1.2
3	Density 50x15 cm	79.0	40.0	18.7	9.4	1.6	1.1

From the table we can conclude that the vegetative area has positive influence on the tobacco variety P-66-9/7 dimensions.

Table 2. Dimensions of stalk, the fruit and capsule in tobacco variety NS-72

Variant	Research conditions (vegetative area)	Stalk		Fruit		Capsule	
		Height (cm)	Weight (cm)	Height (cm)	Weight (cm)	Height (cm)	Weight (cm)
1	Density 40x15 cm	48.5	38.5	10.2	9.6	1.8	1.3
2	Density 45x15 cm	51.0	41.5	14,8	16.9	1.8	1.4
3	Density 50x15 cm	55.0	45.0	13.8	14.0	1.8	1.3

The vegetative area has positive influence on each part of the plant we have analyzed from tobacco variety NS-72. From the two tables we can conclude that the vegetative area has great influence on P-66-9/7.

Table 3. Characteristics of the fruit in tobacco variety P 66-9/7

Variant	Research conditions (vegetative area)	Weight of the fruit (g)	Number of capsule in the fruit	Weight of seeds in the fruit (g)
1	Density 40x15 cm	12.60	48	5.36
2	Density 45x15 cm	15.10	54	6.85
3	Density 50x15 cm	24.60	108	13.68

From the table we can see that the vegetative area has great influence on the cluster weight, number of capsule and the seed quantity seed in the fruit.

Table 4. Characteristics of the inflorescence in tobacco variety NS-72

Variant	Research conditions (vegetative area)	Weight of the fruit (g)	Number of capsule in the fruit	Weight of seeds in the fruit (g)
1	Density 40x15 cm	13.55	63	6.76
2	Density 45x15 cm	18.91	79	14.89
3	Density 50x15 cm	29.41	119	15.51

Tobacco seed variety NS-72 has great influenced from the vegetative area on the characteristics which are presented in the table. If we compare the two tobacco varieties we can see that the larger vegetative area has greater influence on the tobacco variety NS-72, especially the third variant (50x15cm).

Table 5.Tobacco seed characteristics in tobacco variety P 66-9/7

Variant	Research conditions (vegetative area)	Absolute seed weight g	Germination energy %	Total germination %
1	Density 40x15 cm	0.0848	87	87
2	Density 45x15 cm	0.0864	93	93
3	Density 50x15 cm	0.0892	91	91

The absolute seed weight, germination energy and the total germination were analyzed in the laboratory with methods which are in line with the Book of rules. When it comes to the temperature of the tobacco seed germination Prespanoski (4) established that the optimal tobacco seed germination temperature is in the range of 20 to 24 ˚C. The data for this characteristic presented in the table show variable values which depend of the variant. If we compare the values, we can

conclude that tobacco seed absolute weight is higher in the seed which is given from stalks which were grown on larger vegetative area.

Table 6.Tobacco seed characteristics in tobacco variety NS-72

Variant	Research conditions (vegetative area)	Absolute seed weight g	Germination energy %	Total germination %
1	Density 40x15 cm	0.0968	90	98
2	Density 45x15 cm	0.0988	92	98
3	Density 50x15 cm	0.0995	91	97

From the data presented we can conclude that parameter absolute weight in tobacco variety NS-72 has minimal variations in the value which depends on the variant. The variant which was grown on larger vegetative area has no significant varieties in tobacco seed absolute weight, which means that the larger vegetative area has almost no influence on the tobacco seed absolute weight. When it comes to the energy and tobacco seed germination we can conclude that the size of vegetative area (transplanting density) has no influence on the two tobacco varieties which were analyzed in different variants.

Conclusions

The analyzed tobacco plants which were grown on larger vegetative area have shown better results when it come to the tobacco varieties and their characteristics. Tobacco plants grown on larger vegetative area have higher values concerning the height and width of the stalk, height and width of cluster of capsule, and height and width of capsule. The number of capsules in cluster of capsules (119) has highest value in tobacco variety NS-72. Tobacco variety NS-72 has biggest ammount of tobacco seed in one capsule cluster (29.41g).Tobacco seed variety NS-72 has highest absolute weight (0.0988g). Tobacco seed variety NS-72 has highest total germination (98%).

References

1. Аческа, Н., 1987, Влијанието на зрелоста на семето врз дормантноста, енергијата на ртење и вкупната ртливост на тутунското семе од типот Прилеп и Вирџинија (магистерски труд) Земјоделски факултет-Скопје. Стр.120.
2. Dražić, S., 1980, Proućavanje veze izmedju vremena sakupljanja ploda (ćaura), njegovog položaja u cvasti I semenskih kvaliteta duvana (magistarski rad) Poljoprivredni fakultet u Zemunu. Стр. 85.
3. Младеноски,Т., 1996, Биологија на семето, Земјоделски институт-Скопје. Стр.137-138.
4. Преспаноски, Љ., 1997, Ртливост на тутунското семе од сортите МВ-1 и П-23 при различни температурни услови и фитопериодизам (дипломска работа), Природно математички факултет- Интитут за биологија- Скопје. Стр.102.
5. Узуноски, М., 1985, Производство на тутун. Стопански весник. стр.107-110. Скопје