



(RESEARCH ARTICLE)



## Morphological study for Accipitrid birds (Accipitridforms, Accipitridae) in Iraq

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### Abstract

The current study revealed to six species of four genus belong to family Accipitridae, Order Accipitriformes; about 24 specimens of birds are deposited in the vertebrates departments in "the Iraq Natural History Research Center and Museum INHM" were reviewed. Morphometrics of six species of mummified Accipitrid birds as follow: Sparrow-Hawk *Accipiter nisus* (Linnaeus, 1758), Tawny Eagle *Aquila rapax* (Temminck, 1828), Greater spotted eagle *Aquila clanga* (Pallas, 1811), long-legged Buzzard *Buteo rufinus* (Cretzschmar, 1825), Steppe Buzzard *Buteo buteo* (Linnaeus, 1758), and Short toed Eagle *Circaetus gallicus* (Gmelin, 1788), were reviewed. Global conservation status and the distribution ranges of each species throughout Iraq were discussed.

**Keywords:** Accipitridforms; Buzzard; Hawk; Short toed Eagle

### 1. Introduction

The Order Accipitriformes contains any numerous carnivores' birds that hunt and kill other animals like kites, eagles, hawks, and vultures but not falcons. Some researchers discussed the different between Accipitriformes and Falconiformes by DNA studies [1 and 2]. The splitting of falcons in another order has been revealed by "the American Ornithological Societys: South American Classification Committee (SACC)" [3 and 4]; "North American Classification Committee (NACC)" [5 and 6]. And adopted also by the International Ornithological Congress (IOC) [6 and 7].

Accipitriformes Order includes three families: Sagittariidae, Pandionidae and Accipitridae. Accipitridae currently with 262 species [8].

The aims of current study are catalogue the voucher specimens of all species belong to Accipitridae family which deposited in bird collection of "the Iraq Natural History Research Center and Museum, University of Baghdad (INHM)"; and reviewing the morphometrics, distribution, and conservation status for each one.

### 2. Material and methods

#### 2.1. Specimen's collection

A total of 24 voucher specimens of Accipitrid birds of four genus: *Accipiter*, *Aquila*, *Buteo* and *Circaetus* that belong to Accipitridae Family which collected from many localities of Iraq as: Sirsniq, Falluja, Chorbachi farm , (north of Iraq); Agra Road, Himreen Mountains (west of Iraq); Baghdad, Rashidiyya, Khalis, Mohmodiya Road, Baguba Road, Tarmiyya Road, Azizia Road, Kut near Hay, Teltawa and Abu- Ghariab (middle of Iraq); Diawania, Amara and Al- Chibayish Marsh (south of Iraq) deposited in the vertebrates department in (INHM). All birds were tagged with museum collection label.

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One specimen as a representative of each studied species were measured (mm) and photographed by digital camera to support species identification and documentation.

### 3. Results and discussion

A total of six species of four genus belong to the family: Accipitridae, were recorded in the collection of Order Accipitriforms in " the Iraq Natural History Research Center and Museum INHM", table 1. In addition to four species were registered in the document of INHM without specimens, table 2.

**Table 1** Collection of Accipitridae Family Order Accipitriforms in the Iraq Natural History Research Center and Museum INHM

Family name	Genus name	Species name	Common name	Number of birds
Accipitridae	<i>Accipiter</i>	<i>nisus</i>	Sparrow-Hawk	5
Accipitridae	<i>Aquila</i>	<i>clanga</i>	Greater spotted eagle	2
Accipitridae	<i>Aquila</i>	<i>rapax</i>	Steppe Eagle	1
Accipitridae	<i>Buteo</i>	<i>buteo</i>	Stepe Buzzard	6
Accipitridae	<i>Buteo</i>	<i>rufinus</i>	long-legged Buzzard	6
Accipitridae	<i>circaetus</i>	<i>gallicus</i>	Serpent Eagle Short toed Eagle	4

**Table 2** Registered species in the document of INHM without specimens of Accipitridae in the collection of the museum

Scientific name	Common name	Area of collection	Museum number
<i>Aquila chrysaetus</i>	Golden Eagle	Ana (west)	3565
<i>Aquila heliaca</i>	Imperial Eagle	Near Kut (middle)	1063
<i>Aquila rapax orientalis</i>	Steppe Eagle	Baghdad (middle)	888
<i>Aquila nipalensis</i>	Steppe Eagle	Baghdad (middle)	833

#### 3.1. Sparrow-Hawk *Accipiter nisus* (Linnaeus, 1758)

Synonyms according to [9]:

=*Accipiter wolterstorffi* (Kleinschmidt, 1901)

=*Falco nisus* (Linnaeus, 1758)

##### 3.1.1. Morphology study

It is a fast-flying small bird with long legs and tail, round wing and striped from the bottom. In the male the upper parts are blue-gray, with a bit of redness on the cheeks and earmuffs, and more white spots on the back. The wing blue, but the feet are brownish with dark brown fringes on the bottom surface. The tail is like the back, but it has a brownish tinge and ends with a little white and is cut by 4 dark brown areas, the rest of the lower parts are white, the lower tail and armpits are white. In the chest area there are red striped lines; the undersides are whitish with brown stripes. The female bird is larger than the male, and its upper parts are grayish-brown, the bottom parts are white and brown striped. The iris is orange, beak is gray, and bit (cere) is greenish-yellow, the feet are yellow. Figure 1, measurements of one sample in table 3.

### 3.1.2. Species status in Iraq

Five specimens of current study were collected from Sirsniq (North), west of Mohmudiya and Baghdad (middle). It is one of the common and widespread winter visitors in our country and it spawns in some places for sure, [10, 11]. The first recorded of *Accipiter nisus* in Iraq by [12], then by [13]; [14];[15]; [16]; [17]; [18] and [19]. [20] Mentioned that seven sparrow hawks were recorded on the edge of the Central Marshes in Thi Qar province south of Iraq. Recently, [21] recorded it in Al-Dalmaj Wetlands, south of Iraq. *Accipiter nisus* is listed as Least Concern (LC) by IUCN [22] and [23].



**Figure 1** (A) Ventral view of *Accipiter nisus*, and ( B) Dorsal view

### 3.2. Greater spotted eagle *Aquila clanga* (Pallas, 1811)

Synonyms according to [9]:

= *Clanga clanga* (Pallas, 1811)

= *Lophaetus clangus*

#### 3.2.1. Morphology study

Feathers in an adult are dark brown almost homogeneous, but the feathers are light in color at the top of the head, lower part is a dark brown or hazelnut color. Usually a white spot is found on the covers, at the ends of the scrolls, the hooves, and the wing covers - hence the name in English, which indicates the spotted style of juvenile feathers. The tail is very dark and clear, is brownish-black, and above it has 3 or 4 areas of dark brown and ends with slightly white feathers. The nostrils are round; this is another sign that helps differentiate them from other types of eagles, figure 2 and 3. Measurements of one sample in table 3.

#### 3.2.2. Species status in Iraq

two specimens of current study were collected from Baghdad and Rashidiya (middle of Iraq). *Aquila clanga* is a passage migrant and winter visitor [10]. It was almost recorded by all the previous surveys in Iraq as follow: [24]; [25]; [12]; [26]; [14]; [16]; [17]; [27]; [19]. In addition of, [28] revealed to it in Al-Dalmaj Marsh, south of Iraq.

While, [20] recorded 18 individuals of *Aquila clanga* in Central Marshes and 10 in Western Al-Hammar Marsh in Thi-Qar province during 2018-2019. Recently, [21] recorded it in Al-Dalmaj Wetlands, south of Iraq. *Aquila clanga* is listed as Vulnerable (VU) with decreasing by IUCN [22] and [23].

### 3.3. Tawny Eagle *Aquila rapax* (Temminck, 1828)

Synonyms according to [9]:

= *Falco rapax* (Temminck, 1828)

### 3.3.1. Morphology study

It is slightly larger than the previous species but they are very similar, even indistinguishable in the field. The upper parts are lighter brown and the header darker. It has red spot at the back, but it is sometimes not clear; upper of wing is brown and with a light coffee color ends, the upper area of tail is white and has some gray areas. The nostrils are oval in this bird and are oblique. . Wing coverts end in yellowish brown spots forming 3 rows on the wing surface. The tail covers are brown. The tail is black, interrupted by eight larger gray areas or 9 gray areas and finished with a fat brown stripe. The lower parts are grayish brown, and the wrist is lighter in color. A dark brown iris, gray bill, yellow cere, and the nostrils are white two oblique. The fingers are yellow, figure 2. Measurements of one sample in table 3.

### 3.3.2. Species status in Iraq

One voucher specimen was collected from Amara south of Iraq. *Aquila rapax* is found in the winter in small numbers [11]. This species has not been recorded by researchers in Iraq, perhaps because of its disappearance from the Iraqi environment or the difficulty of distinguishing it from the Steppe Eagle *Aquila rapax orientalis* [11]. It is listed as Vulnerable (VU) and decreasing in current population trend by IUCN [22] and [23].



**Figure 2** (A) Ventral view of *Aquila* sp.: a- *A. clanga*, b- *A. rapax*. (B) Dorsal view of *Aquila* sp.: a- *A. clanga*, b- *A. rapax*

### 3.4. Steppe Buzzard *Buteo buteo* (Linnaeus, 1758)

Synonyms according to [9]:

=*Falco buteo* (Linnaeus, 1758)

= *Falco vulgaris*

#### 3.4.1. Morphology study

Its feather is brown on top with a bit of a coffee color in its edges, where the axes of the feathers are in the form of dark-brown lines. The tail is red lined with 8 or 9 dark brown areas, the end of the tail, as there is a wide black stripe near the end and this is a sign distinguishes this type from the others. The Feathers located in the thigh is more red and streaked. The bottom of the wing is brown, dotted with brown reddish. Female a little bigger than the male the iris is yellowish, and the beak is yellowish the foot is yellow. Figure 4, Measurements of one sample in table 3.

#### 3.4.2. Species status in Iraq

Six voucher specimens of *Buteo buteo* were collected from Baghdad, Tarmiya Road and Kut near Hay (middle of Iraq). This buzered is resident; winter visitor and passage migrant [10]; [29]; [30]. It was recorded from Al-Fao, Al -Basrah province in southern Iraq by Cumming [24]; [12]. While, [18] recorded it in Western Desert, Gaara Depression (west of Iraq). *Buteo buteo* is listed as Least Concern (LC) and stable population trend by IUCN [22] and [23].

### 3.5. Long-legged Buzzard *Buteo rufinus* (Cretzschmar, 1825)

Synonyms according to [9]:

=*Buteo ferox* (Gmelin, 1771)

=*Falco rufinus* (Cretzschmar, 1829)

#### 3.5.1. Morphology study

This wild bird has two forms, one of which is dark hazel brown which is the least common and the second is reddish brown which is the most common. The first color has deep hazel feathers appearing black in the field with a clear spots in the lower surface of wing. And in the other color, the upper parts are brown, edges of the feathers are reddish, but are exposed at the head and the back, head is white, tail is light brown or grayish brown but not stripes and axes of the feathers are white. The chest and abdomen area of the bird is reddish-hazel, and the center of the feathers is black. Female is bigger than male. The iris is brown to yellow in color, the beak is gray, and the cere is yellowish green, and the foot is yellow. Figure 3, Measurements of one sample in table 3.

#### 3.5.2. Species status in Iraq

Six voucher specimens of *Buteo rufinus* were collected from Azizia Road, Baghdad, Abu-Gharaib, Baquba and Tarmiya (middle of Iraq). It is resident; winter visitor and passage migrant [10];[13]; [30].

Many researchers recorded this buzzard like: [24]; [12]; [14]; [17]. And, [31] recorded it in Bahr Al-Najaf Depression (south of Iraq). Also, [18] revealed to it with the vertebrate diversity in Iraqi Western Desert at Ga'ara Depression. However, [28] revealed to it in Al-Dalmaj Marsh, south of Iraq. Then, [32] recorded it with the diversity in Huwaiza marsh, south of Iraq.

While, [20] recorded two buzzards of this species were observed along the road linking Al-Adel Township to Al-Auda Marsh on March 2016. A juvenile was recorded over the Central Marshes in Thi-Qar province on March 2018. Recently, [21] recorded it in Al-Dalmaj Wetlands, south of Iraq. *Buteo rufinus* is listed as Least Concern (LC) and stable population trend by IUCN [22] and [23].



**Figure 3** (A) Dorsal view of *Buteo* sp., a- *Buteo buteo*. b- *B. rufinus*, (B) Ventral view: a- *Buteo buteo*. b- *B. rufinus*

### 3.6. Serpent Eagle or Short toed Eagle *Circaetus gallicus* (Gmelin, 1788)

Synonyms according to [9]:

=*Accipiter ferox* (Gmelin,1771)

=*Circaetus ferox* (Gmelin,1771)

=*Falco gallicus* (Gmelin, 1788)

### 3.6.1. Morphology study

This species of eagle is distinguished by its huge head, its large yellow eyes, the featherless wrist and short fingers, the upper parts are grayish brown and the area around the eye is white, the wing is lighter in color but the front of wing is black in color. The tail is brown ending in white and interrupted by three or four blackish brown areas. The female is larger than the adult male, but has a striped chest. Yellow- brown iris, gray beak, and gray-brown foot. Figure 4, measurements of one sample in table 3.

### 3.6.2. Species status in Iraq

Four voucher specimens of *Circaetus gallicus* were collected from Agra Road, Himreen Mountains (west), Baghdad (middle). It is breeding summer visitor, passage migrant [13]and [30]. [18] recorded it in Gaara Depression, Iraqi Western Desert. While, [20] observed an adult female hovering over Ishan Al-Gubbah Marsh on the northern part of Central Marshes in Thi-Qar province on March 2018. Recently, [21] recorded it in Al-Dalmaj Wetlands, south of Iraq. *Circaetus gallicus* is listed as Least Concern (LC) and stable population trend by IUCN [22] and [23].



**Figure 4** (A) Dorsal view of *Circaetus gallicus*, (B) Ventral view

**Table 3** Measurements ± of collection six species belong to four genus of Accipitridae by millimeters

Measurements	<i>Accipiter nisus</i> ♀	<i>Aquila clanga</i> ♀	<i>Aquila rapax</i> ♂	<i>Buteo buteo</i> ♂	<i>Buteo rufinus</i> ♀	<i>Circaetus gallicus</i> ♀
T.L.	385	700	710	600	610	628
W.	243	520	550	450	480	525
T.	183	275	225	250	260	260
B.	15	37	36	30	28	37
T.s	63	105	87	90	85	100

"T.L=total length, W= width, T=tail, B= beak, T.s=tarsus"

#### 4. Conclusion

The current study are catalogue the voucher specimens of six species belong to Accipitridae family which deposited in vertebrate department of "the Iraq Natural History Research Center and Museum, University of Baghdad (INHM)"; six species of four genus belong to family Accipitridae, Order Accipitriformes; about 24 specimens which are deposited in the INHM. The current study revealed to the presence and conservation state of six species distributed in all Iraq. *Aquila clanga* and *Aquila rapax* are listed as Vulnerable (VU) with decreasing by IUCN. The rest of species were listed as Least Concern as : *Accipiter nisus* (LC), *Buteo buteo* (LC), *Buteo rufinus* (LC) and *Circaetus gallicus* (LC).

#### Compliance with ethical standards

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##### Disclosure of conflict of interest

The authors declare no conflict of interest related to the work in a manuscript.

##### Statement of ethical approval

The trial was registered in "the Iraq Natural History Research Center and Museum INHM" (E-mail: info@nhm.uobhdad.edu.iq). The research proposal was approved by the Scientific Affairs Department of Baghdad University (SH.A.923/17/2/2021).

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