

AN INVESTIGATION ON THE MORPHOLOGICAL TRAITS OF ANATOLIAN WATER BUFFALOES POPULATION RAISED IN SİLİVRİ DISTRICT OF İSTANBUL PROVINCE

Mehmet İhsan SOYSAL¹ Yahya Tuncay TUNA¹ Eser Kemal GÜRCAN¹

SUMMARY

Research has been conducted in Danamandıra village of Silivri district of İstanbul province which is distinguished for the population of water buffalo breeding in the region. The research material were consisted of 102 individual belonging to 16 different farmer. They were examined for body size end morphological build by separating groups to sexuality end age. Measurements taken from water buffaloes were at fallow, they were sequential withers height (WH), rump height (RH), tail base height (TBH), chest girth (CG), body length (BL), **haunch lump width (KYG)**, **seat lump width (OYG)**, chest width (GW), ridge height (RH). 9 different body measurements were grouped to sexuality and age of buffalo. After that diagnosis statistics was calculated for all of them. Also variance analysis was done for body measurements. Finally results were compared with others body measurements which were taken by different researches from different area.

KEY WORDS: Anatolian water buffaloes , body measurements, morphological traits.

INTRODUCTION

Water buffalo was first domesticated animal species in the world. They originated south and south-eastern Asia. So they originate Asia animals. Buffalo has exist in Turkey since prehistoric period. Formerly buffaloes have been used as draft animals for centuries. Also they have been used for source of meat and milk products. Than buffalo number was decreased, because of increasing demand for cattle breeding and increasing technology in agriculture. Although there were 544.831 head buffaloes in Turkey in 1985 they decreased to 164.000 head buffaloes according to 2003 statistics .

There are more buffaloes in north of Turkey. The north (black-sea) region have been the first area for buffalo breeding. There are the least buffalo population in the Mediterranean area and west of Turkey. The most buffalo population of south-west region of Turkey belong to İstanbul. Buffalo population in middle black sea region consist of % 40 of the Turkey total buffalo. Also Samsun, Kars, Diyarbakır, Afyon, Sivas provinces have the most buffalo consistency (Ziğirler, 1992). Native buffaloes, also known Anatolia buffalo, are Mediterranean buffalo, which is of river type. It originated from Indian water buffalo (Dellal, 1994).

¹ Trakya University , Agricultural Faculty of Tekirdağ, Department of Animal Science, 59030, TEKİRDAĞ.

Turkey's buffalo is Anatolia buffalo which has been isolated from Mediterranean buffalo. It has developed some unique phenotypic characteristics in Trakya region. They are black coat with black hair and massive swept back horns.

Danamandira village has the most suitable environmental conditions for buffalo farming. Because of having water sources which locate very near to village. There is a small flowing water in forest fodder area. It even in summer and made a mud area at around.

Growing of buffalo continue from the birth to 5-6 years old. Individuals who are 5 years old were adult buffalo group.(Düzgüne, o., 1960).

_lashan et al. (1983), in Afyon Buffalo Research Institute, live- weight of 19 adult milking buffalo was found $518.58 \pm 0,17.19$ kg. Body measurements of buffaloes were found as at follows; withers height is 138.26 ± 1.32 cm, body length is 141.42 ± 0.81 cm, chest girth is 207 ± 1.95 cm, chest depth is 76.58 ± 1.17 cm, for shin circumference is 22.83 ± 0.27 cm.

Uslu (1970), noted that average live-weight of buffaloes was 411 ± 0.97 kg in Afyon Buffalo Research Institute. Morphological characteristics of the 325 head buffaloes were surveyed. The results were as at follows; 124 ± 0.28 for wither height (WH), 75.72 ± 0.31 cm for chest length, 129 ± 0.42 cm. for body length, 41.74 ± 0.1 cm for rump length, 41.45 ± 0.13 cm for rump width, 124.3 ± 0.24 cm for rump height, 181.42 ± 0.61 cm for chest girth.

Amano et al. (1981), noted 10 different body size belong to crossbreed strain of river and swamp buffaloes. Body size of swamp female buffalo was smaller than river buffalo. Significant differences were found among swamp buffalo of Indonesia, Thailand, Malaysia and Philippines.

Zahariev et al.(1986), reported that withers height ranged from 120 to 127 cm, chest girth ranged from 170 to 196 cm, body length ranged from 127 to 152 cm in different regions of south Asia. Also they noted that withers height is 134-142 cm, body length is 150-158 cm and rump width is 45-56 cm for Egypt buffalo.

Anatolia buffalo have been bred since centuries in Anatolia. That buffalo belong to turkey was a Mediterranean type. Generally they have small massive body weight. As compared others buffalo breeds of the world they are more thick and weak build than others. Though Nipple, finger nail and horns are black colour, it may ranged from brawn to black colour. (_ekerden, Ö. 2001).

Kök, S., (1996), reported that withers height and body length were sequential 138.1 ± 1.22 cm and 145.1 ± 1.33 cm for male, 133.1 ± 0.70 cm and 146.5 ± 1.45 cm for adult female.

Therefore the aim of the present research was to measure morphological traits of Anatolian water buffaloes population raised in Silivri district of Istanbul province. Finally results were compared with others morphological traits which were taken by different researches from different area.

MATERIALS AND METHODS

Research was surveyed by using 102 heads water buffaloes in Danamandıra village. Materials were grouped as 50 individuals for 0-12 month, 8 individuals for 12-24 month, 11 individuals for 24-48 month, 33 individuals for 48 month or older than 48 month years old. As for sex, 60 individuals for female, 42 individuals for male were examined. Body measurements were taken from animals according to method applied by Bıyıklı, (1973).

Results were grouped to age and sexuality and calculated descriptive statistics values. At the end, age differences were observed in several body parts in the water buffaloes to estimate the difference, variance analysis was surveyed by completely randomized experimental design. Also it was noted how to be connection among all body part by calculating correlation coefficients showed in matrix table (Soysal, M., 1998).

RESULTS

Materials which were taken body measurements were grouped. They were performed on sex (male and female) and ages. 50 individuals from 1 years old (22 female, 28 male), 8 individuals from 2 years old (5 female, 3 male), 11 individuals from 3 years old (all of them are female), 33 individuals from 4 years old (32 female, 1male) were examined.

Statistics results of body measurements were illustrated in table at follow.

Table 1. Mean and standard errors of the body measurements of research material.

Body measurements	0 - 12 month		12 - 24 month		24 - 48 month	48 month (or older than 48 month)	
	Female (22)	Male (28)	Female (5)	Male (3)	Female (11)	Female (32)	Male (1)
Withers height (cm)	90.95 ± 2.29	87.46 ± 2.27	105.0 ± 6.10	131.33 ± 2.90	126.54 ± 2.89	134.15 ± 0.94	141.3
Ridge height (cm)	91.68 ± 2.31	89.78 ± 2.22	103.20 ± 5.58	129.33 ± 3.48	123.1 ± 2.41	129.03 ± 1.15	139.4
Rump height (cm)	95.81 ± 2.32	93.28 ± 2.31	109.20 ± 5.72	137.33 ± 5.36	128.09 ± 2.26	132.87 ± 1.30	147.5

Tail base height (cm)	89.22 ± 2.44	86.00 ± 2.06	103.80 ± 6.55	126.00 ± 2.30	117.7 ± 1.91	122.34 ± 1.11	136.5
Chest girth (cm)	85.77 ± 12.38	80.17 ± 10.82	-	-	-	-	-
Body length (cm)	74.27 ± 2.05	75.82 ± 3.15	96.40 ± 10.17	116.0 ± 5.50	127.09 ± 3.45	138.56 ± 1.46	142.5
Haunch lump width (cm)	23.95 ± 0.95	22.96 ± 0.96	29.20 ± 1.88	42.00 ± 1.15	38.54 ± 1.35	40.09 ± 1.05	48.0
Seat lump width (cm)	13.00 ± 0.58	13.00 ± 0.58	17.6 ± 2.30	23.33 ± 1.20	26.18 ± 1.53	28.87 ± 0.81	33.3
Chest width (cm)	20.36 ± 1.03	20.07 ± 0.83	22.60 ± 2.11	29.33 ± 0.66	32.63 ± 1.59	33.78 ± 0.87	39.3

For withers height, sexual and age differences were examined than results were showed at table 1 average withers height was 90 ± 2.29 cm in female and 87.46 ± 2.27 cm in male for age of 0-12 month, the withers height of water buffaloes which were 12-24 month old was average 105.0 ± 6.10 cm in female and 131.33 ± 2.90 cm in male, for materials which were 24-48 month old, the withers height was found average 126.54 ± 2.89 cm, the withers height of individuals being 48 month old (or older than 48 month old) was 134.15 ± 0.94 cm in female and 141.3 cm in male. The other body measurements was showed in table 1.

The differences for body measurements in different age and sex groups were analysed by using variance analysis test. Results were showed in table 2 at fallow. No significant differences in individuals being one year old were found between female and male. Other hand, in age group having 12-24 month old, significant differences in some body parts were found between males and females. Variance analysis was not done for individuals who were 3 years old. Because, all of them were female. Significant differences were found in group having 4 years old (or older than) individuals for all of body measurements.

Table 2. Results of variance analysis belong to body measurements for sex in every age groups.

Body measurements		0 - 12 month				12 - 24 month				48 month and over			
		SD	KT	KO	P	SD	KT	KO	P	SD	KT	KD	P
Withers height (cm)	G	49	6510	-	-	7	2096.8	-	-	32	3618	-	-
	T	1	0.66	0.66	0.944	1	1300	1300	0.02	1	2739	2739	0.0001
	E	48	6509	335.61	-	6	796	132	-	31	878.2	28.33	-
Ridge height (cm)	G	49	6251.7	-	-	7	1976	-	-	32	2304	-	-
	T	1	6.67	6.67	0.82	1	1280	1280	0.016	1	1477	1477	0.0001
		48	6245	130.10	-	6	695	115.9	-	31	1326	42.8	-

	E												
Rump height (cm)	G	49	6636	-	-	7	2311	-	-	32	3223	-	-
	T	1	0.239	0.239	0.967	1	1484	1484	0.017	1	1541	1541	0.0001
	E	48	6635	138.24	-	6	827	115.9	-	31	1681	54.2	-
Tail base height (cm)	G	49	6118	-	-	7	1814	-	-	32	3307	-	-
	T	1	0.625	0.625	0.944	1	924	924	0.04	1	2082	20.82	0.00001
	E	48	6117	127.4	-	6	890	148	-	31	1225	39.5	-
Chest girth (cm)	G	49	159965	-	-	7	8403	-	-	32	123364	-	-
	T	1	5.06	5.06	0.969	1	720	720	0.48	1	11231	11251	0.05
	E	48	159961	3332.4	-	6	7683	1280	-	31	112112	3616	-
Body length (cm)	G	49	9486	-	-	7	2971	-	-	32	5672	-	-
	T	1	13.51	13.51	0.79	1	720	720	0.21	1	3556	3356	0.0001
	E	48	9472	197.34	-	6	2251	375	-	31	2115	68.2	-
Haunch lump width (cm)	G	49	1132	-	-	7	386	-	-	32	1289	-	-
	T	1	4914	49.14	0.14	1	307	307	0.03	1	192.61	192.61	0.026
	E	48	1082	22.36	-	6	78.8	13.13	-	31	1096	35.37	-
Seat lump width (cm)	G	49	420.00	-	-	7	195	-	-	32	812	-	-
	T	1	2.65	2.65	0.58	1	61	61	0.14	1	160.74	160.74	0.009
	E	48	417.34	8.69	-	6	133.8	22.31	-	31	651	21.01	-
Chest width (cm)	G	49	1018	-	-	7	176	-	-	32	915	-	-
	T	1	26.37	26.37	0.26	1	83	85	0.057	1	158.41	158.41	0.016
	E	48	991.6	20.65	-	6	91	15.3	-	31	757.4	24.43	-

[G: General (total) , T: Treatment (Between of group) , E: Error (With in Group)].

Table 3. Correlation coefficient matrix and significant test belong to body measurements of general group.

Body measurements	Wither height	Ridge height	Rump height	Tail base height	Chest girth	Body length	Haunch lump width	Seat lump width	Chest width
Withers height	1.00	** 0.979	** 0.969	** 0.969	** 0.449	** 0.954	** 0.852	** 0.887	** 0.842
Ridge height		1.00	** 0.981	** 0.975	** 0.461	** 0.937	** 0.872	** 0.867	** 0.837

Rump height			1.00	** 0.979	** 0.477	** 0.933	** 0.888	** 0.854	** 0.828
Tail base height.				1.00	** 0.424	** 0.922	** 0.869	** 0.840	** 0.834
Chest girth					1.00	** 0.493	** 0.479	** 0.530	** 0.292
Body length						1.00	** 0.858	** 0.905	** 0.836
Haunch lump width							1.00	** 0.838	** 0.859
Seat lump width								1.00	** 0.783
Chest width									1.00

[** Correlation coefficient is important ($P < 0.01$)].

It was found that all correlation coefficients for body measurements were important. The most significant relativity was seen between withers height and ridge height (0.979); also ridge height and rump height (0.981).

DISCUSSION

At the end of that research, morphologic characters were investigated by measuring different body measurements in herds having 102 heads buffaloes in Danamandra village of Silivri district of _stanbul province. After that the results were compared with other measurements taken from different region.

These results were in agreement with the other researches. The results of this study showed that the withers height was found average 141.3 cm. for adult male buffaloes. It was found 124 ± 0.280 cm by Uslu (1970) and found 138.36 ± 1.32 cm. by _lashan et al., (1983). Also it was found 132.3 ± 3.1 cm. native breeds of Bulgaria by Zahariev et al., (1986). According to Kk, S. (1996) the same measurement was 138.23 ± 1.22 cm. withers height of adult female buffaloes was average 134.15 ± 0.94 cm Kk, S. (1996) noted that it was 133.14 ± 0.709 cm. Amora et al., (1981), said that withers height of female swamp buffaloes being three years old, was 122.7 ± 6.5 cm. It was 132.3 ± 1.7 cm. for river buffaloes. Average withers height was 126.54 ± 2.89 in Turkey. Body length was found 139.22 ± 1.42 cm for adult male buffaloes taken from north of Turkey (black-sea) ; the ridge height was average 131.19 ± 17 cm. also the same researches estimated that the withers height was 134.7 ± 4.32 cm and rump height was 134.5 ± 0.67 cm, body length was 144.80 ± 0.80 cm in adult female (Kk, S.,1996).

At same time correlation coefficient was calculated and found significant among the body measurement. Kök, S. (1996), performed comparisons among the body measurements. He reported that the highest correlation coefficients was between withers height and rump height (0.923). the least correlation coefficient was between withers height and chest girth (0.374) for adult male buffaloes. The same investigator also reported that for adult female buffaloes, the highest correlation coefficient was between wither height and rump height (0.908), the least correlation coefficient was between body length and chest depth (0.402).

REFERENCES

- Amano T, Katsumoto M, Suzuki S, Mozanora KY, Namikova T, Mortojo H, Abdugani _ K, Nadjib M (1981) Morphological and genetics survey of water buffaloes in Indonesia Native Livestock (part-2). Investigation on the goats, horses and water buffaloes by the research group of overseas scientific survey.
- Dellal G (1994) Di_i mandalarda üreme. Hayvancılık Ara_tırma Dergisi Cilt:4 Sayı:1 T.C. Tarım ve Köyi_leri Bakanlığı Hayvancılık Merkez Ara_tırma Enstitüsü, Konya.
- Düzgüne_ O (1996) Hayvancılık . Ziraat Vekaleti Mesleki Kitaplar Serisi D-1, Ankara.
- Bıyıkolu K (1973) Genel Zootečni. Atatürk Üniversitesi Yayını, No: 231, Ziraat Fakültesi Yayınları No. 117, Ders Kitapları Serisi No: 15, Erzurum.
- _lashan M, Karabulut A, A_kın Y, _zgi A.N, (1983) Yerli mandalarda vücut yapısı, döl ve süt verimi üzerine ara_tırmalar.Afyon Ziraat Ara_ıst.Yayın No:14, Afyon.
- _zgi A.N., Asker R, Kılıç A, _ahin M, (1992) Manda besisinde üre kullanımının besi performansı üzerine etkisi. Mandacılık Ara_tırma Enstitüsü Afyon Yayın No 23, Afyon .
- Kök S, (1996) Marmara ve Karadeniz bölgesinin çe_itli illerindeki manda populasyonlarının kimi morfolojik ve genetik özellikleri üzerine bir ara_tırma. Doktora Tezi, Trakya Üniversitesi Fen Bilimleri Enstitüsü. Edirne.
- Soysal MI, (1998) Biyometrinin Prensipleri, Trakya Üniversitesi, Tekirda_ Ziraat Fakültesi. Yayın No: 95, Ders Notu No: 64, Tekirda_.
- _ekerden Ö, (2001) Büyükba_ hayvan yeti_tirme (manda yeti_tiricili_i), Hatay.
- Uslu NT, (1970) Mandalarda tabii ve suni emzirmenin süt verimine tesiri ve malaklarının büyümelerinin mukayesesi. Tarım Bakanlığı Yem Bitkileri Üretme ve Zootečni Deneme _stasyonu, Afyon.
- Zahariev ZI, Aleksiyevev A_, Nikolova SD, (1986) Morphological and genetics survey of water buffaloes. Bivali, Zemizdat, Sofia.