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EVALUATION OF SOME ADVANCED BREAD WHEAT (*Triticum aestivum L.*) LINES FOR AGRONOMIC TRAITS UNDER KIRKLARELİ AND TEKİRDAĞ CONDITIONS

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Abstract: This study was carried out to determine grain yield and yield components of five bread wheat genotypes and 20 advanced lines at Kırklareli and Tekirdağ locations in 2017-2018 cropping year. The experiments were arranged in a randomized complete block design with four replications. In the study, grain yield (GY), plant height (PH), spike length (SL), number of spikelets/spike (SS), number of grains/spike (KS), grain weight/spike (KWS), test weight (TW) and thousand kernel weight (TKW) were investigated. Bread wheat genotypes were found statistically significant for all investigated traits according to the data obtained from two locations. According to the results of two locations the investigated traits such as GY ranked from 423.8 to 572.5 kg da^{-1}, PH 85.3 to 116.2 cm, SL 8.8 to 12.2 cm, SS 16.5 to 21.6, KS 39.4 to 65.6, KWS 1.30 to 2.91 g, TW 65.9 to 75.6 and TKW 32.6 to 44.7 g. Relationship between GY and SS, KS and KWS were found positive and significant. In addition, relationship between PH and SL (r=0.39*), SS and KS (r=0.39*), SS and KWS (r=0.42*), TW and KS (r=0.42), TW and KWS (r=0.44*), KS and KWS (r=0.64**) were significant and positive. The highest grain yield was obtained from SME9 bread wheat advanced line at both Kırklareli and Tekirdağ, which was concluded as promising.

Keywords: Bread wheat, Advanced line, Yield, Yield components

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1. Introduction

Wheat is a grain that is essential in human nutrition, industry, and animal feed, while also having strategic importance in many countries' trade. Wheat is the primary source of nutrition for over a third of the world's population. Wheat also provides 19% of the calories and 21% of the protein consumed by the world's population (Ali, 2017; Bordoni et al., 2017; Akan et al., 2021).

Supplying the production needs for appropriate and balanced nutrition has become a major issue today and in the next years as a result of the rapid increase in population in the world and in Turkey, as well as the narrowing of production areas. In order to overcome this problem, it is important to develop genotypes that are suitable for regional conditions, have a high yield, and have the desired quality traits. (Bayram and et al., 2017; Koc and Akgun, 2018).

Wheat production is influenced by a variety of factors, including yield and quality traits, genetic structure of genotypes, climate and soil type, cultivation practices, and biotic and abiotic stress factors. (Dogan and Kendal, 2012; Kızılgeci et al., 2017).

Wheat cultivation areas in our country fell by 25.9% between 2001 (9.3 million ha) and 2020 (6.9 million ha). While 19 million tons were produced in 2001, 20.5 million tons were produced in 2020 (TUIK, 2022). Despite the decrease in production areas, the production of high yielding and disease resistant varieties that adapt to ecological conditions, and also the dissemination of the produced varieties to farmers, has played an important role in maintaining and increasing production levels.

In this study, five commercial varieties commonly produced in our country and 20 advanced bread wheat lines were evaluated in terms of yield and yield components under Kırklareli and Tekirdağ ecological conditions.

2. Materials and Methods

This research was conducted out in Kırklareli and Tekirdağ locations during 2017-2018 cropping years. Five cultivars (Lucilla, Rumeli, Glosa, Esperia, and Aslı) and 20 advanced bread wheat lines were used as plant materials in the experiment. The research was arranged in a randomized complete block design with four

replications. Sowing was done in the first week of November in both growing seasons, and it was done manually in 5 m long plots with 20 cm row spacing and 6 rows with 500 seeds per m^2. In the experiment, the plot sizes were 6 m^2 for both sowing and harvesting in the trial (6 m × 1 m). Weed control was done manually in the trial plots and no application was made for diseases and pests.

With sowing, 5 kg da^{-1} of nitrogen and 5 kg da^{-1} of phosphorus were applied and top dressing was divided into two and applied as 9 kg da^{-1} N during tillering and 6 kg da^{-1} N during jointing. Harvest was done in the first week of July in both growing seasons. In the study, grain yield (GY), plant height (PH), spike length (SL), number of spikelets/spike (SS), number of grains per spike (KS), grain weight per spike (KWS), test weight (TW) and thousand kernel weight (TKW) were investigated.

The data obtained from two locations were subjected to variance analysis and Duncan multiple comparison test was applied to compare the means. (JMP 15.1 SAS Institute Inc, 2020). While correlation analyzes were performed using the JMP program, visualization was made using the ggplot2 package in R software (Wickham, 2009).

3. Results and Discussion

While genotype and location were both found to be statistically significant in terms of grain yield in the wheat genotypes. However, the genotype × location interaction was found to be statistically insignificant (Table 1).

Table 1. Means and values related to grain yield and plant height

Genotypes	Grain Yield (kg da^{-1})			Plant Height (cm)		
	Kırklareli	Tekirdağ	Mean	Kırklareli	Tekirdağ	Mean
Lucilla	477.5b-e	570.8ab	524.1a-c	88.7k-m	89.0ı-l	88.8jk
Rumeli	497.9a-c	515.8a-f	506.8b-d	100.5ef	96.5e-h	98.5fg
Glosa	457.9b-f	481.6c-g	469.7c-g	89.7j-m	88.0j-l	88.8jk
Esperia	434.6c-f	493.3b-g	463.9d-g	85.2m	87.7kl	86.5k
Aslı	497.5a-c	495.6b-g	496.5b-e	95.0f-j	98.2d-f	96.6gh
SME1	438.7c-f	440.0e-h	439.3fg	98.7fg	98.5de	98.6fg
SME2	462.9b-f	471.8c-g	467.3d-g	100.2ef	104.0b	102.1ef
SME3	461.2b-f	519.6a-e	490.4b-f	110.2b-d	103.5bc	106.8c
SME4	442.0c-f	435.1f-h	438.6fg	104.8de	97.2d-g	101.0ef
SME5	447.5c-f	484.8c-g	466.1d-g	119.5a	113.0a	116.2a
SME6	440.8c-f	501.0b-g	470.9c-g	111.0bc	102.0b-d	106.5cd
SME7	440.8c-f	452.7d-h	446.7e-g	109.2b-d	113.0a	111.1b
SME8	420.4d-f	522.7a-d	471.5c-g	114.7ab	113.5a	114.1ab
SME9	561.2a	583.7a	572.5a	87.7lm	85.5l	86.6k
SME10	445.4c-f	477.9c-g	461.6d-g	96.2f-ı	91.0ı-k	93.6hı
SME11	436.6c-f	434.2gh	435.4g	105.8c-e	100.0b-e	102.8de
SME12	399.1f	482.9c-g	441.0fg	97.5f-h	96.7e-h	97.1gh
SME13	403.3ef	513.3a-g	458.3d-g	91.7ı-l	92.3h-k	92.0ıj
SME14	465.8b-f	537.9a-c	501.8b-d	85.5m	85.2l	85.3k
SME15	462.5b-f	487.1c-g	474.7c-g	93.8g-k	93.5f-ı	93.6hı
SME16	480.4b-d	468.7c-g	474.5c-g	105.3de	100.0b-e	102.6e
SME17	479.2b-d	454.6d-h	466.9d-g	98.7fg	98.8c-e	98.7fg
SME18	432.4c-f	472.3c-g	452.3d-g	92.2h-l	100.0b-e	96.1gh
SME19	531.6ab	545.2a-c	538.4ab	95.7f-ı	92.7g-j	94.2hı
SME20	462.1b-f	385.6h	423.8g	95.7f-ı	93.0g-ı	94.3hı
Location	459.2b	489.1a	474.1	98.9a	97.3b	98.1
Genotype (G)	*	**	**	**	**	**
Location (L)		**			**	
G x L		ns			**	

** significant at 1%, * significant at 5%, ns= not significant

While wheat genotype grain yields ranged from 399.1 to 561.2 kg da^{-1} in Kırklareli and 38.6 to 583.7 kg da^{-1} in Tekirdağ, the average grain yield was determined to be 474.1 kg da^{-1}. The highest grain yield was obtained from the SME9 genotype in both locations and according to the location averages. It has been reported that the yield is affected by many factors such as the genetic potential of the genotype, breeding techniques, and ecological conditions. In previous studies, Bayram et al. (2017), 213.5-756.8 kg da^{-1}, Gungor and Dumlupinar, (2019a), 515.2-790.7 kg da^{-1}, Koc and Akgun, (2018), 722.6-1003.3 kg da^{-1}, Karaman et al. (2021), 186.3-813.0 kg da^{-1} and Sagır and Kara (2021) determined a variation between 147.3-401.3 kg da^{-1}.

The average values for plant height are given in Table 1. The difference in plant height among genotype, location, and genotype × location was found to be statistically significant in the study. Plant heights ranged from 85.2 to 119.5 cm in Kırklareli and from 85.2 to 113.5 cm in Tekirdağ. The SME5 and SME8 genotypes had the longest plant height, while SME9, Esperia and SME14 genotypes had the shortest plant height. The average plant height was found to be 98.9 cm in Krklareli, 97.3 cm in Tekirdağ. The plant height in wheat varies genetic performance, climate and soil structure, and cultural practices according to reports. Mut et al. (2017) reported 60.2-80.3 cm, Gungor and Dumlupinar, (2019a) 80.7-112 cm, and Demirel et al. (2021), 52.16-96.66 cm.

In terms of spike length, differences between genotype, locations, and genotype × location interaction were found to be statistically significant. The spike lengths of genotypes were determined to be 8.6-11.6 cm in Kırklareli and 9.0-13.2 cm in Tekirdağ, with the average value of the locations as 10.4 cm (Table 2). The genotypes with the biggest spike length values were SME11 and SME17, whereas the genotype with the shortest spike length was Aslı cultivar. The spike length was found 8.87-11.10 cm by Aydogan and Soylu, (2017) and 4.65-11.9 cm by Demirel et al. (2021).

Table 2. Means and values related to spike length and no spikelets/spike

Genotypes	Spike Length (cm)			Spikelets/Spike (numbers)		
	Kırklareli	Tekirdağ	Mean	Kırklareli	Tekirdağ	Mean
Lucilla	10.2de	9.7kl	9.9h-j	19.7b-d	20.2c-f	20.0c-h
Rumeli	9.6e-g	9.6kl	9.6ıj	20.5ab	20.5c-e	20.5b-d
Glosa	9.4fg	9.7kl	9.5j	18.0e-g	20.7b-d	19.3e-k
Esperia	9.7e-g	10.1ı-k	9.9h-j	20.0b-d	20.7b-d	20.3b-e
Aslı	8.6h	9.0l	8.8k	19.0c-f	19.5d-g	19.2f-k
SME1	9.5fg	9.5kl	9.4j	17.7fg	19.0e-h	18.3kl
SME2	10.9bc	11.8cd	11.3b	19.2b-e	19.0e-h	19.1g-k
SME3	9.9d-g	10.1ı-k	10.0h-j	19.0c-f	19.0e-h	19.0h-l
SME4	10.2de	11.8cd	11.0b-d	20.0b-d	22.2ab	21.1ab
SME5	11.1a-c	10.9d-ı	11.0b-d	21.5a	21.7a-c	21.6a
SME6	11.0a-c	11.2c-f	11.1b-d	19.7b-d	19.2d-h	19.5d-j
SME7	11.1a-c	12.0bc	11.5b	20.5ab	17.8hı	19.1g-k
SME8	10.9bc	11.5c-e	11.2bc	20.2a-c	19.5d-g	19.8d-h
SME9	10.0d-f	11.3c-f	10.6d-g	20.0b-d	20.7b-d	20.3b-e
SME10	10.5cd	10.9e-j	10.7c-f	18.2e-g	19.2d-h	18.7ı-l
SME11	11.3ab	13.2a	12.2a	17.5g	22.7a	20.1b-g
SME12	9.4fg	11.1d-g	10.3e-h	18.7d-g	18.7f-ı	18.7ı-l
SME13	9.7e-g	10.6f-j	10.2f-h	17.7fg	18.2g-ı	18.0l
SME14	9.7e-g	10.3g-k	10.0h-j	18.7d-g	18.2g-ı	18.5j-l
SME15	9.7e-g	10.2h-k	8.9h-j	15.7h	17.3ı	16.5m
SME16	9.9d-g	11.6c-e	10.8c-e	18.7d-g	20.7b-d	19.7d-ı
SME17	11.6a	12.8ab	12.2a	20.5ab	20.5c-e	20.5b-d
SME18	9.3g	10.8e-j	10.1g-ı	19.2b-e	21.5a-c	20.3b-e
SME19	10.5cd	11.0d-h	10.9c-e	20.0b-d	20.5c-e	20.2b-f
SME20	9.4fg	10.0jk	9.7h-j	19.7b-d	22.2ab	21.0a-c
Location	10.1b	10.8a	10.4	19.2b	20.0a	19.6
Genotype (G)	**	**	**	**	**	**
Location (L)		**			**	
G x L		**			**	

** significant at 1%

In terms of the number of spikelets per spike, the interaction of genotype, location, and genotype × location was found to be statistically significant. It ranged from 15.7 to 21.5 in Kırklareli and from 17.3 to 22.7 in Tekirdağ. When the two locations were combined, the average number of spikelets per spike was found to be 19.6. The largest number of spikelets per spike was determined in the advanced line SME5, while the lowest number of spikelets per spike was determined in the advanced line SME15 based on the mean data of two locations. In other researches, the number of spikelets was reported as 16.5-21.2 by Gungor and Dumlupinar (2019a), 12.1-16.3 by Sagır and Kara (2021), and 18.15-22.13 by Akan et al. (2021).

According to the combined analysis in terms of the number of grains per spike in wheat genotypes; Genotype, location and genotype × location interaction were found to be statistically significant. The average number of grains per spike (55.5) in Tekirdağ location was higher than the average (52.4) in Kırklareli location. While the number of grains per spike was found to be 35.2-68.0 in Tekirdağ location, the average grain number per spike was determined as 40.3-71.7 in Kırklareli location. The highest number of grains per spike was obtained in variety Rumeli in Kırklareli location, advanced line SME4 in Tekirdağ location, the lowest grain number in advanced lines SME15 in Kırklareli location and SME1 in Tekirdağ location. The average number of grains per spike obtained by combining the two locations was found to be 53.9 (Table 3). Aydogan and Soylu, (2017), 31.2-44.9, Bayram et al. (2017), 13.7-26.6, Gungor and Dumlupinar, (2019a), 16.5-21.2, Demirel et al. (2021), determined between 11.3-31.33 with a high variation.

Table 3. Means and values related to no grains/spike and grain weight/spike

Genotypes	Grains/Spike (grains)			Grain weight/Spike (g)		
	Kırklareli	Tekirdağ	Mean	Kırklareli	Tekirdağ	Mean
Lucilla	62.8b	61.5a-d	62.1a-c	2.48b-d	2.76a-d	2.62a-d
Rumeli	71.7a	59.5a-f	65.6a	3.06a	2.53b-f	2.80ab
Glosa	47.0e-g	53.7b-h	50.3g-ı	2.09e-ı	2.61a-e	2.35d-ı
Esperia	58.2bc	62.2a-d	60.2a-d	2.72b	2.11e-g	2.41c-g
Aslı	51.7c-e	44.0hı	47.8hı	2.33c-f	2.01fg	2.17f-j
SME1	43.5fg	35.2ı	39.4j	1.26l	1.34h	1.30k
SME2	45.0e-g	51.5d-h	48.2hı	1.95h-j	1.94g	1.95j
SME3	52.2c-e	52.7c-h	52.5e-h	2.20e-h	2.19e-g	2.19f-j
SME4	51.2c-e	68.0a	59.6a-d	2.25d-g	2.83a-c	2.54b-e
SME5	62.5b	64.5ab	63.5ab	2.03g-j	2.74a-d	2.39c-h
SME6	49.5d-f	44.7g-ı	47.1hı	2.03g-j	1.90g	1.97j
SME7	61.5b	61.7a-d	61.6a-c	2.05f-j	2.39c-g	2.22f-j
SME8	52.2c-e	50.0e-h	51.1f-ı	2.48b-d	2.40c-g	2.44c-f
SME9	49.0d-f	52.8c-h	50.8g-ı	1.86ı-k	2.28d-g	2.07ıj
SME10	57.7bc	60.5a-e	59.1a-e	2.58bc	2.31c-g	2.45c-f
SME11	49.5d-f	63.3a-c	56.3c-g	2.67b	3.14a	2.91a
SME12	46.0e-g	61.5a-d	53.7d-h	1.64k	2.54b-f	2.09h-j
SME13	42.2fg	55.7b-g	49.0hı	2.11e-ı	2.14e-g	2.12g-j
SME14	61.2b	54.3b-h	57.7b-f	2.28d-g	2.02fg	2.15f-j
SME15	40.3g	48.5f-h	44.3ıj	1.81jk	2.33c-g	2.07ıj
SME16	51.5c-e	61.8a-d	56.6c-g	2.29d-g	3.05ab	2.67a-c
SME17	56.3b-d	56.0b-g	56.1c-g	2.13e-ı	2.19e-g	2.16f-j
SME18	46.7e-g	58.2a-f	52.5e-h	2.03g-j	2.55b-f	2.29e-ı
SME19	56.0b-d	43.8hı	49.8g-ı	2.36c-e	2.31c-g	2.33d-ı
SME20	45.7e-g	62.0a-d	53.8d-h	2.29d-g	2.81a-d	2.55b-e
Location	52.4b	55.5a	53.9	2.20b	2.38a	2.29
Genotype (G)	**	**	**	**	**	**
Location (L)		**			**	
G x L		**			**	

** significant at 1%

The average grain weight per spike are given in Table 3. In terms of grain weight per spike, significant differences were found between genotype, location, and genotype × location. The grain weight per spike was determined to be 1.3-2.91 g and the average grain weight per spike was determined to be 2.29 g based on the average of the two locations. The grain weight per spike was found to vary between 1.26-3.06 g at the Kırklareli location and 1.34-3.14 g in the Tekirdağ location. Variety Rumeli in Krklareli location and advanced line SME11 in Tekirdağ location had the highest value. In both locations, advanced line SME1 had the lowest value. In previous works, Aydogan and Soylu (2017), 1.33-2.07, Altındal and Akgun (2017), 0.76-1.94 g, Gungor and Dumlupinar (2019a), 0.93-2.25 g, Subası and Ayrancı (2021), 0.669-1.981 g reported.

In terms of test weight, genotype, location, and genotype × location were found to be statistically significant in the study (Table 4). The test weight in Kırklareli was found to be between 67.6-76.0 kg hl^{-1}, whereas in Tekirdağ it was found to be between 63.4-75.1 kg hl^{-1}. In Kırklareli, genotypes SME16 (76.0 kg hl^{-1}) and SME19 (75.4 kg hl^{-1}) had the highest value, while advanced line SME16 (75.1 kg hl^{-1}) and cultivar Lucilla (74.2 kg hl^{-1}) had the highest value in Tekirdağ. The SME20 genotype had the lowest value in Kırklareli, whereas the SME1 genotype had the lowest value in Tekirdağ. The test weight was determined to be 71.7 kg hl^{-1} as average of the two locations. In previous studies, it is stated to be varied between 73.32 to 84.91 kg hl^{-1} (Aydogan and Soylu, 2017; Mut et al., 2017; Gungor and Dumlupinar, 2019a; Karaman et al., 2021).

Table 4. Means and values related to test weight and thousand kernel weight

Genotypes	Test Weight (kg hl^{-1})			Thousand kernel weight (g)		
	Kırklareli	Tekirdağ	Mean	Kırklareli	Tekirdağ	Mean
Lucilla	75.0b-d	74.2ab	74.6b	36.3ı-k	41.2b	38.7de
Rumeli	75.0b-d	72.1c	73.5c	37.6e-g	38.5de	38.1fg
Glosa	73.2fg	71.8cd	72.5e-g	39.4c	40.0c	39.7b
Esperia	75.0b-d	70.5g-ı	72.7ef	37.2f-h	38.8d	38.0fg
Aslı	71.4j	70.9d-ı	71.2ıj	35.7kl	37.0g-ı	36.4k
SME1	68.5kl	63.4p	65.9n	34.3m	34.7jk	34.5l
SME2	72.9gh	71.2c-h	72.0gh	37.5e-g	37.8e-g	37.6g-ı
SME3	72.6g-ı	68.4m-o	70.5kl	37.4fg	38.8d	38.1fg
SME4	69.1k	70.9e-ı	70.0l	37.9ef	37.8e-g	37.9f-h
SME5	74.7b-d	71.1d-h	72.9de	36.9g-ı	37.4f-ı	37.2ıj
SME6	73.0f-h	68.3no	70.7jk	36.6h-j	36.8hı	36.7jk
SME7	74.4de	71.1d-h	72.7ef	34.8m	35.4j	35.1l
SME8	75.2bc	71.7c-e	73.4cd	38.7cd	37.8e-g	38.2ef
SME9	71.4j	71.5c-f	71.4ı	34.4m	38.4de	36.4k
SME10	71.9ıj	68.6m-o	70.2kl	38.2de	37.9d-g	38.1fg
SME11	74.4de	70.1ı-k	72.2fg	34.3m	32.3m	33.3m
SME12	74.6cd	73.4b	74.0c	35.0lm	34.0kl	34.5l
SME13	72.4hı	67.8o	70.1kl	39.2c	33.5l	36.4k
SME14	73.7ef	69.6j-l	71.6hı	34.4m	30.7n	32.6n
SME15	71.2j	68.9l-n	70.0l	44.9a	44.4a	44.7a
SME16	76.0a	75.1a	75.6a	41.4b	36.5ı	38.9cd
SME17	74.5c-e	71.3c-g	72.9de	36.2ı-k	38.1d-f	37.2ıj
SME18	68.3lm	69.2k-m	68.7m	38.0d-f	40.6bc	39.3b-d
SME19	75.4ab	70.3h-j	72.9de	41.2b	37.7e-h	39.5bc
SME20	67.6m	70.8f-ı	69.2m	35.8j-l	38.9d	37.4hı
Location	72.9a	70.5b	71.7	37.3	37.4	37.4
Genotype (G)	**	**	**	**	**	**
Location (L)		**			ns	
G x L		**			**	

** significant at 1%, ns= not significant

While genotype and genotype × loction interaction were both found to be statistically significant in terms of thousand grain weight in the wheat genotypes. However, the location was found to be statistically insignificant (Table 4). The thousand-grain weight of wheat genotypes in the Kırklareli location ranged from 34.3 to 44.9 g. The SME15 genotype had the highest thousand grain weight, whereas the SME11 genotype had the lowest. The thousand grain weight at Tekirdağ location ranged from 30.7 to 44.4 g. The SME15 genotype had the highest thousand grain weight, while the SME14 genotype had the lowest. When two locations were combined, the average thousand grain weight was found to be 32.6-44.7 g. The greatest thousand grain weight was determined in the SME15 genotype, while the lowest thousand grain weight was determined in the SME14 genotype, based on the average of two sites (Table 4). Aydogan and Soylu (2017) stated that the weight of a thousand grains varied between 28.0-35.2 g, Gungor and Dumlupinar (2019a), 35.8-47.2 g, Mut et al. (2017), 29.2-38.4 g, Karaman et al. (2021), 23.51-46.71 g, and Sagır and Kara (2021) claimed that it ranged between 28.0-35.2 g.

According to correlation analyses of yield and yield components examined at two locations in bread wheat genotypes, there was no significant relationship between grain yield and the rest of investigated traits. Plant height and spike length (r=0.39**), number of spikelets/spike and number of grains/spike (r=0.39*), and grain weight/spike (r=0.42*) were found to be positive and significant. It was found that test weight and the number of grains/spike (r=0.39*) and grain weight per spike (r=0.44*) had a significant and positive relationship. There was a positive correlation between the number of grains per spike and the grain weight per spike (r=0.64**) (Figure 1). Boru et al. (2019) found a positive and significant relationship between grain yield and ear length (r=0.666*), grain number per spike (r=575*), and grain weight per spike (0.825*), as well as a negative and significant relationship between ear length and grain number per spike (0.578*) and kernel weight per ear (r=0.586*). In their study on Bolu ecological conditions, Gungor and Dumlupinar (2019b) found that grain yield was positively correlated with plant height (r=0.755**), heading time (r=0.118), spike length (r=0.141), number of spikes per spike (r=0.210), number of grains per spike (r=0.223), 1000 grain weight (r=0.015), and gluten ratio (=0.274).

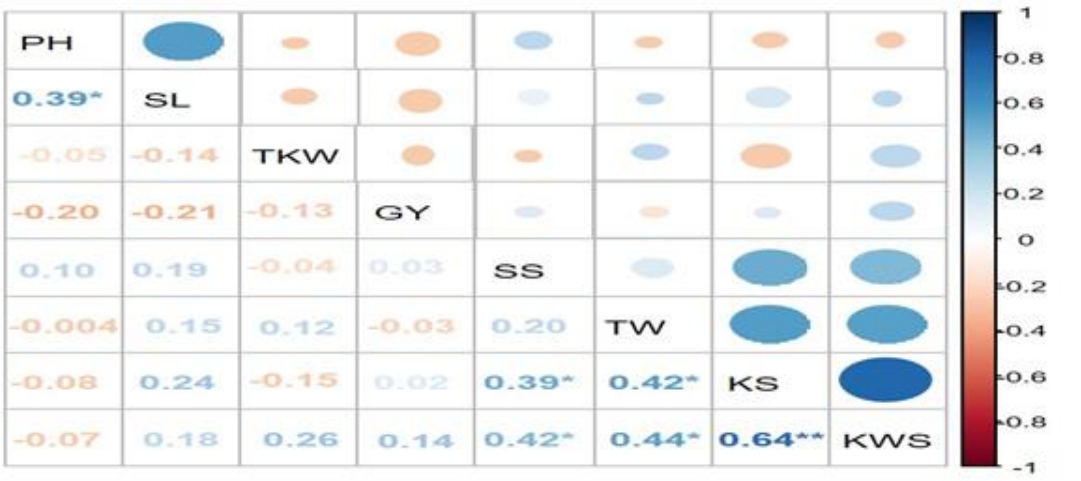

Figure 1. Correlation of yield and yield components in wheat genotypes.

4. Conclusion

Wheat production and economy have an important role for our country. This study was carried out under the ecological conditions of Kırklareli and Tekirdağ in Thrace Region. In this study, registered varieties and newly developed bread wheat lines were evaluated in terms of yield and yield components at two locations. It is determined that, SME9 line was found to be promising as high yielding at both locations. Thus, it is concluded that it might be appropriate to evaluate at more locations.

Author Contributions

All authors had equal contributions and all authors reviewed and approved the manuscript.

Conflict of Interest

The author declared that there is no conflict of interest.

References

Akan E, Unsal N E, Unsal A S. 2021. Determination of important parameters affecting the yield and quality of durum wheat varieties in dry conditions. ISPEC Journal of Agr. Sciences, 5: 246-256.

Ali M J. 2017. Investigation of yield, yield components and primary quality characteristics of some bread wheat (*Triticum aestivum* L.) genotypes. MSc thesis, Bingöl University, Institute of Science, Bingöl, pp. 95.

Altındal D, Akgun İ. 2017. Evaluation in terms of wheat growing of Isparta and Burdur district. Journal of Agricultural Faculty of Uludag University, 31: 89-102.

Aydogan S, Soylu S. 2017. Determination of yield, yield components and some quality properties of bread wheat varieties. Journal of Central Research Institute for Field Crops, 6: 24-30.

Bayram S, Ozturk A, Aydın M. 2017. Evaluation of yield components and grain yield of bread wheat genotypes in Erzurum conditions. Yuzuncu Yıl University Journal of

Agricultural Sciences, 27: 569-579.

Bordoni A, Danesi F, Di Nunzio M, Taccari A, Valli V. 2017. Ancient wheat and health: A legend or the reality? A review on KAMUT khorasan wheat. Int. J. Food Sci. Nutr, 68: 278–286.

Boru K, Yıldırım S, Aydogan Cifci, E. 2019. Investigation of yield and yield components in bread wheat genotypes by correlation and path analysis. Turkish Journal of Agrıcultural and Natural Sciences, 6: 379-387.

Demirel F, Kumlay A M, Yıldırım B. 2021. Evaluation of agromorphological characteristics of some bread wheat (*Triticum aestivum* L.) genotypes by biplot, clustering and path analysis methods. European Journal of Science and Technology, 23: 304-311.

Dogan Y, Kendal E. 2012. Determination of grain yield and some quality traits of bread wheat (*Triticum aestivum* L.) genotypes. Journal of Gaziosmanpasa University Faculty of Agriculture, 29: 113-121.

Gungor H, Dumlupinar Z. 2019a. Evaluation of some bread wheat (*Triticum aestivum* L.) cultivars for yield, yield components and quality traits in Bolu conditions. Turkish Journal of Agricultural and Natural Sciences, 6: 44-51.

Gungor H, Dumlupinar Z. 2019b. Path coefficient and correlation analysis in bread wheat (*Triticum aestivum* L.) varieties for some agronomical traits. KSU J. Agric Nat, 22: 851-858.

JMP®, Version 15.1. SAS Institute Inc., Cary, NC, 1989–2020

Karaman M, Basaran M, Erdemci I, Okan M. 2021. Evaluation of some agricultural characteristics of bread wheat (*Triticum aestivum* L.) genotypes based on augmented experimental design in Diyarbakır rainfall conditions. MSU J. of Sci, 9: 833-842.

Kızılgeci F, Tazebay N, Namlı M, Albayrak O, Yıldırım M. 2017. The drought effect on seed germination and seedling growth in bread wheat (*Triticum aestivum* L.) International Journal of Agriculture, Environment and Food Sciences, 1: 33-37.

Koc A, Akgun I. 2018. Comparing yield and quality of ICARDA-CIMMYT bread wheat lines in the west mediterranean. Ziraat Mühendisliği, 365: 22-33.

Mut Z, Erbas Kose O, Akay H. 2017. Determination of grain yield and quality traits of some bread wheat (*Triticum aestivum* L.) varieties. Anadolu Journal of Agricultural Sciences, 32: 85-95.

Sagır F, Kara B. 2021. Comparison of yield and ear characteristics of some bread wheat varieties registered in old and recent years. Gaziosmanpasa Journal of Scientific Research, 10: 36-42.

Subası K, Ayrancı R. 2021. Determination of the correlations between grain yields and agricultural characteristics of some bread wheat genotypes in Konya ecological conditions. Journal of Bahri Dagdas Crop Research, 10: 13-28.

TUIK 2022. Turkish Statistical Institute. (https://www.tuik.gov.tr/) (accessed date: February 04, 2022).

Wickham H. 2009. ggplot2: Elegant Graphics for Data Analysis. Springer-Verlag New York.