VARIABILITY IN SOME OLD TOBACCO VARIETIES IN THE REPUBLIC OF MACEDONIA

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ABSTRACT

The studies were made with five old tobacco varieties of the types: Prilep, Djebel and Yaka, to study their quantitative traits: height of the stalk without inflorescence, number of leaves and green mass yield per stalk. The trial was set up in the Experimental field of Tobacco Institute-Prilep in 2010, 2011 and 2012, in randomized block design with four replications. Traditional agro-technical measures were applied during the period of vegetation.
The purpose of investigations was to evaluate the variability of the above quantitative traits typical for the old varieties by the use of biometric analysis and to give directions for their maintenance in future for selection aims in tobacco.
The significant differences obtained between the traits of investigated variants indicate that they are different varieties adapted to agro-ecological conditions of the region. No significant differences were observed between the three years of investigation. It is an indication of highly heritable traits. The values of standard deviation and coefficient of variability are low, which is an indication of stable and homozygous genotypes. Results on the parameters of variability were lower in 2012, because the seed sawn in this crop was obtained from one stalk for each variant isolated in 2010 and 2011. The lowest statistical data on variability of stalk height and leaf number in three years were registered in the varieties of type Prilep, and for green mass yield in the Yaka tobacco.
Keywords: tobacco (Nicotiana tabacum L.), old varieties, quantitative traits, standard deviation, variability coefficient

MATERIAL AND METHODS

Investigations included studies of five oriental autochthonous tobacco varieties of the types Prilep (P 10-3/2 – Ph.1 and P 12-2/1 – Ph.2), Djebel Dj № 1 – Ph. 3 and Yaka (YK 7-4/2 – Ph.4 and KY - Kishinska Yaka – Ph.5). The trial was carried out in 2010, 2011 and 2012 in the field of Scientific Tobacco Institute-Prilep in a randomized block design with four replications. Subject of the investigations were the quantitative trait: stalk height without inflorescence, leaf number per stalk and green mass yield per stalk.
Standard deviation (σ) is an indicator of the variability of quantitative characters. It indicates the mean square deviation from the arithmetic mean and is a result obtained from the square root of the variance. It is calculated by the following formula:

$$\sigma = \pm\sqrt{\frac{\Sigma(x-\bar{x})^2}{n}} \qquad \sigma = \pm\sqrt{\sigma^2}$$

If the representative sample consists of lower number of individuals, the following formula is used:

$$\sigma = \pm\sqrt{\frac{\Sigma(x-\bar{x})^2}{n-1}}$$

Standard deviation is expressed with the same measurement with which the investigated character is measured.
The degree of variability of characters is calculated from the standard deviation by the following formula:

$$V\,(\%) = \frac{\sigma \cdot 100}{\bar{x}}$$

The above formulas for calculation of standard deviation and variability coefficient were used by Najčevska (2002).

RESULTS AND DISCUSSION

Photo 1. P 10-3/2

Photo 2. P 12-2/1

Photo 3. Djebel № 1

Photo 4. Yaka YK 7-4/2

Photo 5. Kishinska Yaka KY

Table 1. Mean value and variability of the quantitative traits of the autochthonous tobacco varieties

Autochthonous tobacco varieties	Quantitative traits								
	Stalk height without inflorescence			Leaf number per stalk			Green mass yield per stalk		
	$\bar{x} \pm s\bar{x}$ cm	δ	V (%)	$\bar{x} \pm s\bar{x}$	δ	V (%)	$\bar{x} \pm s\bar{x}$ g	δ	V (%)
2010									
1. P 10-3/2	42 ± 0,48	4,95	7,98	32 ± 0,42	1,76	5,15	59,54 ± 0,86	0,71	6,38
2. P 12-2/1	45 ± 0,45	3,85	6,52	36 ± 0,35	1,35	3,64	71,42 ± 0,57	0,73	6,22
3. Dj № 1	78 ± 0,67	6,22	7,06	28 ± 0,41	1,91	6,38	40,61 ± 0,32	0,52	6,82
4. YK 7-4/2	89 ± 0,69	6,88	6,78	28 ± 0,39	1,71	5,99	52,55 ± 0,34	0,52	6,43
5. KY	112 ± 0,91	8,93	7,64	41 ± 0,42	1,87	4,45	81,48 ± 0,42	0,41	3,51
2011									
1. P 10-3/2	44 ± 0,44	4,14	7,95	34 ± 0,39	1,76	5,15	64,41 ± 0,26	0,71	6,27
2. P 12-2/1	40 ± 0,35	3,32	5,72	37 ± 0,30	1,35	3,64	76,25 ± 0,27	0,70	6,32
3. Dj № 1	79 ± 0,62	5,92	6,66	30 ± 0,43	1,91	6,38	42,11 ± 0,18	0,57	6,72
4. YK 7-4/2	90 ± 0,67	6,33	6,27	29 ± 0,38	1,71	5,99	53,07 ± 0,17	0,59	6,53
5. KY	110 ± 0,85	8,10	6,81	42 ± 0,42	1,87	4,45	85,78 ± 0,19	0,62	3,73
2012									
1. P 10-3/2	44 ± 0,28	2,71	5,01	36 ± 0,32	1,41	3,93	57,1 ± 0,11	0,55	5,82
2. P 12-2/1	46 ± 0,33	3,09	5,52	38 ± 0,24	1,09	2,86	76,7 ± 0,12	0,64	5,44
3. Dj № 1	78 ± 0,46	4,34	4,98	28 ± 0,36	1,63	5,80	36,18 ± 0,09	0,43	6,63
4. YK 7-4/2	93 ± 0,66	6,23	6,05	31 ± 0,37	1,67	5,40	63,45 ± 0,10	0,47	4,46
5. KY	115 ± 0,53	5,07	4,09	41 ± 0,36	1,61	3,93	92,9 ± 0,11	0,49	3,56

CONCLUSIONS

The autochthonous tobacco varieties Prilep P 10-3/2, P 12-2/1, Djebel Dj № 1, Yaka YK 7-4/2 and KY - Kishinian Yaka bear the following characteristics:
- They are homozygous, due to which their population is very uniform, with high genetic stability.
- They have a low standard deviation and variability of the investigated characters, which indicates high genetic homogeneity.
- They present a sound basis in selection of tobacco for obtaining superior varieties.