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Morphological Characteristics of Şanlıurfa Yapışan (Tumbler) Pigeons (*Columba livia domestica*)

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Abstract: Şanlıurfa is referred to as one of the pigeon domestication centers. It is also believed that most of the pigeon breeds in Turkey originated from Şanlıurfa pigeons. This study was carried out to determine the morphological characteristics of the Şanlıurfa Yapışan (Tumbler) pigeon native to Şanlıurfa in Turkey. The animal material of the study, according to their age, was 06-12 months (Group 1, n=43), 13-24 months (Group 2, n=49), and > 24 months (Group 3, n=36), as well as male (n=65) and female (n=63) 128 heads of Yapışan pigeons. Chosen for their ability to somersault or roll backwards during flight, Tumbler pigeons are one of the domesticated pigeons descended from the Rock pigeon. All the Yapışan pigeons have trotters. The trotter feathers are soft, curved to the side, overlapping, and give the foot a thick appearance. The leg pads above the elbow are curved in and out, giving the feeling of covering between the legs, and the pads do not go beyond the toes. The difference between the sex groups was statistically significant in terms of all the other features except tail length in the morphological features examined. The effect of age on wingspan ($P<0.001$), wing length ($P<0.05$) and, tail length ($P<0.001$) was determined to be significant. The findings of this study verified the view that Yapışan pigeons are a breed. Supporting this result with future genetic characterization and similar studies will be meaningful.
Keywords: *Biodiversity, Gene sources, Morphological characteristics, Pigeon, Şanlıurfa.*

Şanlıurfa Yapışan (Tumbler) Güvercinlerin (*Columba livia domestica*) Morfolojik Özellikleri

Özet: Şanlıurfa güvercin evcilleştirme merkezlerinden biri olarak anılır. Türkiye'deki güvercin ırklarının çoğunun Şanlıurfa güvercinlerinden geldiğine inanılmaktadır. Şanlıurfa Yapışan (Taklacı) güvercinleri, yüzyıllardır Şanlıurfalı yetiştiricilerin ilgisini çeken önemli taklacı ıklardan biridir. Bu çalışma Şanlıurfa ve Türkiye'ye özgü Yapışan güvercinlerin morfolojik özelliklerini belirlemek amacıyla yapılmıştır. Araştırmanın hayvan materyalini, yaşlarına göre 06-12 ay (Grup 1, n=43), 13-24 ay (Grup 2, n=49), ve > 24 ay (Grup 3, n=36) ayrıca farklı cinsiyet gruplarından erkek (n=65) ve dişi (n=63) olmak üzere toplam 128 baş Yapışan güvercini oluşturmuştur. Uçuş sırasında takla atma veya geriye doğru yuvarlanma yetenekleri nedeniyle seçilen Taklacı güvercinleri, Kaya güvercininin soyundan gelen evcil güvercinlerden biridir.Yapışan güvercinlerin hepsinde paça mevcuttur. Ayağa kalın bir görünüm kazandıran paça tüyleri üst üste binik olup yumuşak ve yana kıvrıktır. Dirseğin üstündeki bacak pedleri içe ve dışa doğru kavisli olup bacaklar arasında örtü hissi verir ve pedler ayak parmaklarını geçmez. İncelenen morfolojik özelliklerde, kuyruk uzunluğu dışındaki diğer tüm özellikler açısından cinsiyet grupları arasındaki fark istatistiksel olarak anlamlı bulunmuştur. Yaşın kanat açıklığı ($P<0.001$), kanat uzunluğu ($P<0.05$) ve kuyruk uzunluğu ($P<0.001$) üzerindeki etkisi istatiski olarak anlamlı bulunmuştur. Bu çalışmanın bulguları, Yapışan güvercinlerin bir ırk olduğu görüşünü desteklemektedir. Bu sonucun ileride yapılacak genetik karakterizasyon ve benzeri çalışmalarla desteklenmesi anlamlı olacaktır.
Anahtar Kelimeler: *Biyoçeşitlilik, Gen kaynakları, Güvercin, Morfolojik özellikler, Şanlıurfa.*

Introduction

The domestic pigeon seen in our daily lives belongs to the wild pigeon Columba livia (Blasco et al., 2014). The feral pigeon was most likely domesticated in the Middle East and Mediterranean region at least 5,000 years ago (Anonymous, 3; Domyan and Shapiro 2017). This situation gave it the title of the oldest domesticated winged bird and, perhaps, made its phenotypic variance the most diverse (Price, 2002). Pigeons have provided some needs of people (food source, communication tool, racing animal) for many years. More importantly, they have satisfied pigeon fanciers with their aesthetic appearance of different races and symbolizepeace today (Atasoy et al., 2013).

They were regarded as sacred religious symbols and war heroes by people who were primarily responsible for their near-world distribution. They are an important model for research in parasitology, behavior, physiology, psychology, neuroscience, microbiology, and other disciplines today (Domyan and Shapiro, 2017).

The monogamy of pigeons provides an advantage for pigeon fanciers in acquiring new breeds and varieties and makes it possible to

develop them by selection (Darwin, 1976). Tumbler pigeons are one of the domesticated pigeons' descendants of the rock pigeon chosen for their ability to somersault or roll backwards during flight. In domestic pigeons, this fascinating feature has been reported for centuries (Anonymous, 1); It is believed to manifest as a reflection of the survival skill that birds of prey develop to escape air attacks. Tumbler pigeons, which are active and playful, are mostly seen in Şanlıurfa, Ankara, Antalya, Diyarbakır, Sivas, Malatya, Çorum and Konya regions in Turkey. Şanlıurfa Yapışan (tumbler) pigeons, which keep their wings low under their tail, are a breed that has won the attention of breeders from Şanlıurfa. Among the features that distinguish it from other tumblers is that the head structure is slightly angular, and the forehead is full. In addition, the ring around the eyes is less hairy and prominent (Anonymous, 2).

In Şanlıurfa, the number of individual bird keepers referred to as "curious people" is high (Kürkçüoğlu, 2011), and there are many unique places where pigeon shows and trades are held. As such, pigeon breeding stands out not only as a hobby breeding branch, but also as a typical commercial activity. It is believed that most of the pigeon breeds in Turkey came from Şanlıurfa pigeons. Because Mesopotamian figurines, mosaics, coins, and tablets (Biray, 2019) that date pigeons 5000 years ago and depict a place in Mesopotamia point to Şanlıurfa as one of the pigeon' domestication centers.

Although there are studies to determine the characteristics of many different breeds of pigeons, for example, Muradiye Dönek (Özbaşer et al., 2021), Classic Manisa Hünkarisi (Türkeş and Gündüz, 2021), and Alabadem (Erdem et al., 2021), there are no studies describing the characteristics of the Yapışan (tumbler) pigeon breed in Turkey. Yapışan pigeon is unique to the Şanlıurfa region, which is one of the domestication centers of pigeons, and pigeon breeding is a tradition in this region. This study was carried out to determine the morphological characteristics of the Yapışan pigeon native to Şanlıurfa in Turkey, to bring these characteristics to the literature, as well as to make a preliminary study for the registration of the pigeons by determining the breed characteristics.

Material and Methods

This research was approved by the Harran University Animal Experiments Local Ethics Committee with the decision dated 24.06.2021 and numbered 2021.005.04.

This research was carried out on Yapışan Pigeons raised by five different local businesses located between 37°09'30"N and 38°47'30"E in Şanlıurfa province. Pigeons were managed and fed according to the routine schedule of other breeders. The animal material of the study, according to their age, was 06-12 months (Group 1, n=43), 13-24 months (Group 2, n=49), and > 24 months (Group 3, n=36), as well as male (n=65) and female (n=63) 128 heads of Yapışan pigeons.

Morphological characteristics of pigeons (head type, eye color, beak type, beak tip color, nail color, and body color) were determined with the naked eye and photographic shots (Canon EOS 650D and Canon EF 50 mmF1.8 lens).Special boxes of 60x50 cm and a top light were used for this work. We covered them with a 500x300 cm black cloth to keep them away from external stimuli.

For morphometric measurements; body length, wingspan, wing length, tail length, chest circumference with a tape measure; head length, head width, chest width, shank length, beak length, and depth were measured with a digital caliper (Atasoy et al., 2013; Çelik 2021; Özbaşer et al., 2016).

One-Way ANOVA procedure was used to analyze the difference between groups for the features under consideration; the Independent-Sample T-test analysis method (Özdamar, 2001; Soysal, 2000) was used for the difference between gender groups, and the "Descriptors" method was followed for descriptive statistics, and the factors revealing a significant effect were calculated with the Duncan test (Duncan, 1955).

Results

In this study, as a result of measurements and observations made from 128 Yapışan pigeon samples, three different color variations were determined, taking into account the evaluations of the breeders: Gök 71.9% (n=92), Arap 17.2% (n=22), Beyaz 10.9% (n=14) (Figure 1).

The head of the yapışan pigeon is large with a thick neck. The beak is bluish- grey in the Gök variety and vibrant pink in the Beyaz variety. There were grey spots on the tip of the beak in the Arap variety only (Figure 2).

Table 1. Number of wing and tail feathers in Şanlurfa Yapışan (tumbler) pigeon.

Morphological characteristics	Ratio (%)	(n)
Number of Wing feather		
10-1-10	80.4	103
10-1-11	14.1	18
10-1-9	5.5	7
Number of Tail feather		
12 feathers	82.0	105
13 feathers	14.1	18
14 feathers	3.9	5

The number of wing feathers counted according to the p-a-s method (by following the primary, axial, and secondary feathers, respectively) was also determined as the number of tail feathers were counted (Table 1). In addition, the photographs were taken as visuals to assess the wing (Figure 3) and tail structures (Figure 4) of the Yapışan pigeons.

All Yapışan pigeons have trotters. The leg feathers, which give the foot a thick structure, are soft, slightly curved, and layer by layer. The leg pads above the elbow are curved inwards and outwards, giving the feeling of covering between the legs; these pads do not go past the toes. The trousers below the elbow, which are not very hard and long, are arranged in symmetrical feathers that support each other. (Figure 5).

In this study, the statistical analysis resulted in significant differences between groups for wing length and beak depth characteristics ($P<0.05$). Also, a considerable difference was head width ($P<0.01$). The mean values for body weight, head length, wingspan, and tail length were statistically significant ($P<0.001$) when measured traits were compared in terms of gender groups, differences for wing length, body length, head width, chest width, and wingspan ($P<0.001$); for body weight, head length, chest circumference and shank length ($P<0.01$); beak depth and beak length ($P<0.05$) were significant (Table 2).

Figure 1. Color variants of Yapışan pigeons; Gök, Arap, Beyaz.

Figure 2. Head structure, eye colors and beak types of Yapışan pigeons.

Discussion and Conclusion

Although domestication is more focused on mammals, it covers the importance of other species, such as poultry (Blasco et al., 2014). The domestic pigeon is derived from the wild rock pigeon and is the oldest domesticated bird species (Cobo-Simón et al., 2020; Price, 2002; Rose et al., 2006). Cuneiform tablets found in Mesopotamia can be accepted as physical evidence since the domestication process of

Figure 4. Examples of Wings in Şanlıurfa Yapışan pigeon.

the poultry cannot be proven with bones (Anonymous, 3).

Compared to their wild ancestors, they differ significantly in morphological structure, particularly in the color, length, and distribution of feathers and anatomy of the head, beak, and trotters. These features significantly affect appearance (Özbaşer et al., 2021; Parés-Casanova and Kabir, 2019; Shapiro et al., 2013; Vickrey et al., 2018). As a result of the intense selection and breeding efforts of enthusiasts, many breeds and varieties have emerged around the world (Johnston, 1990; Murton et al., 1972; Price, 2002; Stringham et al., 2012). This is the reason why breeders who purebred breed pays maximum attention to protecting the pedigree of pigeons (Balcı et al., 2018; Baptista et al., 2009; Bartels, 2003; Helms and Brugmann, 2007).

The most common area of intense research in pigeons has been the genetic basis of pigmentation for aesthetic or practical reasons. Pigeons display unique color variations. In addition to being a valuable feature that appeals to breeders' visual and aesthetic perceptions, color variations are associated with sexual preference, survival, and

Figure 5. Examples of trotters in Şanlıurfa Yapışan pigeons.

Table 2 The statistical values of the morphometric characteristics detected from Şanlıurfa Yapışan (tumbler) pigeons (X±Sx).

Yapışan	n	Body weight (g)	Beak length (mm)	Beak depth (mm)	Head length (mm)	Head width (mm)	Shank length (mm)
Group 1	43	290.35±3.58^{a}	16.53±0.61^{a}	7.01±0.82	33.35±1.03^{a}	21.78±1.37^{a}	39.82±3.55
Group 2	49	321.63±2.16^{b}	16.53±0.53^{b}	7.29±1.11	33.99±1.81^{b}	22.20±1.21^{b}	40.43±3.85
Group 3	36	343.89±3.70^{c}	16.58±0.95^{b}	7.35±0.51	34.77±1.24^{c}	22.33±0.57^{b}	40.66±2.95
Total	128	317.38±2.59	16.54±0.39	7.21±0.54	33.99±0.98	22.10±0.70	40.29±2.08
Age		***	-	*	***	**	-
Female	63	309.92±3.83	16.45±0.41	7.10±0.74	33.70±1.13	21.77±1.06	39.60±3.28
Male	65	324.62±3.27	16.63±0.64	7.32±0.77	34.28±1.50	22.41±0.73	40.96±2.31
Sex		**	*	*	**	***	**
Yapışan	**n**	**Wing length (cm)**	**Wingspan (cm)**	**Tail length (cm)**	**Body length (cm)**	**Chest perimeter (cm)**	**Chest width (mm)**
Group 1	43	28.10±1.94^{a}	65.57±2.65^{a}	13.67±1.64^{a}	33.05±1.52	20.43±1.82	54.31±1.08
Group 2	49	28.42±2.40^{ab}	66.85±2.58^{b}	14.34±1.61^{b}	33.40±1.87	20.86±1.80	54.40±0.83
Group 3	36	28.90±1.96^{b}	67.46±2.15^{b}	14.71±1.67^{b}	33.44±2.32	21.11±2.86	54.66±1.18
Total	128	28.45±1.28	66.59±1.60	14.22±1.01	33.29±1.10	20.79±1.24	54.45±0.59
Age		*	***	***	-	-	-
Female	63	27.98±1.78	65.90±2.13	14.12±1.49	32.82±1.61	20.43±1.74	54.21±0.69
Male	65	28.90±1.66	67.25±2.09	14.32±1.38	33.75±1.26	21.13±1.66	54.67±0.88
Sex		***	***	-	***	**	***

-: P>0.05; *: P<0.05; **: P<0.01; ***: P<0.001, a-c means within a column with different letters are significantly different (P<0.05).

predator avoidance requirements for pigeon populations living in nature (Darwin, 1868).

Studies by Si et al. (2021) have observed that the domestic pigeon exhibits three primary iris colors, including yellow to orange "pebble," white "pearl," and black "bull's eye". Pebble and pearl irises in pigeons are described as luminescent pigment cells with birefringent crystals in the anterior stromal tissue. In some studies, the Bull's-eye feature is associated with white feathers (Bond, 1919; Hollander and Owen, 1939). Our findings on Yapışan pigeons confirm these studies (Figure 2).

Atasoy et al. (2013) reported no age effect regarding body weight, head length and width in their study on tumbler pigeons. However, just like the results obtained in the study on Scandaroon pigeons (Yıldırım et al. 2018), the statistically significant difference between age groups in terms of these characteristics shows that the development of Yapışan pigeons continues. Moreover, the difference between age groups in terms of wing length, wingspan and, tail length was found to be significant in both studies. The effect of age on wingspan, wing length and tail length ($P<0.001$, $P<0.05$, $P<0.001$) was determined to be significant at the level of significance. The development of this condition with age is essential to remain stable and durable. In the study, body measurements were higher in males in general, except for the tail length. Similar results were found in some tumbler pigeons reared in Ankara.

Mean adult body weight was determined as 317.38±2.59 g in Yapışan pigeons. This situation is similar to Klasik Manisa Hünkârisi (Türkeş and Gündüz, 2021) found to be 319.3 g, Tumbler pigeons in province of Ankara as 321.62±1.97 g (Atasoy et al., 2013) and Alabadem pigeons found to be 321.17 ± 2.61 g (Erdem et al., 2021). It is lower than the values obtained for Filo flyer pigeons (Özbaşer et al. 2016) as 428.85±5.67 and for Thrace Roller Breeds (Soysal et al., 2011) as 335.58 g. In this sense, it would not be wrong to define the Şanlıurfa Yapışan (tumbler) pigeon as a medium-sized breed. This means that instead of selectively improving traits such as body weight, breeders are focusing heavily on the somersault trait of Şanlıurfa Yapışan pigeons.

Conservation of local gene resources is closely related to the economic, scientific, cultural, and ecological needs of a country. In this sense, animals, a local gene source, and biodiversity elements, are frequently investigated in terms of genetic and various morphological characteristics, not only to shed light on phylogenetic studies but also to develop more efficient production systems and genetic improvement studies (Casanova, 2013). The findings of this study support the view that Şanlıurfa Yapışan pigeons are a breed. Studies have started to be registering the Şanlıurfa Yapışan pigeon breed as a local gene source, and it is thought that morphometric characterization studies will significantly contribute to this sense. In addition, it will be meaningful to support the results obtained with future DNA studies.

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Conflict of interest:

The authors declared that there are no actual, potential, or perceived conflicts of interest for this article.

Ethical Statement

This research was approved by the Harran University Animal Experiments Local Ethics Committee with the decision dated 24.6.2021 and numbered 2021.005.04.

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