

An Avian Systematic Review and Status of Gaviidae, Podicipedidae, Procellariidae, Hydrobatidae and Pelecanidae in Pakistan

Farhatul-Ain Arshad¹, Rubaida Mehmood², Sajid Hussain^{2*} and Muhammad Annus Khan³

¹Department of Zoology, Women University, Multan, Punjab, Pakistan

²Multan Institute of Nuclear Medicine and Radiotherapy (MINAR), Nishtar Hospital, Multan, Punjab, Pakistan

³Department of Ornamental Horticulture, Anhui Agricultural University, Hefei, China.

Abstract

It has been observed that the avifauna has not been given proper attention with particular reference to the subspecies level. Thereby, an attempt has been extended to review the taxonomical status of the class Aves. The order Gaviiforms, family Gaviidae, genus *Gavia* which viz., only species *Gavia stellata* with subspecies *G.s. stellata* representing from Pakistan. However, in order Podicipediforms, family Podicipedidae includes two genera, which are *Tachybaptus* and *Podiceps* which represents five species *T. ruficollis*, *P. cristatus*, *P. griseogena*, *P. auritus* and *P. nigricollis* with five subspecies *T.r.capensis*, *P.c.cristatus*, *P.g.griseogena*, *P.a.auritus* and *P.n.nigricollis*. Secondly, order Procellariiforms, have two families Procellariidae and Hydrobatidae, where family Procellariidae contains two genera *Puffinus* and *Bulweria*. These two genera have four species *P. tenuirostris*, *P. iherminieri* and *B. fallax* with three subspecies *P.t.tenuirostris*, *P.i.iherminieri*, and *B.f.fallax*. Thirdly, family Hydrobatidae representing genus *Oceanites* has one species *O. oceanicus* with subspecies *O.o.oceanicus* from Pakistan. Whereas, order Pelecaniforms, contains five families Pelecanidae, Phalacrocoracidae, Anhingidae, Sulidae and Phaethontidae. Out of which, one family Pelecanidae, with genus *Pelecanus*, representing three species *P. onocrotalus*, *P. philippensis*, *P. crispus* along with three subspecies *P.o.onocrotalus*, *P.p.philippensis*, *P.c.crispus* from Pakistan. The study revealed that the above families represent thirteen species overall, with thirteen subspecies, where, three are vagrant, one migrant, one resident, one winter visitors, one summer vaster, one common, two recorded, two breeders and one Rare in Pakistan.

Keywords: Taxonomy; Systematic review; Status; Subspecies; Pakistan

Introduction

Family Gaviidae is a family of non-passerine birds having five species around the world [1]. The existing Checklist of the birds of Pakistan described that there were five subspecies in total belonging to this family. However, our review works reveals that, in Pakistan Gaviidae is represented by one genera which includes, *Gavia*; having only species *Gavia stellata* with subspecies *G.s.stellata*. Secondly, family Podicipedidae includes two genera, which are *Tachybaptus* and *Podiceps*. *Tachybaptus* have four species around the world which represents only species from Pakistan is *T. ruficollis* with subspecies *T.r.capensis*. *Podiceps* have eleven species around the world which represents four species from Pakistan is *P. cristatus*, *P. griseogena*, *P. auritus* and *P. nigricollis* with four subspecies, *P.c.cristatus*, *P.g.griseogena*, *P.a.auritus* and *P.n.nigricollis*. Thirdly, family Procellariidae includes two genera *Puffinus* and *Bulweria*. These two genera have twenty one species around the world [1]. These genera represent three species *P. tenuirostris*, *P. herminieri* and *B. fallax* with three subspecies *P.t.tenuirostris*, *P.i.iherminieri* and *B.f.fallax*. Fourthly, family Hydrobatidae representing genus *Oceanites*, which represents two species around the world [1]. Which has one species *O. oceanicus* with subspecies *O.o.oceanicus* from Pakistan. Whereas, family Pelecanidae, with genus *Pelecanus* represents eight species around the world [1]. But representing three species *P. onocrotalus*, *P. philippensis*, *P. crispus* along with three subspecies *P.o.onocrotalus*, *P.p.philippensis*, *P.c.crispus* from Pakistan.

The study revealed that the above families represent thirteen species overall, with thirteen subspecies, where, three are vagrant, one migrant, one resident, one winter visitors, one summer vaster, one common, two recorded, two breeders and one Rare in Pakistan. The systematic review and status of class Aves family Gaviidae, Podicipedidae, Procellariidae,

Hydrobatidae and Pelecanidae in Pakistan is mainly based upon available literature searched to establish the history of treatment of the taxa concerned. The idea of reviewing competing views is based on the philosophy that in many cases these alternatives remain valid hypothesis. The arrangement is discussed and more recent treatments are described in this work [1,2].

Materials and Methods

In order to review and update the information, literature was cited from all published sources. It was not possible to verify all information by capturing, sighting and mist-netting the species in their distributed areas due to obvious technical reasons. However, mist-netting was performed at conceivable sites and the information was upgraded where deemed necessary. The Abbreviations which we used in this paper are given below:

1, 2, 3.....etc. shows description at species level in Key

a, b, c.....etc. shows description at subspecies level in the key

*Corresponding author: Hussain S, Multan Institute of Nuclear Medicine and Radiotherapy (MINAR), Nishtar Hospital, Multan, Pakistan, Tel: +923006861199; E-mail: sajid9596@gmail.com

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FBI.....
Fauna of British India

Is.....
.....Island

JBNHS.....Journal of Bombay Natural
History Society

OBC.....
Oriental Bird Club

SE.....
.....Southeast

KPK.....
Khyber Pakhtoon Khua.

Results

The results show that the above families represent thirteen species overall, with thirteen subspecies, where, three are vagrant, one migrant, one resident, one winter visitors, one summer vaster, one common, two recorded, two breeders and one Rare in Pakistan (Tables 1-5).

Family: Gaviidae

Higher taxonomy: Jerdon [3] reported this family as Colymbidae under the Tribe *Mergitores* with an order *Natatores*. Baker [4] reported this family as Colymbidae with an order *Pygopodes* under one genus *Colymbus* from Pakistan. Roberts [5], Ripley [6] as well as Dement'ev and Gladkov [7] reported this family as Gaviidae below the order *Gaviiforms*. This family represents one genus *Gavia* from Pakistan besides Ali and Ripley [8] reported this same in Hand book of the Birds of India and Pakistan. Howard and More [1] (1994), Inskipp et al. [2], Grimmett et al. [9] and Rasmussen and Anderton [10] revealed family Gaviidae, order *Gaviiforms* and genus *Gavia* from Pakistan.

Specific and subspecific taxonomy

Gavia stellata (Red-throated Diver/Loon)

Synonyms: *Colymbus lumme* GUNNKB [11].

Colymbus stellatus [7]; *Gavia stellata* [1,2,5,6,8-10] as done here.

This species is represented by single member in Pakistan named as *Gavia stellata*. It is a duck shaped, Red-throated Diver with spots on throat. This species is more lightly built than Black-throated, with a small upward-angled bill, flatter crown, straighter neck, and lightly speckled back diver [10,11].

Key to genera: The plumage more especially on the upper parts is harder but not so furry having webbed feet with tail consists of 16-20 feathers.

Key to subspecies found in Pakistan: *Gavia stellata stellata* (Red-throated Diver)

1. Forehead, crown, sides of the head, chin, throat sides of the neck are ashy slate-grey.
2. The hind neck and extreme upper back is blackish-grey, the centres of the feathers are darkest and the margins white, giving a streaked appearance.
3. The tail is slaty-brown.
4. The wings are slaty-brown, the tips of the primaries being more grey.
5. Lower plumage is white.
6. The throat is not red in winter as in the summer.

Family: Podicipedidae

Higher taxonomy: Jerdon [3] reported this family as Podicipidae under the Tribe *Mergitores*. He placed this tribe under the order *Natatores*. This family represents one genus *Podiceps* from Pakistan

Scientific Name	Common Name	Balochistan	Sindh	Punjab	K.P.K	Gilgit Baltistan	Kashmir
<i>Gavia stellata stellata</i>	Red-throated Diver	≠					
≠: Vagrant							

Table 1: Province wise distribution of different races of Loons Family Gaviidae found in Pakistan.

Scientific Name	Common Name	Balochistan	Sindh	Punjab	K.P.K	Gilgit Baltistan	Kashmir
<i>Tachybaptus ruficollis capensis</i>	Little Grebe	+				■ +++	
<i>Podiceps cristatus cristatus</i>	Great crested Grebe	++ ■	++	++			
<i>Podiceps grisegena grisegena</i>	Red-necked Grebe			≠			
<i>Podiceps auritus auritus</i>	Horned Grebe	□					
<i>Podiceps nigricollis</i>	Eared Grebe	±	±	±			
≠: Vagrant; +: Resident; ++: Winter Visitors; ±: Recorded; ■: Breeders; □: Rare							

Table 2: Province wise distribution of different races of Grebe Family Podicipedidae found in Pakistan.

Scientific Name	Common Name	Balochistan	Sindh	Punjab	K.P.K	Gilgit Baltistan	Kashmir
<i>Puffinus tenuirostris tenuirostris</i>	Slender-billed Shearwater	≠					
<i>Puffinus iherminieri persicus</i>	Dusky Shearwater	± ■	''				
<i>Bulweria fallax fallax</i>	Jouanin's Petrel		++				
≠: Vagrant; '': Migrant; ++: Winter Visitors; ±: Recorded; ■: Breeders							

Table 3: Province wise distribution of different races of Shear water and Petrel Family Procellariidae found in Pakistan.

Scientific Name	Common Name	Balochistan	Sindh	Punjab	K.P.K	Gilgit Baltistan	Kashmir
<i>Oceanites oceanicus oceanicus</i>	Slender-billed Shearwater	+++	-				
+++ : Summer visitors; - : Non-Breeders							

Table 4: Province wise distribution of different races of Storm Petrel Family Hydrobatidae found in Pakistan.

Scientific Name	Common Name	Balochistan	Sindh	Punjab	K.P.K	Gilgit Baltistan	Kashmir
<i>Pelecanus onocrotalus onocrotalus</i>	Great White Pelican	++	++	+	+		
<i>Pelecanus philippensis philippensis</i>	Spot-billed Pelican	+	+	+	+		
<i>Pelecanus crispus crispus</i>	Grey Pelican	±		±			

++: Winter Visitors; +: Resident; ±: Recorded

Table 5: Province wise distributions of different races of Pelicans Family Pelecanidae found in Pakistan.

while Murray [12] reported same family Podicipidae with different order *Herodiones* and genus *Podiceps* from Pakistan. Blanford [13] and Baker [4] reported this family as Podicipedidae. He placed this family under the order *Pygopodes*. This family represents one genus *Podiceps* from Pakistan. Ripley [6] reported this family as Podicipedidae. He placed this family under the order Podicipediformes. This family represents one genus *Podiceps* from Pakistan. Dement'ev and Gladkov [7] reported this family as Colymbidae. He placed this family under the order Colymbiformes. This family represents one genus *Colymbus* from Pakistan. Ali and Ripley [8] in Hand book of the Birds of India and Pakistan revealed this family as Podicipedidae. He placed this family under the order Podicipediformes. This family represents one genus *Podiceps* from Pakistan. Roberts [5] as well as Howard and More [1], Inskipp et al. [2], Grimmett et al. [9] and Rasmussen and Anderton [10] reported this family as Podicipedidae, order Podicipediformes under two genera *Podiceps* and *Tachybaptus* from Pakistan.

Specific and subspecific taxonomy

Tachybaptus ruficollis (Little grebe or Dabchick)

Synonyms: *Tachybaptus ruficollis capensis* [1,2,5-9] as done here.

A very small, short-billed grebe, mostly brown with black cap and whitish posterior [10].

Podiceps cristatus (Great-crested grebe)

Synonyms: *Colymbus cristatus cristatus* [7].

Podiceps cristatus cristatus [1,2,5,6,8-10] as done here.

A large and spindly pale grebe with a long thin neck and bill, triangular head and much white on fore parts and wing [10].

Podiceps grisegena (Red necked grebe)

Synonyms: *Podiceps grisegena grisegena* [1,2,5-9] as done here.

A rather large, stocky, dark grebe; from larger, slimmer Great Crested by shorter yellowish-based, black-tipped, blocker head and thicker neck, and darker foreneck and area around eyes [10].

Podiceps auritus (Salvonian Grebe or Horned Grebe)

Synonyms: *Podiceps auritus auritus* [1,2,5-9] as done here.

A small, chunky dark grebe, like Black-necked but sturdier, with short, straight bill, flatter crown and thicker neck [10].

Podiceps nigricollis (Black-necked Grebe or Eared Grebe)

Synonyms: *Podiceps nigricollis nigricollis* [1,2,5-10] as done here.

A small, dumpy grebe, recalling Little; much like vagrant Horned, but bill looks turned, and plumage less pied [10].

Key to genera: The front toes are furnished with broad lateral lobes, small raised broad lobe hind toe.

The fourth toe is longest. The nails are broad and flattened in *Tachybaptus*.

Bill is straight, compressed and sharply pointed, oblong nostrils at the base, small wings, short downy tail in *Podiceps*.

Key to subspecies found in Pakistan: Wing 94 to 109 mm, tarsus 30 to 35 mm, culmen 18 to 22 mm.

Adults without any decoration of long feathers on head or neck.

The bill is blackish, short and sharply pointed with prominent yellow fleshy gape during the breeding season.

The feet are large, set well back on the body and are green-black on the tarsus, but more olive tinged on the two inner toes.

All toes are broadly webbed with flap-like lobes of skin.

This genus contains the following four species.

A. The bill is long.

a. The bill is long, straight, sharply pointed and with no curve on culmen; pink at the base.....*Podiceps cristatus cristatus*.

b. The bill is slightly shorter and the culmen is gently curved rather than straight; yellow at the base.....*Podiceps grisegena grisegena*.

B. The bill is short.

c. The bill is pale tipped, quite short, straight and recurved on the culmen, not up-tilted.....*Podiceps auritus auritus*.

d. The bill is more slender and the lower mandible is angled to give bill a slightly up-tilted appearance.....*Podiceps nigricollis nigricollis*.

Family: Procellariidae

Higher taxonomy: Jerdon [3] reported this family as Procellariidae under the Tribe *Vagatores*. He placed this tribe in the order *Natatores*. This family has one sub-family Halodrominae which contain only genus *Pelicanoides* which is reported from Pakistan. Murray [12] reported this family as Procellariidae. He placed this family under the order *Herodiones*. This family has one sub-family *Procellarine* which represents two genera *Oceanites* and *Puffinus* from Pakistan. Blanford [13] and Baker [4] reported this family as Procellariidae. He placed this family under the order *Tubinares*. This family represents two genera *Oceanites* and *Puffinus* from Pakistan. Ali and Ripley [8] in Hand book of the Birds of India and Pakistan and Ripley [6] reported this family as Procellariidae. He placed this family under the order Procellariiformes. This family represents two genera *Puffinus* and *Bulweria* from Pakistan. Dement'ev and Gladkov [7] reported this family as Procellariidae. He placed this family under the order Procellariiformes. This family represents two genera *Puffinus* and *Oceanodroma* from Pakistan. Roberts [5], Howard and Moore [1], Inskipp et al. [2], Grimmett et al. (1998) [9] and Rasmussen and Anderton [10] revealed Procellariidae. They placed this family under the order *Procellariiformes*. This family represents two genera *Procellaria* and *Bulweria* from Pakistan.

Specific and subspecific taxonomy

***Puffinus tenuirostris* (Slender-billed Shearwater)**

Synonyms: *Puffinus tenuirostris tenuirostris* [1,2,5-10] as done here. Very like larger (and hypothetical) Sooty but with much shorter bill; wings almost as long, but body slighter [10].

***Puffinus iherminieri* (Persian or Audubon's Shearwater)**

Synonyms: *Puffinus iherminieri persicus* [1,2,5-10] as done here.

A small, sharply pied (black above and white below) shearwater with short, rather triangular wings, long, full, rounded tail and all-dark slim bill [10].

***Bulweria fallax* (Jouanin's Petrel)**

Synonyms: *Bulweria fallax fallax* [1,2,5-10] as done here.

Larger and heavier head and neck, larger all-dark bill, broader wings, shorter tail [10].

Nostrils are impervious, which terminate externally in tubes. The wings are long and spinal feather tract is well developed on the neck. Plumage having brown colour in *Puffinus* while black in *Bulweria*.

Key to subspecies found in Pakistan

1. The bill is long hooked at the point.
2. The tubular nostrils end in two distinct, oblique orifices directed forward and upward.
3. The wings are long and pointed, tail is long and of 12 feathers.
4. The tarsus is compressed and sharp in front, reticulated and shorter than the middle and outer toes, which are sub-equal with a small hind claw.

This genus contains the following two subspecies.

- a. No white on lower plumage.....*P. tenuirostris tenuirostris*.
- b. Lower plumage partly or wholly white.....*P. iherminieri persicus*. Genus: *Bulweria*

This genus contains a single subspecies in Pakistan.

***Bulweria fallax fallax* (Jouanin's Petrel)**

1. This is an all-dark Petrel with a long wedge-shaped tail and head is large.
2. Its upper parts are blackish brown and under parts are a slightly grayer brown.
3. This bird has a fast swooping type of flight.

Family: Hydrobatidae

Higher taxonomy: According to Jerdon [3], Murray [12], Blanford [13] and Baker [4] this family act as the genus in Family Procellariidae. Dement'ev and Gladkov [7] reported this family act as the genus in the family Procellariidae. He placed this family under the order *Procellariiformes*. This family represents one genus *Oceanodroma* from Pakistan. Ali and Ripley [8] in Hand book of the Birds of India and Pakistan and Ripley (1961) revealed this family as a separate family Hydrobatidae. He placed this family under the order *Procellariiformes*. This family represents one genus *Oceanites* from Pakistan. Roberts [5], Howard and Moore [1], Inskipp et al. [2], Grimmett et al. [9] and

Rasmussen and Anderton [10] revealed Hydrobatidae. They placed this family under the order *Procellariiformes*. This family represents one genus *Oceanites* from Pakistan.

Specific and subspecific taxonomy

***Oceanites oceanicus* (Wilson's Storm Petrel)**

Synonyms: *Oceanites oceanicus oceanicus* [1,2,5-10] as done here.

A very small, dainty storm-petrel with short square tail and projecting (yellow-webbed) feet [10].

Key to genera

The bill is slight and weak, shorter than the head. The nostrils combine in a single external orifice. The wings are very long and tail is moderate and very shallowly forked. The tarsi are smooth and much longer than the toes. The claws are sharp, spatulate but little flattened.....*Oceanites*.

Key to subspecies found in Pakistan

1. Upper tail-coverts, bases of outer tail-feathers and sides of flanks from vent pure white, greater secondary coverts gray with white tips. Tail is about 72 mm to 84 mm.
2. Wing is 140 mm to 157 mm, plumage is sooty-brown.
3. The primaries are almost black with paler inner webs.
4. Tarsus about 32 mm to 36 mm, Culmen 12 mm to 14 mm.
5. Bills, legs and feet black, the centre of the webs yellowish.

Family: Pelecanidae

Higher taxonomy: Jerdon [3] reported this family as Pelecanidae under the Tribe *Piscatores*. He placed this tribe under the order *Natatores*. This family has one genus *Pelecanus* which is reported from Pakistan. Murray [12] reported this family as Pelecanidae. He placed this family in the order Steganopodes. This family has one sub-family Pelecanine which represents one genus *Pelecanus* from Pakistan. Blanford [13] and Baker [4] reported this family as Pelecanidae. He placed this family under the order Steganopodes. This family represents one genus *Pelecanus* from Pakistan. Dement'ev and Gladkov [7], Roberts [5], Ripley [6], Howard and Moore [1], Inskipp et al. [2], Grimmett et al. [9] and Rasmussen and Anderton [10], Ali and Ripley [8] in Hand book of the Birds of India and Pakistan reported this family as Pelecanidae. He placed this family under the order Pelecaniformes. This family represents one genus *Pelecanus* from Pakistan.

Specific and subspecific taxonomy

***Pelecanus onocrotalus* (Great White or Rosy Pelican)**

Synonyms: *Pelecanus onocrotalus onocrotalus* [1,2,5-10] as done here.

Huge told from congeners by the more extensive orange or pinkish facial skin surrounding dark eye and slightly arched bill with a long hook at tip and yellow or yellow-orange pouch which extends farther back on sides of neck; lacks recurved crest [10].

***Pelecanus philippensis* (Dalmatian Pelican)**

Synonyms: *Pelecanus crispus crispus* [1,2,5-10] as done here.

Huge, with a very long straight bill. See much smaller spot-billed; from Great white by its cool-toned and rougher-looking plumage with an unkempt recurved nape-crest, and extensively feathered face with

forehead feathers meeting bill-base in broad concave bands; legs are never brightly coloured, and tail is longer and squarer [10].

***Pelecanus philippensis* (Grey or Spot-billed Pelican)**

Synonyms: Pelecanus philippensis philippensis [1,2,4-6,8-10] as done here.

Much smallest Pelican Very like larger Dalmatian but bill is shorter with a small hook, bill and pouch are mostly pale and eye appears darker than broad bare eye-ring [10].

Key to genera

The upper mandible is depressed, narrower and less flattened at the base, broader and more flattened towards the end. The lower mandible is thin. The wings are broad but not long or pointed tail short and nearly square while tarsus are compressed and reticulate.....*Pelecanus*.

This genus includes three species from Pakistan.

Key to subspecies found in Pakistan

Genus: *Pelecanus*

This genus contains three species in Pakistan.

A. Feathers of forehead terminate in a point.....*Pelecanus onocrotalus onocrotalus*.

B. Feathers of forehead end in front in a transverse concave line.

a. Gular pouch of male tangerine orange in breeding season.....*Pelecanus crispus crispus*.

b. Gular pouch of male dull purple or greenish purple in breeding plumage.....*Pelecanus philippensis philippensis*.

Discussion

Gavia stellata stellata Roberts [5] quotes are all from the year 1967 onwards and obviously so, records of this particular bird as a vagrant have been given by Rasmussen and Anderton [10], Grimmett [9], Roberts [5] and Ali and Ripley [8]. *Gavia stellata stellata* has been seen in Makran coast.

Tachybaptus ruficollis capensis Roberts [5] describing the distribution of this particular bird has mentioned that widespread in all four provinces. Restricted to lakes, flooded borrow pits and swamps with some open water, very rarely seen in main rivers, uncommonly visiting estuaries and salt water lagoons on the seacoast in winter and permanently resident on the larger perennial lakes. Occasional birds recorded in the winter months on Sonmiani lagoon, Lasbela; a few occur in tidal creeks such as Ghizri and upon the Indus delta. They breed in suitable swamps in Gilgit Baltistan in summer but migrate southwards in winter.

Podiceps cristatus cristatus status recorded as a scarce [9,5], Breeding resident [10], winter visitor [8].

Podiceps grisegena grisegena Roberts [5] quotes are all from the year 1967 onwards and obviously so, no records of this of this particular bird have been given by Murray [12], Blandford [13], Baker [4] and Ripley [6] described to be in Iran and most probably this is the same species that has been sighted a couple of times [1].

Podiceps auritus auritus has been recently included in the checklist as even Ripley's Revised Synopsis [6] sightings in 1984 and 1987. Though on these occasions, mostly single and only once two birds were observed. So, Roberts [5] considers it "rare", due to the few numbers

in which it was observed, but indicated the possibility of it being overlooked along the Makran coast.

Podiceps nigricollis nigricollis Baker [4] describing the distribution of this particular bird has mentioned that "Hume records it as uncommon off the Makran coast, Ticehurst obtained two specimens and saw another on the Manchar Lake and Meinertzhagen obtained it in Baluchistan". But surprisingly Ripley [6] has not included it in the synopsis, though later cited by Ali and Ripley's Handbook [8].

Puffinus tenuirostris tenuirostris according to Roberts [5] there is only one record of this bird in Pakistan along the coastal waters. This was collected in May 1899 when laying a submarine cable. It was shot off the coast at Ormara (Baluchistan) following three days of gale force winds. Originally it was misidentified as *Puffinus chlororhynchus* and the specimen is now in the British Museum. It is believed that this ranges widely during the Antarctic winter (Northern Hemisphere summer months) from the Sea of Japan to the southern Indian Ocean. Its status, by Roberts [5], is considered "vagrant" and very rightly so.

Puffinus lherminieri persicus Roberts [5] recorded as a resident to Balochistan [5]. A purely oceanic pelagic bird of which a population assigned to the sub-species *Puffinus persicus* Hume, 1873, Stray Feathers I: 5 is thought to breed somewhere in the Persian Gulf (At sea between Guadar and Muscat). It can be regularly sighted off the Makran coast but is much less common further east around Karachi.

Bulweria fallax fallax is considered endemic to Indian Ocean, and occurs frequently in the Gulf of Aden, Red Sea and off the southeast coast of Arabia). Roberts [5] records two sightings of this bird, one in November 1983 and the other in February 1984. He further states, 'in both these sightings, the birds were far off and could not be identified but the possibility that they were Jouanin's Petrel (*Bulweria fallax*) must be considered as this is the most likely species to occur offshore in the Arabian Sea and much more likely than the slender-billed Shearwater (*Puffinus tenuirostris*).

Oceanites oceanicus oceanicus Roberts [5] states "large numbers (of Stormpetrels) reach Pakistan coastal waters and can be sighted within few hundred meters of the shore during the monsoon season". Thus it can be ascertained that they are the regular winter visitors to our country.

Pelecanus onocrotalus onocrotalus is considered to resident and locally migratory, in well-watered tracts [8]. The whole of Oriental region, less common in western India [4].

Pelecanus philippensis philippensis In Ali and Ripley's (1980) "Handbook", its distribution is given as resident in (West) Pakistan. Likewise, in Ripley's [6] synopsis, it is described as wintering in Pakistan. Roberts [5] excludes it from the checklist considering no records. But, Howard and Moore [1] and Inskipp et al. [2] again describe its distribution as present in Pakistan.

Pelecanus crispus crispus Roberts [5] states that there appear to be ecological and other differences between these two populations as *P. philippensis* is a tree-top nester, whilst *P. crispus* nests on the ground in reed beds. The other difference being stated is the colour of the gular pouch during the breeding season. Observations of the two birds feeding together (Yalla National Park, Sri Lanka, late February) shows a striking difference in size, plumage and bill colour, even when not in breeding plumage.

References

1. Howard R, Moore A (1991) A Complete Checklist of the Birds of the World. (2nd edn.), Academic Press Ltd., pp: 5-11.

2. Inskipp T, Lindsey N, Duckworth W (1996) An annotated Checklist of the birds of Oriental region. *Oriental Bird Club*; pp: 100-109.
3. Jerdon TC (1863) *The Birds of India*. Military Orphan Press, Calcutta 3: 819-823.
4. Baker ECS (1927) *The Fauna of British India including Ceylon and Burma. Birds.* (2nd edn.), Taylor and Francis, London 4: 476-484.
5. Roberts TJ (1991) *The birds of Pakistan.* (1st edn), Oxford University Press, Oxford 1: 49-71.
6. Ripley SD (1961) *Synopsis of the birds of India and Pakistan.* (1st edn), Bombay Natural History Society; pp: 1-8.
7. Dement'ev PG, Gladkov AN (1969) *Birds of the Soviet Union.* Israel Programme for Scientific Translation, Jerusalem 2: 307-334.
8. Ali S, Ripley DS (1983) *Handbook of the birds of India and Pakistan together with those of Bangladesh, Nepal, Bhutan and Srilanka.* Oxford University Press, New York, 6: 1-8.
9. Grimmett R, Inskipp C, Inskipp T (1998) *Birds of the Indian Subcontinent.* Christopher Helm, London; pp 552-581.
10. Rasmussen CP, Anderton CJ (2005) *Birds of South Asia: The Ripley Guide, Attributes and status.* (2nd edn.), Smithsonian Institution, U.S.
11. *The Ornithology of Illinois.* Pantagraph Printing and Stationery Company, Illinois.
12. Murray JA (1890) *Avifauna of British India and its dependencies.* Trüner and Co., London 2: 707-712.
13. Blanford WT and Oates EW (1890) *The Fauna of British India including Ceylon and Burma.* Taylor and Francis, London, 2: 333-336.