Characteristics of the new cotton varieties Pirin and Perun

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Abstract
The study was conducted in 2011-2013 and 2016-2019 at the Field Crops Institute in Chirpan. In the IASAS system, Pirin variety was tested in 2016-2017, Perun variety - in 2017-2018. Both varieties were certified and included in the Official variety list of the Republic of Bulgaria, Pirin in 2018, Perun in 2019 and regionalized for the entire country. The two varieties were created by the method of intervarietal hybridization G. *hirsutum* L. The good combination of productivity, early maturity and fiber quality defined Pirin and Perun varieties as new achievements in cotton selection in terms of productivity and early maturity. In the state variety test, both varieties realized high seed cotton yields, Pirin variety - 2029 kg/ha and Perun variety - 2255 kg/ha, on average for the period, and exceeded the two standards and the average standard by 2.9% and 9.5%, respectively, in lint yield the increase was 3.5% and 12%. The high productivity was combined with good technological fiber qualities.

Keywords: cotton; *G. hirsutum* L.; new varieties; seed cotton yield; lint yield; fiber properties

INTRODUCTION

Cotton is a major fibrous and important oilseed crop. There is no branch of national economy that does not use cotton materials and products to one degree or another. Despite the great achievements in the synthesis and production of artificial fibers, the cotton fiber retains its dominant position and in many cases it is irreplaceable especially in terms of hygiene with its softness, electro neutrality and hygroscopicity.

Cotton is spread over all continents and is grown in many countries. In Europe, cotton is grown only in Spain, Greece, more limited in Portugal and Bulgaria, and the production of cotton fiber in the EU is not enough. In Spain and Greece cotton is grown under irrigated conditions and yields are much higher. Varieties grown in these countries have a longer growing season, higher productivity and longer fiber.

In our country, cotton is grown under non-irrigated conditions with very limited temperatures and rainfall for this crop. In the selection of cotton, the greatest attention is paid to early maturity, productivity and fiber quality, especially of its length. Bulgarian varieties are characterized by great early maturity. At this stage, cotton selection is mainly aimed at improving the productivity and fiber quality, while preserving early maturity.

The variety is the most effective factor for ensuring high yields and quality production without investing additional costs of labor and funds (Valcheva & Valchev, 2009). The main goal of cotton selection in Bulgaria is the creation of new germplasm and early ripening varieties with high productivity and high fiber quality. In recent years as a result of selection many new cotton varieties have been created: Dorina (Stoilova & Nistor, 2012), Rumi, IPK Nelina (Stoilova & Meluca, 2013), Denitsa, Philipopolis, Sirius, (Valkova, 2014a; 2014b; 2017), Tsvetelina (Koleva & Valkova, 2019), Aida, Anabel, Tiara and Melani (Dimitrova, 2022a; 2022b; 2022c). All these varieties are early ripening and high yielding, Anabel and Melani have improved fiber quality characteristics.

Regardless of the good achievements, the yields and lint percentage are lower for the quality varieties, the high-yielding varieties have shorter fiber. Selection results of the European countries Greece

and Spain and a number of other cotton-producing countries are much higher and set higher criteria in front of our selection.

The aim of this research was to study the productive potential and evaluate the fiber quality of the newest Pirin and Perun cotton varieties.

MATERIAL AND METHODS

Source selection material

Pirin variety was created by intraspecific hybridization between the varieties Trakia (Bulgarian) and Tabladila-16 (Spanish) in 2005. After selection and improving work in the progenies in the following years, in 2008 the stabilized line was harvested and in 2009 was included in a control nursery. Since 2010 the line has been in variety testing: in 2010 - in preliminary and since 2011 to 2013 it has been in competitive variety testing. From 2014 to 2017 the variety was included in a comparative variety trial with a range of new cotton varieties and two standard cultivars for yield and fiber quality. The State Variety Testing was conducted by the IASAS (Exclusive Agency for Variety Testing, Approbation and Seed Control) in two experimental stations (Radnevo and Burgas) during the period 2016 - 2017. The cultivar Chirpan-539 was the standard for yield and the cultivar Avangard-264 was the standard for fiber quality. In 2018 the variety was approved for inclusion in list A of the Variety List of the Republic of Bulgaria (Order No. RD 12-7 of 26.03.2018 of the Minister of Agriculture) and in 2019 it was certified by the Patent Office. (Certificate No. 11170 P2 / 23.04.2019).

Perun variety was also created by intraspecific hybridization between the variety Trakia and line 411 in 2007. After selection during the next three years the stabilized line was tested in 2011 in a control nursery and since 2012 it has been in variety testing - one year in advance and three years in competition. In 2017 and 2018 the variety was included in the system of State Variety Testing. The cultivars Chirpan-539 (for yield) and Avangard-264 (for fiber quality) were used as standards. In 2019 the variety was approved for inclusion in list A of the Variety List of the Republic of Bulgaria (Order No. RD 12-5 of 10.04.2019 of the Minister of Agriculture) and in 2020 it was certified by the Patent Office (Certificate No. 11200 P2 / 30.09.2020).

The variety trials at the Field Crops Institute in Chirpan were carried out according to the standard method in four repetitions and the harvest plot size was 20 m^2. The cultivar Chirpan-539 was used as a standard. The soil type was Pellic Vertisols and standard cotton growing technology was applied. To evaluate the economic qualities the following traits were taken into account: total seed cotton yield (kg/ha); boll weight (g); number of bolls per plant; lint percentage (%), plant height and height of the first fruiting branch (cm), fiber length (by "butterfly" method) (mm). Data were processed using the statistical program Statistics 7.

RESULTS AND DISCUSSION

Characteristics of Pirin variety

Plants were medium tall. The stem was erect, reddish green, medium mossy hairy at the top. The bush was conical. The fruiting branches were of medium length and were located high above the ground surface. The first fruiting branch height was about 19-21 cm. The leaves were palm-shaped, medium in sized, light green in color and moderately hairy, without glands. The foliage density was loose. The flowers had a whitish petal color. The bolls were medium-sized, with a short handle, ovoid, 4-5 lobed, with a strong protrusion at the tip and opened early. The degree of opening at full ripeness was strong. Boll weight was on average 5.2 g. The seeds were medium large, covered with medium dense gray fuzz. The fiber was white, medium fine to coarse, very strong and highly uniform in length and 24-26 mm long. The lint percentage was 39-41%. The vegetation period was 118-120 days and in early maturity index, it was equal to the standards. On average for 2 years under non-irrigated conditions, the total seed cotton yield was 2030 kg/ha, which was 3.0% over the standard. On a natural infectious background, there was no development of verticillium wilt and bacteriosis. As for technological properties: uniformity and strength it exceeded, while in maturity it was equal to the standards. It was inferior to them in fiber length.

Characteristics of Perun variety

Plants were medium tall. The stem was erect, reddish green, medium hairy at the top. The bush

was conical. The fruiting branches were medium long. The first sympodium was located by 1-2 cm lower than the standard varieties. The leaves were palm-shaped, medium-sized, with a dark green color and moderately hairy, with the presence of glands. The foliage density was medium. The flowers had a whitish petal color. The bolls were small to medium in size, with a short handle, ovoid, 4-5 lobed, with a medium protrusion at the tip. They open early and had high fiber content. The degree of opening at full maturity was medium. Boll weight was about 4.9 g. The seeds were medium-sized, covered with light brown fuzz.

The fiber was white, medium fine to coarse and very strong, very uniform and 25-26 mm long. In lint percentage, it exceeded both standards. The vegetation period of the variety was 112-114 days and ripened 2-3 days before the standards. On average for 2 years under non-irrigated conditions, it showed a total seed cotton yield of 2260 kg/ha - 9.7% above the standard and a fiber yield of 850 kg/ha - 11.2% over the standard. On a natural infectious background, there was no development of verticillium wilt and bacteriosis. As for the technological properties: homogeneity and strength it exceeded, while in maturity it was equal to the standards. It was inferior to them in fiber length.

Agronomic traits

Pirin variety

Pirin was a highly productive and very early cotton variety. In the competitive variety test conducted in the experimental field of the Field Crops Institute in Chirpan Pirin variety in seed cotton yield of 1608 kg/ha, on average for 7 years, insignificantly outperformed the standard cultivar Chirpan-539 by 6.8% **(Table 1a).** The boll weight was 5.3 g, by 0.2 g more than that of the standard. Pirin variety had a fiber length of 26.4 mm, by 0.5 mm longer than the standard. The higher boll weight and longer fiber of this variety were statistically significant at GD 1%. In lint percentage – 36.9% this variety was equal to the standard. The Pirin variety was very suitable for mechanized harvesting the first fruit branch height was18.6 cm compared to 18.3 cm for the standard.

Perun variety

Perun variety in the competitive variety test conditions carried out at the Field Crops Institute in seed cotton yield of 1825 kg/ha, on average for 7 years, significant exceed the standard by 18.4% **(Table 1b).** The higher yield of this variety was combined with a higher setting of the first fruiting branch. Perun variety set the first fruiting branch at 18.4 cm against 17.1 cm for the standard, 1.3 cm higher, which was 7.6% more. Higher yield and higher setting of the first fruiting branch were statistically significant at GD 1%. Perun variety in lint percentage – 37% insignificantly was lower than the standard by 0.4% (98.9%). Regarding the boll weight - 5.4 g and the fiber length - 25.9 mm Perun variety was equal to the standard variety.

Table 1a. Agronomic characters of **Pirin** variety for a seven year period in competitive variety trial (2011-2013 and 2016-2019)

Varieties	Seed cotton yield, kg/ha		Height of first fruit branch, cm		Boll weight, g		Lint percentage, %		Fiber length, mm	
	Average	%/St	Average	%/St	Average	%/St	Average	%/St	Average	%/St
Chirpan-539	1506	100.0	18.3	100.0	5.1	100.0	36.9	100.0	25.9	100.0
Pirin	1608	106.8	18.6	101.6	5.3	103.9**	36.9	100.0	26.4	101.9**
GD 5%	276	18.3	1.0	5.5	0.2		0.3		0.3	1.1
GD 1%	366	24.3	1.7	9.3	0.3		0.6		0.5	1.9
GD 0.1%	473	31.4	2.3	12.6	0.4		0.9		0.8	3.1

Significant * $p \leq 0.05$; ** $p \leq 0.01$;

Table 1b. Agronomic characters of **Perun** variety for a four year period in competitive variety trial (2012-2015)

Varieties	Seed cotton yield, kg/ha		Height of first fruit branch, cm		Boll weight, g		Lint percentage, %		Fiber length, mm	
	Average	%/St	Average	%/St	Average	%/St	Average	%/St	Average	%/St
Chirpan-539	1542	100.0	17.1	100.0	5.4	100.0	37.4	100.0	25.9	100.0
Perun	1825	118.4*	18.4	107.6*	5.4	100.0	37.0	98.9^0	25.9	100.0
GD 5%	276	17.9	1.0	5.8	0.2	3.7	0.3	0.8	0.3	1.1
GD 1%	366	23.7	1.7	9.9	0.3	5.5	0.6	1.6	0.5	1.9
GD 0.1%	473	30.7	2.3	13.5	0.4	7.4	0.9	2.4	0.8	3.1

Significant $^{*}p\leq0.05$; $^{**}p\leq0.01$;

Results of the State Variety Test

Pirin variety

In the State Variety Test **(Table 2a)** on average over a two-year period Pirin variety realized an average seed cotton yield of 2029 kg/ha, 2.9% over the average standard. The two standards - Chirpan-539 (for yield) and Avangard-264 (for fiber quality) did not differ significantly in seed cotton yield -1962 kg/ha and 1972 kg/ha, respectively. Pirin variety exceeded Chirpan-539 by 3.4%, Avangard-264 - by 2.5%.

In 2016, the cultivar Chirpan-539 produced an average seed cotton yield of 1853 kg/ha and the cultivar Avangard-264 - 1934 kg/ha, which was 4.4% more. In this year, Pirin variety in seed cotton yield of 1943 kg/ha exceeded Chirpan-539 by 4.9% and was equal to Avangard-264, as a result of which it exceeded the average standard by 2.6%.

The excess of seed cotton yield was more significant in 2017. Perun variety realized seed cotton yield of 2116 kg/ha and exceeded the average standard by 3.4%. In this year, the two standards differed by 46 kg/ha with a higher average yield obtained from the cultivar Chirpan-539 – 2070 kg/ha, which was 2.2% above Avangard-264. Perun variety outperformed the two standards, weaker Chirpan-539 and stronger Avangard-264, by 2.2% and 4.5%, respectively.

Pirin variety in lint yield – 811 kg/ha, on average for the two years, exceeded the average standard by 3.6%. This variety exceeded the two standards, stronger Avanagard-264 and weaker Chirpan-539, by 5.7% and 1.5%, respectively. The two standards differed significantly in fiber yield. The cultivar Chirpan-539 realized a higher fiber yield than the cultivar Avangard-264 in both years of the study and on average for the period. In 2016, the Pirin variety in lint yield – 815 kg/ha slightly exceeded the cultivar Chirpan-539 (by 0.7%), Avangard-264 - by 4.0% and the average standard - by 2.4%. Similar to the total seed cotton yield the increase in lint fiber yield in 2017 was more significant. In this year, Pirin variety exceeded Chirpan-539 by 2.1%, Avangard-264 - by 7.4%, the average standard - by 4.7%.

Pirin variety in lint percentage - 40.0%, average for the period, surpassed Avangard-264, very slightly was lower than Chirpan-539 and the average standard. The highest lint percentage of the new variety and both standards was recorded in 2016. In this year, Pirin variety in lint percentage of 41.4% was inferior to Chirpan-539, which had a very high lint percentage of 43.1%, and exceeded by 3.5% Avangard-264. In 2017, Pirin variety in lint percentage of 38.6% very slightly by 0.5% exceeded Chirpan-539, Avangard-264 it exceeded by 3.5% and the average standard - by 2.1%.

Perun variety

Results for the economic qualities of Perun variety from the State Variety Testing in 2017-2018 are presented in **Table 2b**. Perun variety in total seed cotton yield of 2255 kg/ha, on average for the two years, surpassed the two standards, Chirpan-539 by 7.8%, Avangard-264 - by 11.1% and the average standard - by 9.5%. In 2017, Perun variety in seed cotton yield slightly surpassed Avangard-264 and slightly was inferior to Chirpan-539 as a result

Table 2a. Test results of Pirin variety in the IASAS system - 2016-2017

Varieties	Average seed cotton yield kg/ha				Fiber yield kg/ha				Lint percentage %			
	2016	2017	Average	%/St	2016	2017	Средно Average	%/St	2016	2017	Average	%/St
Av. standard	1894	2047	1971	100.0	787	778	783	100.0	41.6	37.8	39.7	100.0
Chirpan-539	1853	2070	1962	99.5	800	798	799	102.0	43.1	38.4	40.8	102.8
Avangard-264	1934	2024	1979	100.4	775	759	767	98.0	40.0	37.3	38.7	97.5
Pirin	1943	2116	2029	102.9	806	815	811	103.5	41.4	38.6	40.0	100.8

Table 2b. Test results of Perun variety in the IASAS system - 2017-2018

Varieties	Average seed cotton yield kg/ha				Fiber yield kg/da				Lint percentage %			
	2017	2018	Average	%/St	2017	2018	Average	%/St	2017	2018	Average	%/St
Av. standard	2047	2073	2060	100.0	778	740	759	100.0	37.8	35.7	36.8	100.0
Chirpan-539	2070	2111	2091	101.5	798	779	789	103.9	38.4	36.9	37.7	102.4
Avangard-264	2024	2034	2029	98.5	759	702	731	96.3	37.3	34.5	35.9	97.6
Perun	2043	2470	2255	109.5	780	919	850	112.0	38.1	37.2	37.7	102.4

it leveled with the average standard. In 2018, the variety realized a very high seed cotton yield of 2470 kg/ha and significantly exceeded the two standards, Chirpan-539 - by 17.0%, Avangard-264 – by 21.4% and the average standard – by 19.1%.

Perun variety in lint yield - 759 kg/ha, on average for the test period, exceeded the two standards, Chirpan-539 – by 7.7%, Avangard-264 - by 16.3% and the average standard - by 12.0%. The two standards differed in lint yield in both testing years. The cultivar Chirpan-539 realized a higher lint yield than Avangard-264 and the difference between the two standards was more pronounced in 2017. In this year, Perun variety in lint yield of 780 kg/ha exceeded by 11.0% Avangard- 264 and by 2.3% was lower than Chirpan-539 and equalized with the average standard.

The differences in lint yield between the new variety and the standard cultivars were much more significant in 2018, which is explained by the significantly higher seed cotton yield realized by the new variety in the same year. In this year, Perun variety, similar to the seed cotton yield, accounted the highest lint yield - 919 kg/ha, significantly exceeding by 18.0% and 25.7% the two standards Chirpan-539 and Avangard-264, respectively and the average standard – by 24.2%.

Perun variety in lint percentage – 37.7%, on average for the test period, was equal to Chirpan-539, exceeded by 5.0% Avangard-264 and by 2.4% the average standard. The two standard cultivars showed significant differences in lint percentage more pronounced in the second year of testing. During the first year of testing, Perun variety in lint percentage of 38.1% was equal to Chirpan-539, exceeded by 2.1% Avangard-264 and by 0.8% the average standard. In the second year, this variety exceeded Chirpan-539 by 0.8%, Avangard-264 - by 7.8% and the average standard - by 4.2%.

Technological fiber properties

Pirin variety

The fibre technological properties of Pirin variety according to the IASAS data in 2016-2017 are given in the **Table 3a.** In spinning consistency Index (SCI), fiber fineness and fiber strength, the variety was inferior to Avangard-264 and equaled to Chirpan-539. The new variety had a micronaire value of 4.82 mic, on average for the two years, the standard cultivars Chirpan-539 and Avangard-264 had 4.83 mic

Table 3a. Technological fiber properties of Pirin variety in the IASAS system in 2016-2017

Year	Av. standard	Chirpan-539	Avangard-264	Pirin
Spinning, consistency (SCI), Index				
2016	115	102	127	102
2017	115	114	117	113
Average	**115**	**108**	**122**	**107**
Micronaire (Mic)				
2016	4.82	4.93	4.70	5.04
2017	4.57	4.74	4.41	4.60
Average	**4.69**	**4.83**	**4.55**	**4.82**
Maturity (Mat) Index				
2016	0.87	0.86	0.87	0.87
2017	0.87	0.87	0.86	0.87
Average	**0.87**	**0.87**	**0.87**	**0.87**
Upper Half Mean Length (UHML), mm				
2016	25.61	24.56	26.66	24.11
2017	25.33	25.13	25.54	24.65
Average	**25.47**	**24.85**	**26.10**	**24.38**
Uniformity in length %				
2016	81.7	80.5	82.9	80.4
2017	81.5	81.6	81.3	81.1
Average	**81.6**	**81.1**	**82.1**	**80.7**
Short fiber (SFL), 12.7 mm				
2016	8.8	9.5	8.1	10.0
2017	9.2	9.4	9.0	9.6
Average	**9.0**	**9.5**	**8.5**	**9.8**
Fiber strength (Str), g/tex				
2016	27.9	26.8	29.1	27.2
2017	28.3	28.4	28.2	28.0
Average	**28.1**	**27.6**	**28.7**	**27.6**
Elongation (Elg), %				
2016	7.8	8.0	7.5	7.7
2017	7.1	7.1	7.2	7.2
Average	**7.5**	**7.5**	**7.3**	**7.5**
Spectroscopy reflecting the difference (Rd)				
2016	81.1	80.4	81.9	82.9
2017	82.0	81.5	82.6	82.7
Average	**81.5**	**80.9**	**82.2**	**82.8**
Yellowness (+b)				
2016	8.8	8.7	8.9	8.9
2017	8.9	8.9	8.9	9.1
Average	**8.9**	**8.8**	**8.9**	**9.0**
Color grade (C Grad) Upland				
2016 Radnevo	-	21-1	11-1	11-1
2016 Burgas	-	11-1	11-1	11-1
2017 Radnevo	-	21-1	11-1	11-1
2017 Burgas	-	11-2	11-2	11-1

Table 3b. Technological fiber properties of Perun variety in the IASAS system in 2017-2018

Year	Av. standard	Chirpan-539	Avangard-264	Perun
Spinning, consistency (SCI), Index				
2016	115	114	117	111
2017	117	114	119	118
Average	**116**	**114**	**118**	**115**
Micronaire (Mic)				
2016	4.57	4.74	4.41	4.87
2017	4.92	5.0	4.83	4.72
Average	**4.75**	**4.87**	**4.62**	**4.79**
Maturity (Mat) Index				
2016	0.86	0.87	0.86	0.87
2017	0.87	0.87	0.87	0.86
Average	**0.87**	**0.87**	**0.87**	**0.87**
Upper Half Mean Length (UHML), mm				
2016	25.33	25.13	25.54	24.77
2017	26.37	25.91	26.83	26.20
Average	**25.85**	**25.52**	**26.18**	**25.48**
Deviation		**-0.33**	**+0.33**	**-0.37**
Uniformity in length %				
2016	81.5	81.6	81.3	81.2
2017	82.4	82.3	82.5	82.2
Average	**81.9**	**81.9**	**81.9**	**81.7**
Short fiber (SFL), 12.7 mm				
2016	9.2	9.4	9.0	9.6
2017	8.4	8.6	8.1	8.2
Average	**8.8**	**9.0**	**8.5**	**8.9**
Fiber strebgth (Str), g/tex				
2016	28.3	28.4	28.2	28.3
2017	27.5	27.3	27.7	27.5
Average	**27.9**	**27.8**	**27.9**	**27.9**
Elongation (Elg), %				
2016	7.2	7.1	7.2	7.8
2017	7.1	7.3	6.9	7.2
Average	**7.2**	**7.2**	**7.1**	**7.5**
Spectroscopy reflecting the difference (Rd)				
2016	81.1	80.4	81.9	81.7
2017	81.5	81.9	81.0	82.6
Average	**81.3**	**81.1**	**81.5**	**82.1**
Yellowness (+b)				
2016	8.9	8.9	8.9	9.0
2017	8.2	8.3	8.0	8.1
Average	8.6	8.6	8.5	8.5
Color grade (C Grad) Upland				
2017 Radnevo	-	21-1	11-1	11-1
2017 Burgas	-	11-2	11-2	11-1
2018 Radnevo		21-1	21-1	11-2

and 4.55 mic, respectively. The two standard cultivars differed in micronaire value. Lower micronaire means finer fiber. According to international standards, the new variety and both standards regarding micronaire value referred to "medium fine cottons" (from 4.0 mic to 4.9 mic). As for fiber strength - 27.6 g/tex for the new variety and Chirpan-539 and 28.7 g/tex for Avangard-264 they referred to the varieties with "strong fiber" (26-29 g/tex).

Regarding spectroscopy reflecting the difference (Rd) the variety was leveled with Avangard-264. The two standards differed in this property and Avangard-264 had better spectroscopy.

In terms of fiber length - Upper Half Mean Length (UHML) and fiber uniformity in length the variety was inferior to the two standard cultivars. Perun variety in fiber length - 24.38 mm was inferior by 1.72 mm to Avangard-264, by 0.47 mm to Chirpan-539 and by 1.09 mm to the average standard. The new variety and the two standard cultivars were characterized by a "medium-long staple".

In terms of uniformity in length 80.7% for the variety and 82.1% and 81.1% for the standard cultivars Avangard-264 and Chirpan-539, respectively referred to the varieties with "good uniformity" (81-83%).

According to short fibers content - 9.8% the variety slightly exceeded the two standards. In the experimental station Burgas a smaller amount of trash was recorded for Avangard-264 and a larger for Chirpan-539, while in Radnevo they were equal.

Color grade (C Grad) Upland 11-1 (for the variety and standards) indicates high fiber quality in terms of coloration.

According to the other technological properties – maturity, elongation, yellowness, color degree, the variety was equal to the two standard cultivars, which ones also did not differ from each other. In terms of maturity and elongation, the new variety and both standards belonged to the group of "mature" (0.95-0.85) cottons and had "good" elongation.

The data analysis shows that Pirin variety in some fiber technological qualities (spinning, fineness, strength, mean length, uniformity in length) was characterized by a medium fine and strong fiber with a medium long staple and a good uniformity in length, a high maturity and a very good whiteness (C GRAD), which makes it very valuable for the textile industry.

Perun variety

The results of fiber technological analysis of Perun variety, according to IASAS data for 2017 – 2018, are presented in **Table 3b.** Compared to the two standard cultivars, the fiber of this variety had a better elongation, a better spectroscopy reflecting the difference RD and a better whiteness.

The Perun variety fiber was characterized as very white, in color (whiteness) it was 11-1 in Radnevo and Burgas in 2017 and 11-2 in Radnevo in 2018 surpassing both standards. This variety had a slightly finer fiber than Chirpan-539.

Averaged over the two years, micronaire value was 4.79 mic compared to 4.87 mic for Chirpan-539 and 4.62 mic for Avangard-264.

Perun variety in fiber length - 25.48 mm, average for the two years, and in spinning consistency Index (SCI) was inferior to Avangard-264 and leveled with Chirpan-539. The short fibers content was higher compared to Avangard-264.

According to the other technological fiber qualities as maturity, yellowness, strength and uniformity in length Perun variety was equal to both standards.

Summarized the results from the analysis showed that the new cotton varieties Pirin and Perun appeared as very early in maturity and highly productive. In the State Variety Test both varieties confirmed their economic qualities. Pirin variety realized high and stable seed cotton yields over the years. Perun variety had great potential for productivity in the favorable environments. In seed cotton yield and lint yield/ha, on average for the test period, the new varieties outperformed the two standard cultivars and the average standard. The higher yield was combined with other valuable qualities. Pirin variety had larger bolls than the standard cultivars. The fiber of these two new varieties was very white with good technological properties. Both new varieties had high fruiting branches and were very suitable for mechanized harvesting of cotton.

CONCLUSIONS

The new varieties Pirin and Perun were distinguished by great early maturity and high productivity combined with other valuable economic qualities. In the State Variety Test, the two varieties in seed cotton yield of 2029 kg/ha for Pirin and 2255 kg/ha for Perun, on average over the test period,

outperformed the standard cultivars by 2.9% and 9.5%, respectively and the average standard. In lint yield the increase was by 2.9% and 9.5%.

Pirin variety realized high and stable yields over the years and Perun variety showed a specific adaptation to more favorable environments.

The high productivity of these new varieties was combined with good technological qualities of fiber, which was distinguished by great whiteness C Grade 11-1.

These varieties set high the fruiting branches and were very suitable for mechanized harvesting of cotton.

Great early maturity and high performance in productivity, combined with other valuable qualities, defined Pirin and Perun varieties as new achievements in the selection of early maturity and productivity.

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