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RESEARCH ARTICLE

DETERMINATION OF SOME MORPHOLOGICAL CHARACTERS AND FORAGE YIELD OF VETCH (*Vicia* sp.) GENOTYPES COLLECTED FROM THRACE REGION OF TURKEY.

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Abstract

In this research was to determine the morphological characteristics and forage yield of some vetch genotypes gathered from flora of Thrace Region of Turkey. Seventy four vetch genotypes consists *Vicia hybrida* L., *V. pannonica* Crantz., *V. sativa* L., *V. villosa* Roth., *V. narbonensis* L., *V. lutea* L., *V. peregrina* L., *V. lathyroides* L., and *V. grandiflora* Scop. species were used as the material. The field experiment was carried out in the 2015-2016 growing season at field experimental area of Tekirdag Namık Kemal University, Agricultural Faculty, Field Crops Department in Tekirdag/Turkey. Plant height, stem diameter, leaflet length and width, fresh and dry forage yield of vetch genotypes were measured.

Plant height, stem diameter, leaflet length, leaflet width, fresh forage yield and dry forage yield have significant ($P<0.01$) differences between vetch genotypes. Plant height, stem diameter, leaflet length, leaflet width, fresh forage yield and dry forage yield of vetch genotypes ranged among 14,0 - 129,0 cm, 1,20 - 4,27 mm, 5,66 - 52,5 mm, 1,10 - 11,4 mm, 6,56 - 360,77 g/plant and 2,67 - 120,22 g/plant, respectively.

As a result, vetch genotypes have a wide variation in plant height, stem diameter, leaflet width and height, and fresh and dry forage yield. Vetch genotypes with this wide variation can be used as material in vetch breeding researches.

Introduction:-

Vicia sp. is one of the most common cultivated species of leguminous. Wild species of cultivated vetch varieties spreads from Middle and South Europe, Turkey, North Africa, Caucasus to Afghanistan. However, the vetches were developed primarily in the Mediterranean and Iran-Turan regions (Kupicha, 1981; Takhtajan, 1969). The Mediterranean Region has been the most important site for the biological diversity of the genus *Vicia*. The second important center is North America and South Siberia (Kupicha, 1981; Hanelt and Mettin 1989). The genus *Vicia* includes about 190 species (ILDIS, 1999). According to Davis and Plintman (1970), there has been 59 different vetch species in flora of Turkey. The number of cultivated vetch species with economic importance is fourteen (Acıkgoz, 2001). Among these species, common vetch, Hungarian vetch, hairy vetch and narbon vetch breeding were emphasized. The potentials of other vetch species will also be taken into consideration with breeding programs.

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Vetch species have been adapted to temperate climatic conditions. Average 300-500 mm rainfall areas are rich in vetch species (Kernick, 1978; Siddique, 2005). They need a cool season for good development. Their maturation is the end of spring and early summer. There are significant differences in terms of resistance to winter. The most resistant to cold is hairy vetch. It is known that the species with the highest rate of winter after the hairy vetch are Hungarian vetch and narbon vetch.

Vetch is important as a source for forage production, soil improver, green manure, silage and wild animals. They are also used in roadside erosion control. Especially, *Vicia ervilia* Wild., *V. narbonensis* L., *V. sativa* L., V. *benghalensis* L. and *V. articulata* Hornem. seeds are used in animal feed by adding to feed rations (Lopez Bellido, 1994; Enneking et. al., 1995; Jose Esteban, 1996). Most of the cultivated vetch varieties for forage production (*V. ervilia, V. narbonensis, V. sativa*) is traditionally involved in rations (Lopez Bellido, 1994). Usually it is cultivated with cereals such as barley and oats. It has been reported that hairy vetch is preferred as green manure plant and used as mulch material in tomato cultivation (Abdul-Baki et al., 1997). Annual wild vetch species with their rapid development, adaptability and high nutritional value can contribute to the vegetation of the existing pastures as well as in the planting of short-term rotation pastures. Wild vetch species, where hard seed rate is high, are easily propagated around the seeds with the cracking of the fruits ripened in the period when the plant is green. In this regard, it is important to develop new vetch agriculturally and economically.

In this study, it was aimed to determine some morphological characteristics and fresh forage yields of different vetch genotypes grown in field conditions by collecting from natural flora of Thrace Region.

Material and Methods:-

Research material consisted of 9 genotypes of *V. hybrida* L. (10-4, 14Y196, 15-11, 15-14, 17-4, 22-1, 7-6, 7-7), 6 genotypes of *V. pannonica* Crantz. (120-1, 14I24, 15-4, 15I15, 15K, 15Y201), 27 genotypes of *V. sativa* L. (10-6, 10-7, 111-1, 116-1, 14N64, 14O03, 14O04, 14Y462, 15-13, 15-2, 15-3, 15-5, 15-6, 15F20, 15I01, 15I08, 15K17, 17-6, 3-1, 3-2, 37, 4-1, 6-5, 7-1, 7-3, 7-8, 98-1), 19 genotypes of *V. villosa* Roth. (10-5, 110-2, 112-1, 116-2, 120-3, 121-7, 14O02, 14O05, 14O06, 14P197, 14Y105, 15-7, 15I16, 15I23A, 15I43, 17-2, 21-2, 4-2, 96-1), 2 genotypes of *V. narbonensis* L. (110-1, 17-3), 5 genotypes of *V. lutea* L. (10-3, 10-8, 14-1, 14-2, 6-4), 2 genotypes of *V. grandiflora* Scop. (14U01, 15K25), 2 genotypes of *V. peregrina* L. (6-3, 7-4) and 2 genotypes of *V. lathyroides* L. (10-1, 36-1). These genotypes (74 genotypes) have been collected from native flora of Thrace Region of Turkey.

The field experiment was carried out in the 2015-2016 growing season at field experimental area of Tekirdag Namık Kemal University, Agricultural Faculty, Field Crops Department in Tekirdag/Turkey (N 40^{o} 59' 25.1", E 27^{o} 34' 50.2", 15 m). Long year average temperature, total rainfall and relative humidity were 11.7 ^{0}C, 529.7 mm and 80 %, respectively, during growing period in Tekirdag (Table 1). Total rainfall of experiment year was lower than that of long years with 388.6 mm. Therefore, average temperature in 2015-2016 was 13.37 ^{0}C. This tempeture over 1,67 ^{o}C from long year average tempeture. Relative humidity was 78.4 %. During the experiment period, the climate was hot and dry from the long years averages.

Soil test values of 0-20 and 20-40 cm soil levels at experimental field determined a pH of 6.25-6.52, 0.01-0.01 % lime, 1.6-1.5 ppm P_2O_5, 429-386 ppm Mg, 27-25 ppm Fe, 25-20 ppm Mn, 0.32-0.41 ppm Zn and 1.08-1.11 % organic matter, respectively. This analysis results shows soil of experimental field slightly acidic and low organic matter levels.

Sowing were made by hand on 3 November 2015. Twenty seeds of each genotypes were sown into a single row (5 m) at 0.5 m intervals. The plant height was determined by measuring the length from the ground level to the top of the main branch. The stem diameter was determined by measuring the third internode from the bottom of the main stem.The leaflet width and length were measured by the second leaflet of the leaf in the third node of the main stem. Plants were harvested at 50 % flowering time and weighed for fresh forage yield(g/plant). Fresh sample was taken from the harvested material, dried in the shade and weighed. Hay yield was calculated as dry weight percentage. An analysis of variance was carried out on the data set using SPSS 18.0 according to completely randomized experimental design. Significant differences among the mean values were compared by DUNCAN test.

Table 1:-Climatic data of October 2015 – June 2016 period and long-term average (1960-2016) at Tekirdag, Turkey

Months	Mean temperature (°C)		Total precipitation (mm)		Relative humidity (%)	
	2015-2016 year	Long term	2015-2016 year	Long term	2015-2016 year	Long term
October	16,4	15,7	83,7	90,0	80,1	80,5
November	13,8	11,3	48,5	62,5	80,7	84,0
December	7,3	7,2	0,7	82,5	79,9	83,6
January	5,6	5,2	70,7	62,1	80,0	84,0
February	9,7	5,7	68,4	64,9	85,5	81,4
March	10,4	8,0	30,6	57,4	80,3	80,7
April	15,6	12,2	22,9	41,5	72,2	78,2
May	17,9	17,6	28,1	33,8	74,4	75,1
June	23,6	22,2	35,0	35,0	72,2	72,6
Total			388,6	529,7		
Average	13,37	11,7			78,4	80,0

Result and Discussion:-

Results of stem diameter, leaflet length, leaflet width, plant height, fresh forage yield and dry forage yield of seventy four vetch genotypes were discussed in this session.

Stem diameter

Statistically significant differences (P <0.01) were found between the stem diameters of the vetch genotypes (Table 2). Stem diameter values of vetch genotypes were determined between 1,20 – 4,27 mm. The most thick stem in the vetch genotypes is 4,27 mm at genotype 21-2 (*V. villosa* Roth.). This genotype was followed by the genotype 15-13 (*V. sativa* L.) with 4,23 mm. The finest stem diameter was found at genotype 10-1 (*V. narbonensis* L.) with 1,20 mm. When the species evaluated in their own, stem diameters have been determined as 1,37-2,77 mm at *V. hybrida* L., 2,50 - 3,20 mm at *V. pannonica* Crantz., 1,67 - 4,00 mm at *V. sativa* L., 1,30 - 2,27 mm at *V. villosa* Roth, 1,78 - 2,78 mm at *V. narbonensis* L., 1,50 - 1,64 mm at *V. lutea* L., 1,80 - 2,08 mm at *V. grandiflora* Scop., 1,67 - 2,93 mm at *V. peregrina* L., and 1,20 - 1,96 mm at *V. lathyroides* L.

The results of Sayar and Han (2014) on narbon vetch genotypes with 3,55 - 4,30 mm are higher than our findings. Determined values of stem diameter in common vetch genotypes at the researchs of Van de Wouw et al. (2003) with 1,20 - 3,90 mm and Sayar et al. (2009) with 1,53 - 2,26 mm is consistent with our findings.

Leaflet width and length

Differences between vetch genotypes were statistically significant (P <0.01) in leaf width and length (Table 2).

The leaflet width values of the vetch genotypes ranged from 1,10 to 11,4 mm. The widest leaflet width in the vetch genotypes was found at genotype 15-6 (*V. sativa* L.) with 11,4 mm. This genotype was followed by genotype 15-5 (*V. sativa* L.) with 10,25 mm. The narrowest leaflet width of the vetch genotypes was measured with the 1,10 mm at genotype 6-3 (*V. peregrina* L.). When the species evaluated in their own, leaflet width have been determined as 2,74 - 9,90 mm at *V. hybrida* L., 2,05 - 5,37 mm at *V. pannonica* Crantz., 2,27 - 10,38 at *V. sativa* L., 2,03 - 6,30 mm at *V. villosa* Roth., 4,38 - 7,24 mm at *V. narbonensis* L., 2,32 - 5,78 mm at *V. lutea* L., 2.20 - 3.96 mm at *V. grandiflora* Scop., 1.10 - 3.98 mm at *V. peregrina* L. and 3.64 - 4.27 mm at *V. lathyroides* L.

The leaflet length values of the vetch genotypes used in the study were measured between 5.66 - 52.5 mm. The largest leaflet length value was determined at genotype 10-1 (*V. lathyroides* L.) with 52.5 mm and the smallest leaflet length value was determined at genotype 14O01 (*V. hybrida* L.) with 5.66 mm. The leaflet length values of the species were 5,66 - 19,97 mm at *V. hybrida* L., 8,87 - 14,97 mm at *V. pannonica* Crantz., 6,05 – 25,00 mm at *V. sativa* L., 6,13 - 23,67 mm at *V. villosa* Roth, 18,75 - 22,80 mm at *V. narbonensis* L., 10,10 - 14,82 mm at *V. lutea* L., 11,50 - 12,84 mm at *V. grandiflora* Scop., 8,15 - 11,37 mm at *V. peregrina* L. and 14,98 -52,50 mm *V. lathyroides* L.

Table 2:-Some morphological characters of *Vicia s*p. genotypes

Genotype	Species	Stem diameter (mm)	Leaflet length (mm)	Leaflet width (mm)	Genotype	Species	Stem diameter (mm)	Leaflet length (mm)	Leaflet width (mm)
10-4	*V. hybrida* L.	2,77 e-m	19,97 b-h	9,90 ab	**6-5**	*V. sativa* L.	2,33 ı-w	18,60 b-k	3,67 ı-r
14O01	*V. hybrida* L.	2,02 k-z	5,66 x	2,94 k-r	**7-1**	*V. sativa* L.	3,55 a-d	25,00 b	4,38 f-q
14Y196	*V. hybrida* L.	1,50 x-A	8,28 s-x	3,78 h-r	**7-3**	*V. sativa* L.	3,18 b-h	19,30 b-j	9,00 abc
15-11	*V. hybrida* L.	1,37 yzA	10,60 m-x	3,27 j-r	**7-8**	*V. sativa* L.	2,40 h-w	12,83 ı-w	6,33 d-ı
15-14	*V. hybrida* L.	2,23 j-x	8,13 t-x	2,80 m-r	**98-1**	*V. sativa* L.	2,52 g-s	14,80 g-t	3,26 j-r
17-4	*V. hybrida* L.	2,50 g-t	7,15 u-x	3,15 j-r	**10-5**	*V. villosa*	2,37 ı-w	13,23 h-v	6,20 d-ı
22-1	*V. hybrida* L.	1,66 u-A	5,78 x	2,74 m-r	**110-2**	*V. villosa*	2,33 ı-w	8,97 p-x	4,03 h-q
7-6	*V. hybrida* L.	2,48 g-u	10,325n-x	5,35 d-m	**112-1**	*V. villosa*	1,90 o-A	6,13 wx	2,70 m-r
7-7	*V. hybrida* L.	1,70 s-A	5,73 x	3,00 k-r	**116-2**	*V. villosa*	2,00 l-A	15,97 e-p	6,30 d-ı
120-1	*V. pannonica*	2,50 g-t	14,53 g-t	3,30 j-r	**120-3**	*V. villosa*	1,95 m-A	9,075 p-x	2,38 n-r
14I24	*V. pannonica*	3,20 b-g	8,87 q-x	2,90 k-r	**121-7**	*V. villosa*	2,25 j-x	9,03 p-x	6,00 d-j
15-4	*V. pannonica*	3,13 b-ı	14,97 f-t	5,37 d-m	**14O02**	*V. villosa*	1,93 n-A	15,30 f-r	3,30 j-r
15I15	*V. pannonica*	2,70 e-p	9,57 p-x	3,57 ı-r	**14O05**	*V. villosa*	2,17 j-y	15,40 f-q	2,10 o-r
15K	*V. pannonica*	2,58 g-r	10,25 o-x	2,05 pqr	**14O06**	*V. villosa*	2,10 k-z	15,50 f-q	3,10 k-r
15Y201	*V. pannonica*	2,93 c-j	12,03 k-x	3,98 h-r	**14P197**	*V. villosa*	1,63 w-A	6,53 vwx	2,93 k-r
10-6	*V. sativa* L.	2,84 d-k	19,64 b-ı	7,06 c-f	**14Y105**	*V. villosa*	1,30 zA	10,50m-x	2,03 qr
10-7	*V. sativa* L.	3,63 abc	17,30 c-n	7,40 bcd	**15-7**	*V. villosa*	1,88 p-A	13,28 h-v	3,63 ı-r
111-1	*V. sativa* L.	2,20 j-x	10,83 m-x	2,87 l-r	**15I16**	*V. villosa*	1,74 s-A	10,38 n-x	2,72 m-r
116-1	*V. sativa* L.	2,10 k-z	12,45 j-x	5,75 d-l	**15I23A**	*V. villosa*	2,03 k-z	13,30 h-v	2,77 m-r
14N64	*V. sativa* L.	1,67 u-A	15,50 f-q	2,63 m-r	**15I43**	*V. villosa*	2,20 j-x	11,37 l-x	3,03 k-r
14O03	*V. sativa* L.	3,73 ab	20,33 b-g	8,95 abc	**17-2**	*V. villosa*	2,73 e-n	9,30 p-x	2,77 m-r
14O04	*V. sativa* L.	1,83 q-A	10,53 m-x	3,57 ı-r	**21-2**	*V. villosa*	4,27 a	23,67 bc	4,50 e-q
14Y462	*V. sativa* L.	2,03 k-z	18,68 b-k	4,95 d-p	**4-2**	*V. villosa*	1,77 r-A	8,37 r-x	3,10 k-r
15-13	*V. sativa* L.	4,23 a	13,17 h-v	4,93 d-q	**96-1**	*V. villosa*	2,02 k-z	14,02 g-u	3,12 k-r
15-2	*V. sativa* L.	3,48 b-e	22,43 b-e	10,38 a	**110-1**	*V.narbonensis*	1,78 r-A	18,75 b-k	4,38 f-q
15-3	*V. sativa* L.	3,83 ab	21,66 b-f	6,90 c-g	**17-3**	*V.narbonensis*	2,78 d-L	22,80 bcd	7,24 cde
15-5	*V. sativa* L.	3,73 ab	24,83 b	10,03 a	**10-3**	*V. lutea* L.	1,50 x-A	10,10 o-x	5,30d-m
15-6	*V. sativa* L.	3,40 b-f	22,70 bcd	11,40 a	**10-8**	*V. lutea* L.	1,64 v-A	10,50m-x	2,32 n-r
15F20	*V. sativa* L.	2,47 g-v	13,90 g-u	2,27 n-r	**14-1**	*V. lutea* L.	2,20 j-x	11,96 k-x	5,00 d-o
15I01	*V. sativa* L.	2,20 j-x	14,37 g-t	4,10 g-q	**14-2**	*V. lutea* L.	2,25 j-x	12,25 k-x	5,78 d-k
15I08	*V. sativa* L.	2,30 j-x	16,90 d-o	4,00 h-q	**6-4**	*V. lutea* L.	2,36 ı-w	14,82 g-t	4,10 g-q
15K17	*V. sativa* L.	2,63 f-q	17,40 c-m	4,23 g-q	**14U01**	*V. grandiflora*	2,08 k-z	12,84 ı-w	3,96 h-r
17-6	*V. sativa* L.	3,23 b-g	17,80 c-l	8,98 abc	**15K25**	*V. grandiflora*	1,80 q-A	11,50 l-x	2,20 n-r
3-1	*V. sativa* L.	2,18 j-y	6,05 wx	2,85 m-r	**6-3**	*V. peregrina*	1,67 u-A	11,37 l-x	1,10 r
3-2	*V. sativa* L.	1,85 q-A	13,225h-v	5,03 d-n	**7-4**	*V. peregrina*	2,93 c-j	8,15 t-x	3,98 h-r
37	*V. sativa* L.	1,68 t-A	10,72 m-x	2,98 k-r	**10-1**	*V. lathyroides*	1,20 A	52,50 a	4,27 f-q
4-1	*V. sativa* L.	2,72 e-o	15,26 f-s	6,56 c-h	**36-1**	*V. lathyroides*	1,95 m-A	14,975 f-t	3,68 ı-r

Plant height

There were statistically significant differences (P <0.01) in plant height among the vetch genotypes used in the study (Table 3). The plant height values of vetch genotypes used in the experiment vary between 14,00 - 129,00 cm. The longest plant height was found at genotype 14N64 (*V. sativa* L.) with 129 cm. The shortest plant height was determined as 14 cm at genotype 15F20 (*V. sativa* L.). On the basis of species, plant heights have been determined as 21,26 -29,50 cm at *V. lathyroides* L., 27,00 - 48,00 cm at *V. pannonica* Crantz., 27,75 - 40, 40 cm at *V. narbonensis* L., 30,50 - 43,75 cm at *V. lutea* L, 27,33 - 68,00 cm at *V. hybrida* L. and 33,00 - 42,20 cm at *V. grandiflora* Scop.. *V. grandiflora* Scop. was relatively shorter plant height in the study. Plant heights at *V. peregrina* L. were between 60,66 - 63,25 cm, while plant heights at *V. sativa* L. and *V. villosa* Roth. 14,00 - 129,00 cm and 26,50 - 124,75 cm, respectively. Plant height values of *V. sativa* L. and *V. villosa* Roth. show quite variable within the species.

Most of the studies with vetch species were made on common vetch. The plant heights of the common vetch in the studies were reported as 19,47 – 62,80 cm (Tuna and Orak, 2002), 4,00 - 64,20 cm (Van de Wouw et al., 2003), 25,20 - 36,90 cm (Balabanlı and Kara, 2003), 15,00 - 117,00 cm (Cakmakcı et al., 2006), 27,00 - 44,30 cm (Sayar et al., 2009), 35,63 - 39,17 cm (Basbag et al., 1999), 41,00 - 54,30 cm (Tamkoc and Avcı, 2004), 55,30 - 58,10 cm (Celiktas et al., 2006), 65,00 - 120,00 cm (Basaran et al., 2006), 78,30 - 82,90 cm (Tan and Celen, 2001), and 90,00 - 114,80 cm (Yücel et al., 2004). As seen in previous studies, common vetch species range from 4 cm to 120 cm. Similar results were found with the values we determined. Plant heights were determined as 100 - 235 cm (Mihailovic et al., 2008) and 82,20 – 87,60 cm (Tan and Celen, 2001) in the studies conducted with hairy vetch. In the common vetch, Sümerli and Gül (2001) and Orak and Nizam (2009) reported plant height values as 56,30 - 68,27 cm and 57,54 - 77,98 cm, respectively. It is natural that the research about narbon vetch and hairy vetch is higher values than our findings because it is done on cultivated cultivars.

Table 3:-Plant height and forage yield of *Vicia s*p. genotypes

Genotype	Species	Plant height (cm)	Fresh forage yield (kg/da)	Dry forage yield (kg/da)	Genotype	Species	Plant height (cm)	Fresh forage yield (kg/da)	Dry forage yield (kg/da)
10-4	*V. hybrida* L.	48,5 g-s	109,28 jk	34,70 m-p	**6-5**	*V. sativa* L.	39,66 ı-t	80,93 mn	43,23 ı-l
14O01	*V. hybrida* L.	51,4 f-q	57,44 p-v	22,02 s-w	**7-1**	*V. sativa* L.	45,25 g-s	63,95 pqr	19,11 u-z
14Y196	*V. hybrida* L.	68 e-h	68,67 n-r	28,22 o-r	**7-3**	*V. sativa* L.	48 g-s	118,34 Ij	45,90 g-k
15-11	*V. hybrida* L.	47,5 g-s	126,75 hı	40,79 j-m	**7-8**	*V. sativa* L.	53,67 f-q	47,65 s-y	21,48 s-x
15-14	*V. hybrida* L.	45,25 g-s	95,43 kl	41,65 ı-m	**98-1**	*V. sativa* L.	35 k-t	63,84 pqr	25,85 q-u
17-4	*V. hybrida* L.	40 ı-t	60,82 p-s	30,90 o-r	**10-5**	*V. villosa*	28,33 o-t	53,34 r-x	21,87 s-w
22-1	*V. hybrida* L.	40,8 h-t	19,45 D-G	9,12 B-G	**110-2**	*V. villosa*	59,67 e-m	69,38 n-q	31,70 n-q
7-6	*V. hybrida* L.	52,5 f-q	26,94 A-F	11,97 y-F	**112-1**	*V. villosa*	38 ı-t	39,39 x-B	19,33 u-z
7-7	*V. hybrida* L.	27,33 o-t	41,48 w-B	18,88 u-z	**116-2**	*V. villosa*	54 f-p	78,64 mno	26,20 q-u
120-1	*V. pannonica*	32,33 m-t	58,82 p-u	16,43 v-C	**120-3**	*V. villosa*	104,75 abc	185,09 bc	73,65 c
14I24	*V. pannonica*	36,33 j-t	91,70 lm	30,49 o-r	**121-7**	*V. villosa*	69 efg	135,00 gh	49,15 f-ı
15-4	*V. pannonica*	48 g-s	72,05 nop	29,35 o-r	**14O02**	*V. villosa*	122,33 ab	60,18 p-t	23,90 q-v
15I15	*V. pannonica*	27 o-t	81,51 mn	27,50 p-t	**14O05**	*V. villosa*	99,33 bcd	62,00 p-s	17,52 v-A
15K	*V. pannonica*	35 k-t	48,12 s-y	23,50 r-v	**14O06**	*V. villosa*	124,75 a	146,94 fg	44,46 g-k
15Y201	*V. pannonica*	30,25 n-t	137,32 gh	43,30 ı-l	**14P197**	*V. villosa*	40,33 ı-t	96,06 kl	23,21 r-v
10-6	*V. sativa* L.	46,6 g-s	31,17 z-E	11,27 z-F	**14Y105**	*V. villosa*	77 def	42,41 v-A	13,10 y-E
10-7	*V. sativa* L.	65,25 e-ı	96,76 kl	40,91 j-m	**15-7**	*V. villosa*	120,75 ab	153,40 ef	57,04 de
111-1	*V. sativa* L.	26 e-m	40,05 x-B	19,70 t-y	**15I16**	*V. villosa*	83 cde	101,52 kl	35,92 l-o
116-1	*V. sativa* L.	27,5 o-t	41,15 x-B	11,40 z-F	**15I23A**	*V. villosa*	111 ab	181,90 c	74,39 c
14N64	*V. sativa* L.	129 a	360,77 a	120,22 a	**15I43**	*V. villosa*	106,33 abc	162,37 de	56,30 def
14O03	*V. sativa* L.	50,25 g-r	198,74 b	52,18 efg	**17-2**	*V. villosa*	32 n-t	44,51 u-z	18,38 u-A
14O04	*V. sativa* L.	32 n-t	13,10 fg	4,82 FG	**21-2**	*V. villosa*	53 f-q	47,66 s-y	14,35 w-D
14Y462	*V. sativa* L.	47,5 g-s	168,49 d	63,13 d	**4-2**	*V. villosa*	26,5 p-t	23,10 C-F	8,50 C-G
15-13	*V. sativa* L.	54,33 f-o	192,63 bc	51,80 e-h	**96-1**	*V. villosa*	98,6 bcd	128,44 hı	38,60 k-n
15-2	*V. sativa* L.	61,25 e-k	197,06 b	61,50 d	**110-1**	*V.narbonensis*	27,75 o-t	37,46 y-C	7,75 D-G
15-3	*V. sativa* L.	53,25 f-q	127,16 hı	46,89 g-j	**17-3**	*V.narbonensis*	40,4 ı-t	66,00 o-r	13,52 x-D
15-5	*V. sativa* L.	54,25 f-p	161,83 de	57,02 de	**10-3**	*V. lutea* L.	30,5 n-t	18,02 EFG	6,51 D-G
15-6	*V. sativa* L.	85 cde	95,55 kl	34,15 m-p	**10-8**	*V. lutea* L.	43,2 g-s	48,65 s-y	22,10 s-w
15F20	*V. sativa* L.	14 t	56,50 q-w	13,40 y-D	**14-1**	*V. lutea* L.	43,2 g-s	45,10 t-z	14,70 w-D
15I01	*V. sativa* L.	35,67 k-t	95,76 kl	30,64 o-r	**14-2**	*V. lutea* L.	43,75 g-s	79,91 mno	27,90 p-s
15I08	*V. sativa* L.	30 n-t	13,72 FG	5,13 EFG	**6-4**	*V. lutea* L.	34,2 k-t	28,60 A-E	8,40 C-G
15K17	*V. sativa* L.	33,5 l-t	27,53 A-E	81,70 b	**14U01**	*V. grandiflora*	42,2 g-s	117,81 Ij	44,64 g-k
17-6	*V. sativa* L.	56,25 f-n	155,61 def	44,34 h-k	**15K25**	*V. grandiflora*	33 m-t	38,80 x-B	8,42 C-G
3-1	*V. sativa* L.	46,625 g-s	41,75 w-B	16,76 v-B	**6-3**	*V. peregrina*	60,66 e-l	59,56 p-u	34,43 m-p
3-2	*V. sativa* L.	43 g-s	26,42 B-F	7,47 D-G	**7-4**	*V. peregrina*	63,25 e-j	34,05 y-D	10,70 A-F
37	*V. sativa* L.	22,6 rst	6,56 G	2,67 G	**10-1**	*V. lathyroides*	21,26 st	32,05 z-E	8,70 B-G
4-1	*V. sativa* L.	45 g-s	143,64 fg	52,20 efg	**36-1**	*V. lathyroides*	29,5 n-t	38,39 x-B	13,10 y-E

Fresh forage yield

Among the vetch genotypes used in the study, there were statistically significant differences (P <0.01) in terms of fresh forage yield (Table 3). Fresh forage yield of vetch genotypes ranged from 6.56 to 360.77 g/plant. The highest fresh forage yield was found with 360,77, 198,74, and 197,06 g/plant at genotype 14N64 (*V. sativa* L.), 14O03 (*V. sativa* L.), and 15-2 (*V. sativa* L.), respectively. The lowest values in terms of dry forage yield measured with 6.56 g/plant at genotype 37 (*V. sativa* L.). Fresh forage yields of species have been determined as 19,45 - 126,75 g/plant at *V. hybrida* L., 48,12 - 137,32 g/plant at *V. pannonica* Crantz., 6,56 - 360,77 g/plant at *V. sativa* L., 23,10 - 185,09 g/plant at *V. villosa* Roth., 37,46 - 66,00 g/plant at *V. narbonensis* L., 18,02 - 79,91 g/plant at *V. lutea* L., 38,80 - 117,81 g/plant at *V. grandiflora* Scop., 34,05 - 59,56 g/plant at *V. peregrina* L. and 32,05 - 38,39 g/plant at *V. lathyroides* L.

Results of the research is similar with Büyükburc and Karadag (1999), Soya et al. (1999), Tan and Celen (2001), Yücel et al. (2004), Hakyemez et al. (2005), Orak et al. (2005), Sabancı et al. (2005), Cil and Yücel (2006), AND Sayar et al. (2009).

Dry forage yield

Among the vetch genotypes used in the study, there were statistically significant differences (P <0.01) in terms of dry forage yield (Table 3). Dry forage yield of vetch genotypes ranged from 2,67 to 120,22 g/plant. The highest fresh forage yields were found with 120,22 and 81,70 g/plant on genotype 14N64 (*V. sativa* L.), 15K17 (*V. sativa* L.), respectively. The lowest values in terms of dry forage yield measured with 2,67 g/plant at genotype 37 (*V. sativa* L.). Dry forage yields of species have been determined as 9,12 - 41,65 g/plantat *V. hybrida* L., 16,43 – 43,30 g/plant at *V. pannonica* Crantz., 2,67 - 120,22 g/plant at *V. sativa* L., 8,50 - 74,39 g/plant at *V. villosa* Roth., 7,75 – 13,52 g/plant at *V. narbonensis* L., 6,51 - 27,90 g/plant at *V. lutea* L., 8,42 - 44,64 g/plant at *V. grandiflora* Scop., 10,70 - 34,43 g/plant at *V. peregrina* L. and 8,70 – 13,10 g/plant at *V. lathyroides* L.

Results of the research is similar with Büyükburc and Karadag (1999), Yücel et al. (2004), Orak et al. (2005), Hakyemez et al. (2005), Sabancı et al. (2005), Cil and Yücel (2006), and Sayar et al. (2009).

Conclusion:-

In this research; plant height, stem diameter, leaflet length, leaflet width, fresh forage yield and dry forage yield were significant differently determined between seventy four vetch genotypes. Plant height, stem diameter, leaflet length, leaflet width, fresh forage yield and dry forage yield of vetch genotypes ranged among 14,0 - 129,0 cm, 1,20 - 4,27 mm, 5,66 - 52,5 mm, 1,10 - 11,4 mm, 6,56 - 360,77 g/plant and 2,67 - 120,22 g/plant, respectively.

As a results, this study has shown that some vetch genotypes gathered from flora of Thrace Region of Turkey have a wide variation in plant height, stem diameter, leaflet width and height, and fresh and dry forage yield. This genotypes can be used a material in vetch breeding researches.

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