

## ON SOME BIOLOGICAL CHARACTERISTICS OF *CANIS LUPUS* (LINNAEUS, 1758) IN TURKEY

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[Yıldız Ay, E. & Albayrak, İ. 2019. On some biological characteristics of *Canis lupus* (Linnaeus, 1758) in Turkey. *Munis Entomology & Zoology*, 14 (1): 148-152]

**ABSTRACT:** *Canis lupus* is represented by 10 subspecies in Palaearctic Region and 5 subspecies in Nearctic Region. The other wolf species, *Canis simensis*, ranges only Ethiopia in Afrotropical Region. Up to date, the given information on *Canis lupus* in Turkey is mainly based on the derivation of studies, and thus unsatisfactory. The lack of studies based on specimens indicates a need of detailed research on this species. In this preliminary study, conducted between April 2014 and August 2018, some biological characteristics of the wolf were examined. This research based on 32 *Canis lupus* specimens obtained from different localities. Diagnostic characters, habitat features, morphological features, tooth features, baculum features and fur features of *Canis lupus* were recorded.

**KEY WORDS:** Wolf, morphological characteristics, habitat, Turkey

Classis mammalia which has 5416 species in the world is represented by 29 orders. Of these orders, Carnivora have 15 families; Felidae, Viverridae, Eupleridae, Nandiniidae, Herpestidae, Hyaenidae belong to suborder Feliformia while Canidae, Ursidae, Otariidae, Odobenidae, Phocidae, Mustalidae, Mephitidae, Procyonidae, Ailuridae belong to suborder Caniformia (Wilson & Reeder, 2005).

The wolves are represented by *Canis lupus* that has 10 subspecies in Eurasia and North Africa, 5 subspecies in North America, and *Canis rufus* recorded in Florida. Some subspecies of *Canis lupus* known as grey wolf have been characterized by white, black and cream colours. *Canis rufus* has also been characterized by reddish colour. Two subspecies of *Canis lupus* are extinct [*Canis lupus hodophilax* Temminck, 1839 in Japan except for Hokkaido and *Canis lupus hattai* Kishida, 1931 (= *C.l.rex* Pocock, 1935) in Sakhalin, Hokkaido] (Mech and Boitani, 2006). According to recent systematic records, two wolf species of genus *Canis* are valid as *Canis lupus* and *Canis simensis* located in Ethiopia (Wilson & Reeder, 2005).

Turkey situated among Europe, Africa and Asia hosts many species in term of its zoogeographic position. In this sense, Turkish wildlife fauna got rich via animals coming from north, east and south direction. In Turkey, classis mamalia is represented by 9 orders, Erinaceomorpha, Soricomorpha, Chiroptera, Lagomorpha, Rodentia, Carnivora, Artiodactyla, Perissodactyla and Cetacea. Wild elements of Order Perissodactyla is extinct in the wild but only domestic form exists.

Although *Canis lupus* belonging to the family Carnivora is found all over Turkey, it has a discontinuous distribution. There are some biological, ecological and distributional records concerning *Canis lupus* in Turkey (Huş, 1967; Erençin, 1977; Turan, 1984).

The subspecies recorded from the neighboring geographical regions of Turkey are as follows: *Canis lupus pallipes* Sykes, 1831 from Israel to India; *Canis lupus*

*arabs* Pocock, 1934 in Arabian Peninsula; *Canis lupus cubanensis* Ognev, 1923 in Caucasus and adjacent parts of Turkey and Iran; *Canis lupus lupus* Linnaeus, 1758 (*campestris*, *chango*, *desertorum*) in Europe east to an unknown locality in Russia and also in Central Asia, southern Siberia, China, Mongolia, Korea, Himalayan region (now greatly reduced in distribution, especially in western Europe) (Mech ve Boitani, 2006). In previous studies, it was indicated that the wolf was more active at night, sometimes it was also solitary and, sometimes it hunted wild and domestic animals (Huş, 1967). Period of oestrus is from middle December to February and gestation period of wolf is nine weeks and its litter size is 3-8 pups. Pups become adult of two years old, the wolf lives 14-16 years (Turan, 1984).

The aim of this study is to contribute to the biological features of *Canis lupus* in Turkey.

## MATERIAL AND METHODS

This study is based on some biological records of 32 gray wolf specimens from different region of Turkey between 2014 and 2018. The wolves killed as a result of traffic accidents and also hunting, were collected on permission given by the ministry. Specimens were divided into three age groups as pup, young and adult according to Gipson et al. (2000). Diagnostic characters, habitat features, morphological features, tooth features, baculum features and fur features of this species were given.

## RESULTS

In Turkey, three species belonging to Canidae; *Canis lupus*, *Canis aureus* and *Vulpes vulpes* are exist. Systematics of *Canis lupus* is below (Anonymous, 2018).

Superregnum: Eukaryota

**Regnum: Animalia**

Subregnum: Eumetazoa

(Group): Bilateria

Superphylum: Deuterostomia

**Phylum: Chordata**

Subphylum: Vertebrata

Infraphylum: Gnathostomata

Superclass: Tetrapoda

**Class: Mammalia**

Subclass: Theria

Infraclass: Eutheria

**Ordo: Carnivora**

Subordo: Caniformia

**Family: Canidae**

**Genus: *Canis***

**Species: *Canis lupus***

### ***Canis lupus* (Linnaeus, 1758), Gray wolf**

1758. *Canis lupus* Linnaeus, Systema Naturae, 10th ed., 1:39.

Type locality: Sweden

**Diagnostic characters:** In adults, total length 130-170 cm, shoulder height 69-80 cm, croup height 64-75,3 cm, the greatest skull length 220-264 mm,

condylobasal length 201-244 mm, zygomatic breadth 117-148 mm, baculum length 91,76-120,33 mm and weight 26-45 kg.

**Habitat features:** Grey wolf is a carnivore which encounters wide variety of terrestrial ecosystem in Turkey, such as forests, open areas, flatland and plain, and high areas (Fig. 1).

The wolf which occupies the highest level of food chain covers a lot of ground in winter and summer. It lives in den that is bigger than that of fox. It lives soliter except for reproduction period.

**Morphological features:** Chins have extended forward and relatively spired, chest part of body broader than back part. It's legs are thin and tall. Anterior part of body is taler than back part. External part of earlap is furry and upright. It's tail is relatively short, end of tail and upper side from back side cover with long black tipped hair. Palmar and plantar have intense hairs between and around their pads (Fig. 2).

**Tooth features:** All incisors have one root, first premolars, lower third molar have one root, second, third and fourth premolars have two roots and upper first and second molars have three roots. Canines are long, sharp and slightly bended inward. There is obvious distance in upper jaw between canines and incisors, also in lower jaw canines and first premolars (Fig. 3).

**Baculum features:** Baculum of grey wolf resemble oblique baseball bat. Distal end is narrow and slightly similar bun and proximal end of baculum is broad, jagged and ovoid. Over two thirds of baculum from proximal end takes shape like a Groove (Fig. 4).

**Fur features:** Even if the young, adult and elderly furs of the specimens are more or less different, the fur is gray tinged blackish on dorsal and extends in a narrow strip from the shoulders to the tail. Each sides are slightly reddish tinged pale grayish yellow. Ventral is very light pale yellowish tinged dirty white. Generally, guard hair was examined in terms of structure of root, shaft and tip part and it was irregular wavy crenated type.

## DISCUSSION

Miller (1912) recorded that ears of wolf are moderately pointed, erect, extending about to eye when laid forward and it's muzzle pad is completely bare. Ognev (1931) noted that wolf's tail is shorter than half of body and ears moderately long and pointed.

Miller (1912) reported that condylobasal length is longer than 200 mm (220-255 mm) and when viewed from above, brain case in outline is ovoid. Miller (1912) recorded that condylobasal length 232-255 mm, zygomatic breadth is 132-145 mm. Harrison and Bates (1991) noted that forehead elevated abruptly. They recorded that maximum skull length is 184,5-238 mm; condylobasal length is 169-214 mm; 91,1-133 mm. Ognev (1931) recorded that maximum skull length is 251-285 mm; condylobasal length is 230-262 mm; zygomatic breadth is 111-152 mm.

Comparing our specimens data, the values of our specimens are significantly greater than Arabian specimens and smaller than Asian and European specimens on greatest skull length, condylobasal length and zygomatic breadth.

Although it is forbidden, it is not possible to prevent the killing of the wolf which is regarded as harmful because of the human-wolf conflict. Wolf is in LC category according to IUCN criteria, and listed in Annex II of the Bern Convention. Measures must be taken to prevent the illegal killing of wolf protected by national and international legislation.

## ACKNOWLEDGEMENTS

We thank the Ministry of Agriculture and Forestry, General Directorate of Nature Conservation and National Parks for permission for collecting wolf specimens.

Note: This study is a part of the PhD thesis of first author, Elif Yıldız Ay.

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Figure 1. A gray wolf in the agricultural area killed by traffic accident.



Figure 2. A gray wolf in the mountain area.



Figure 3. A wolf tooth.



Figure 4. A shape of wolf baculum.