

## Short Communication

### Observations on Breeding Birds of Meyghan Wetland and Adjacent Areas, Markazi Province, West-Central Iran

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#### Abstract

In the surveys conducted every two weeks, from late April to early August 2008, breeding birds of Meyghan wetland were listed in three categories: possible breeding (PsB), probable breeding (PrB) and confirmed breeding (CB). Of 125 species recorded in Meyghan wetland, breeding of 17 species was confirmed and 20 others were classified as probable or possible breeders. Six micro-habitats were identified for the breeding birds and for eight species, this was the first record of breeding at this site.

#### Introduction

Meyghan wetland (34°11'59"N, 49°50'32"E) covers an area of about 10,640 ha, located northeast of Arak in west-central Iran (Fig. 1, Sadough & Jalalvand 1999) and is known as an autumn habitat for at least 5,000 Common Crane *Grus grus* (Behrouzi-Rad *et al.* 1997). It is 1,660 m above sea level. Three main plant genera of the wetlands include *Centaurea* spp., *Astragalus* spp. and *Lepidium* spp. The density of vegetation is much more in the southwestern part of the wetland (Akhani 1989). The climate of the area is on the border of warm and cold semi-arid (based on World Köppen-Geiger climate classification) (Wikipedia 2009). Mean annual precipitation is 258 mm and maximum water depth is c. 220 cm (Sadough & Jalalvand 1999). Previous ornithological surveys of the area are limited to Paludan (1940) and Jervis Read (1964) and a recent work on the ecology of Common

Crane (Ansari *et al.* 2008). Pauldan (1940) in a 2-day survey in Meyghan recorded six breeding bird species, namely White Stork *Ciconia ciconia*, Pied Avocet *Recurvirostra avosetta*, Gull-billed Tern *Sterna nilotica*, Slender-billed Gull *Larus genei*, White Wagtail *Motacilla alba* and Carrion Crow *Corvus corone* for the area and Jervis Read (1964) believed at least two species (Great Sand Plover *Charadrius leschenaultii* and White Stork) bred in this wetland. The aim of current study was to investigate the status and population of breeding birds of the wetland.

#### Methods

Visits were carried out mostly in the southwestern part of wetland (an area of about 350 ha) and the islets in the centre of the area



Figure 1. Satellite image of Meyghan wetland.

with a maximum area of 50 ha. The main reasons for choosing these two districts as our sampling area were twofold. Firstly, the increased vegetation density due to the runoff of treated water from the Arak Wastewater Treatment Facility entering the wetland that has decreased the salinity of the soil in the southwestern part of the wetland. This has helped to create a dense cover of *Cyperus Cyperus eremicus* which may provide favorable nesting areas (no other parts of the wetland has this species or density of vegetation). The second reason for choosing the study area was the inaccessibility of other areas. Surveys were conducted every two weeks, from late April to early August 2008. Observations were carried out using 10×40 binoculars and 20×60 telescopes. Digital SLR cameras were used to document the species, nest and habitats. Breeding activities were recorded according to 16 categories of breeding evidences introduced by Hagemeyer & Blair (1997, Fig. 2). If there was more than one category for each species, we took the higher category. We walked particularly in the south-west of the wetland using line transects in one or two-person groups from the hills around the wetland towards the center, which is recognised as a dry place. "Total Count" was used as a method for estimating the number of birds. Numbers of breeding pairs given in the text were taken from nest counts or from the total number of adults sitting near nests. Results were compared with two old surveys (Paludan 1940, Jervis Read 1964).

### Results

Breeding birds of Meyghan wetland were listed in three categories; possible breeding (PsB), probable breeding (PrB) and confirmed breeding (CB). Overall, breeding of 17 species was confirmed in this wetland and 20 others were probable or possible breeders. Breeding is

**Figure 2.** Breeding evidence (after Hagemeyer & Blair 1997).

**A: Possible Breeding**

- 1 Species observed in breeding season in possible nesting habitat
- 2 Signing male(s) present (or breeding calls heard) in breeding season

**B: Probable Breeding**

- 3 Pair observed in suitable nesting habitat in breeding season
- 4 Permanent territory presumed through registration of territorial behavior (song, etc.) on at least two different days a week or more apart at same place
- 5 Courtship and display
- 6 Visiting probable nest-site
- 7 Agitated behavior or anxiety calls from adults
- 8 Brood patch on adult examined in the hand
- 9 Nest-building or excavating of nest-hole

**C: Confirmed Breeding**

- 10 Distraction-display or injury-feigning
- 11 Used nest or eggshells found (occupied or laid within period of survey)
- 12 Recently fledged young (nidicolous species) or downy young (nidifugous species)
- 13 Adults entering or leaving nest-site in circumstances indicating occupied nest or adult seen incubating
- 14 Adult carrying faecal sac or food for young
- 15 Nest containing eggs
- 16 Nest with young seen or heard

reported for the first time from this habitat for the following species: Eurasian Teal *Anas crecca*, Water Rail *Rallus aquaticus*, Armenian Gull *Larus armenicus*, Black-winged Stilt *Himantopus himantopus*, Moorhen *Gallinula chloropus*, Eurasian Coot *Fulica atra*, European Roller *Coracias garrulus*, European Bee-eater *Merops apiaster*. Six micro-habitats were recognised for breeding birds: a) Barren lands (approximately 70 ha) with medium plant density (40–50%) for landbirds including Calandra Lark *Melanocorypha calandra*, Lesser Short-toed Lark *Calandrella rufescens* and Collared Pratincole *Glareola pratincola*; b) Hills (up to 30 ha) around the wetland for Isabelline Wheatear *Oenanthe isabellina*; c) Inflow of wastewater characterised by communities of *Phragmites* sp. (max. 20 ha) for Eurasian Coot and Moorhen; d) Areas covered densely with both by *Cyperus* sp. and Gouan *Aeluropus littoralis* (max. 30 ha) for Eurasian Teal, Common Redshank *Tringa erythropus*, Yellow Wagtail *Motacilla flava*; e) Mud flats (max. 200 ha) with shallow water for Black-winged Stilt; and f) Islets (up to 50 ha) for Armenian Gull and Pied Avocet. Black-winged Stilt was identified as the most numerous breeding waterbird with at least 30 active nests and Common Starling was the most numerous land bird.

**Table 1.** Breeding bird species in Meyghan wetland in summer 2008. Key to symbols: PsB= Possible Breeding, Prb= Probable Breeding, CB= Confirmed Breeding.

Species	Category	No. of obs.: Max. No. of individuals	Remarks
Cattle Egret <i>Bubulcus ibis</i>	PsB: A 1	5:36 (17 July)	Some birds were in breeding plumage.
Greater Flamingo <i>Phoenicopterus ruber</i>	PsB: A 1	7: 400 (4 July) & 1050 (23 May)	They also were present in area from late February. They may also been non-breeders in the wetland (A. Adhami, pers. comm.).
Glossy Ibis <i>Plegadis falcinellus</i>	PsB: A 1	6:35 (17 July)	Regularly recorded in each month in the breeding period
Mallard <i>Anas platyrhynchos</i>	PsB: A 1	5:400 (4 July)	Occurs almost in all months in the area although their population fluctuates between seasons. Breeding from April to mid-July.
Eurasian Teal <i>Anas crecca</i>	CB: C12	1: +90 (4 July)	One female with a juvenile on 4 July
Common Quail <i>Coturnix coturnix</i>	PsB: A 2	5:1	Heard only in surrounding farmlands. Hunters capture this species in other areas in Markazi Province.
Common Crane <i>Grus grus</i>	PsB: A 1	One pair (from late April to August)	They may also be non-breeders or birds which could not continue migration with other Cranes.
Water Rail <i>Rallus aquaticus</i>	CB: C12	One pair	This species seems to occur in the wetland throughout the year except in very cold months.
Moorhen <i>Gallinula chloropus</i>	CB: C12	One pair	On 4 July, one adult trying to help the juvenile to hide among <i>Typha</i> sp.
Eurasian Coot <i>Fulica atra</i>	CB: C12	One pair	This species has a similar breeding habitat type to that of Moorhen. The first juvenile were seen on 4 July. 4 chicks were seen.
Collared Pratincole <i>Glareola pratincola</i>	PrB: B6	7: 30 (17 July)	From May to early September. A nest that was examined may belong to this species. It was a simple nest in a shallow depression in the mud near a plant and 1 egg seen in it. A Collard Pratincole was observed sitting near this nest.
Black-winged Stilt <i>Himantopus himantopus</i>	CB: C15	-: 1000 (4 July)	The most abundant breeding species of Meyghan wetland from late March to August. At least 30 nests were found (mostly with 4 eggs)
Pied Avocet <i>Recurvirostra avosetta</i>	CB: C15	-: 80 (4 June)	16 active nests with 10 non-active ones (The non -active nest was identified from the similar structure to those active nests).
Little Ringed Plover <i>Charadrius dubius</i>	PsB: A 1	4: 5	From late March to early June.
White-tailed Plover <i>Vanellus leucurus</i>	PrB: B7	5: 20 (9 May)	From May to July and in early September.
Lapwing <i>Vanellus vanellus</i>	PsB: A 1	8:50 (17 July)	Occurs throughout the year except in frozen conditions from late Dec to January.
Redshank <i>Tringa erythropus</i>	PrB: B7	6:25 (17 July)	From May to July but still sighted until late August. During one visit, Redshanks circled around us and on 20 June one flew directly towards one of the observers and returned. It repeated this aggressive action several times for c. 5 min until the observer moved away. This agitated behavior in the breeding period almost certainly indicates breeding.
Armenian Gull <i>Larus armenicus</i>	CB: C16	-: 60 (52 chicks or young on 20 June)	The only <i>Larus</i> genus which breeds in this area. A colony of at least 60 adults seen in the three islets (a southern islet had the maximum number of nests).
Gull-billed Tern <i>Sterna nilotica</i>	PrB: B7	8: 70 (4 July)	From late April to mid August. This species is not so abundant in comparison with the two other Terns (White-winged Black Tern and Whiskered Tern) in Meyghan.
Whiskered Tern <i>Chlidonias hybrida</i>	PsB: A 1	8: 100	From early May to at least mid July. Several Whiskered Terns gather in both the southern part of the area and on nearby islands in flocks with other terns namely White-winged Black Tern and Gull-billed Tern.
White-winged Black Tern <i>Chlidonias leucopterus</i>	PsB: A 1	7:100	They arrived late April and departed mid August in the study year.
Rock Dove <i>Columba livia</i>	PsB: A 1	3: 10	Resident throughout the year.
Common Swift <i>Apus apus</i>	PsB: A 1	4: No count	From late April to early June. Swifts were seen in several numbers both in the wetland and the adjacent village (Teremezdz).
European Roller <i>Coracias garrulus</i>	CB: C14	7:2	In breeding periods, rarely seen near the wetland and mostly in adjacent villages and orchards but very abundant after young had fledged
European Bee-eater <i>Merops apiaster</i>	CB: C14	8:10	Very common in villages near Meyghan wetland. We could not find any nests or nest sites.
Calandra Lark <i>Melanocorypha calandra</i>	PsB: A 1	4:10	Like other Passeriformes, this species is not common. They were seen mostly in barren grounds close to the wetland edges.
Lesser short-toed Lark <i>Calandrella rufescens</i>	CB: C14	6: 7	A resident species near Meyghan wetland and observed in different months. Three observations were in this particular survey.

Species	Category	No. of obs.: Max. No. of individuals	Remarks
Crested Lark <i>Galerida cristata</i>	PrB: B3	6: 8	From late April to early July. Crested Lark is a resident species near the wetland. Observation in suitable breeding areas does not confirm breeding.
Barn Swallow <i>Hirundo rustica</i>	CB: C12	6:50	Like <i>Apus apus</i> , Swallows mainly seen near the wetland but were thought to be nesting in villages, namely Mobarak-Abad and Teremezd
Yellow Wagtail <i>Motacilla flava</i>	CB: C14	9:20	Very common in the vegetation around the edge of the wetland, apparently race <i>feldegg</i> .
Isabelline Wheatear <i>Oenanthe isabellina</i>	CB: C13	10:5	This species breeds in holes on hills near the wetland - the nests are near holes of Persian Jird <i>Meriones persicus</i> which is abundant in this place
Great Reed Warbler <i>Acrocephalus arundinaceus</i>	PsB: A2	4: 5 (captured by mist-net on 23 May)	The loud and powerful sound is unmistakable. No attempts were conducted to find possible nests.
Corn Bunting <i>Miliaria calandra</i>	CB: C12	4:3	Seems to be a resident species but seen in small numbers only in the breeding season. There are some records in autumn.
House Sparrow <i>Passer domesticus</i>	CB: C12	6:+10	A resident species in adjacent villages of Meyghan. Seen on almost every visit in the breeding season and other months.
Common Starling <i>Sturnus vulgaris</i>	CB: C12	~:50 (23 May)	A resident species and one of the earliest breeders of area. Recent fledglings (max 50) first seen on 23 May.
Eurasian Magpie <i>Pica pica</i>	CB: C12	8:3	First seen nest-building in late February, most probably due to temperate weather in this month. Subadult individuals seen on 17 July.
Rook <i>Corvus frugilegus</i>	PsB: A 1	4:25 (20 June)	Rook is resident in the area. Fewer birds were counted in summer compared to winter.

### Discussion

In Meyghan wetland 125 species (Appendix I) were observed in various seasons (Tohidifar 2009) of which 37 species were listed as confirmed, probable or possible breeders (Table 1). In the current work we could not find breeding activities of White Stork, Great Sand Plover or Slender-billed Gull (just one juvenile seen on 3 June) although they bred in the past (Paludan 1940, Read 1956). The research shows breeding of some species such as Armenian Gull, Black-winged Stilt, Eurasian Teal, Water Rail, Moorhen, Eurasian Coot (and possibly Whiskered Tern) in this area whereas their breeding was not reported previously in Meyghan (Paludan 1940, Jervis Read 1956, Scott 2007). Gull-billed Tern which commonly bred in the 1940s, seems to be just a probable breeder in the area and we could not confirm its breeding. Destruction of islets for extracting/utilising Sodium Sulphate in addition to livestock grazing are the two important threats which decrease the quality of this habitat for many species. Hunting is another threat for waterbirds in the winter. For Armenian Gull, this is the second known breeding habitat in Iran and is a long distance from its previous known breeding colony in Lake Orumiyeh (Tohidifar *et al.* 2009). In the 1970s, there was no confirmed breeding record of Eurasian Teal in Iran (Scott 2007) and the species remains as a possible breeder in recent years (Scott & Adhami 2006) but this study shows the first confirmed breeding record of the species for the

country. Six recognized microhabitats show us that diversity in features of each microhabitat affected the breeding populations. The main cause for diversity of these breeders depends on the existence of such habitats. Colonial breeders and nests in open bare parts (*e.g.* Black-winged Stilt) including microhabitats e) and f) (see above), were more sensitive to human impacts.

### Conservation priorities

During our field observations the presence of livestock and dogs during the breeding season was a disturbance to the waterbirds. At the same time, water level fluctuations and the drought were other threatening factors to the breeding waterbirds at Meyghan wetland. As mentioned by Sutherland *et al.* (2004), the breeding season presents a period of intense activity and sensitivity to disturbance for most bird species and their nests, eggs, chicks, and adults at the nest are vulnerable to predators. So if we decide to conserve an area, its importance for breeding is one of the high priority criteria.

Regarding the newly declared "Non-hunting Area" (*c.* 30,000 ha) on 6 November 2008 by the Department of the Environment (DOE), Meyghan wetland is possibly a very sensitive area and vulnerable to man-made threats. Ansari *et al.* (2008) previously recommended that hunting should be more controlled in this area. The extensive extracting of Sodium Sulphate (mining) devastated the whole habitat and it is possible that other islet-related breeding species will not breed here any more if

current disappearance of islets continues. No plan was conducted by Markazi Provincial Office of the DOE (Department of the Environment) for preventing mining. Disturbances of dogs to the breeding birds were seen several times during the period of this study and destruction of landbird nests was sighted. Meyghan has a unique ecosystem and eutrofication mostly caused by discharge from water treatment facilities. Sewage from pollutant industries also enters the wetland. The conservation measures in place to protect the area must be enforced and eco-tourists encouraged to visit the wetland as a bird-watching area in central Iran (Ansari *et al.* 2008, Tohidifar 2009). This would help long-term conservation of this valuable wetland.

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**Appendix I.** Check-list of Birds of Meyghan wetland, Markazi Province, Iran (M. Tohidifar pers. obs. from October 2007 to late December 2008). P: Passage migrant, R: resident, r: rare resident, W: winter visitor, B: breeding, b: may breed, Su: summer visitors.

Species	Statu	Species	Statu	Species	Statu
	s		s		s
Great crested Grebe <i>Podiceps cristatus</i>	P	Common Crane <i>Grus grus</i>	P-W	Roller <i>Coracias garrulus</i>	B
Black-necked Grebe <i>P. nigricollis</i>	P	Water Rail <i>Rallus aquaticus</i>	R	Hoopoe <i>Upupa epops</i>	B
White Pelican <i>Pelecanus onocrotalus</i>	P	Moorhen <i>Gallinula chloropus</i>	R	Calandra Lark <i>Melanocorypha calandra</i>	B
Great Cormorant <i>Phalacrocorax carbo</i>	P	Eurasian Coot <i>Fulica atra</i>	R	Bimaculated Lark <i>M. bimaculata</i>	P
Gray Heron <i>Ardea cinerea</i>	P	Black-winged Stilt <i>Himantopus himantopus</i>	B	Short-toed Lark <i>Calandrella brachydactyla</i>	P
Purple Heron <i>A. purpurea</i>	P	Pied Avocet <i>Recurvirostra avosetta</i>	B	Lesser Short-toed Lark <i>C. rufescens</i>	R
Squacco Heron <i>Ardeola ralloides</i>	P	Collared Pratincole <i>Glareola pratincola</i>	B	Crested Lark <i>Galerida cristata</i>	R
Great White Egret <i>Casmerodius albus</i>	P	Ringed Plover <i>Charadrius hiaticula</i>	P	Skylark <i>Alauda arvensis</i>	P
Little Egret <i>Egretta garzetta</i>	P	Little Ringed Plover <i>C. dubius</i>	B	Barn Swallow <i>Hirundo rustica</i>	B
Cattle Egret <i>Bubulcus ibis</i>	b	Kentish Plover <i>C. alexandrinus</i>	P	White Wagtail <i>Motacilla alba</i>	P
Little Bittern <i>Ixobrychus minutus</i>	Su	Caspian Plover <i>C. asiaticus</i>	P	Citrine Wagtail <i>M. citrinella</i>	P
Bittern <i>Botaurus stellaris</i>	P	Lapwing <i>Vanellus vanellus</i>	B	Yellow Wagtail <i>M. flava</i>	B
White Stork <i>Ciconia ciconia</i>	P	Sociable Lapwing <i>V. gregarius</i>	P	Grey Wagtail <i>M. cinerea</i>	P
Glossy Ibis <i>Plegadis falcinellus</i>	B	White-tailed Lapwing <i>V. leucurus</i>	B	Meadow Pipit <i>Anthus pratensis</i>	P
Spoonbill <i>Platalea leucorodia</i>	P	Common Snipe <i>Gallinago gallinago</i>	P	Water Pipit <i>A. spinoletta</i>	R
Greater Flamingo <i>Phoenicopterus ruber</i>	b	Black-tailed Godwit <i>Limosa limosa</i>	P	Red-backed Shrike <i>Lanius collurio</i>	P
Graylag Goose <i>Anser anser</i>	P	Spotted Redshank <i>Tringa erythropus</i>	P	Isabelline Shrike <i>L. isabellinus</i>	P
Ruddy Shelduck <i>Tadorna ferruginea</i>	P-W	Redshank <i>T. erythropus</i>	B	Great Grey Shrike <i>L. excubitor</i>	P
Shelduck <i>T. tadorna</i>	P	Marsh Sandpiper <i>T. stagnatilis</i>	P	Bluethroat <i>Luscinia svecica</i>	P
Teal <i>Anas crecca</i>	B-W	Green Sandpiper <i>T. ochropus</i>	P	White-throated Robin <i>Irania gutturalis</i>	P
Mallard <i>A. platyrhynchos</i>	W-b	Wood Sandpiper <i>T. glareola</i>	P	Common Stonechat <i>Saxicola torquata</i>	P
Pintail <i>A. acuta</i>	P	Common Sandpiper <i>Actitis hypoleucos</i>	P	Finsch's Wheatear <i>Oenanthe finschii</i>	P
Garganey <i>A. querquedula</i>	P	Dunlin <i>C. alpina</i>	P	Desert Wheatear <i>O. deserti</i>	P
Shoveler <i>A. clypeata</i>	W	Curlew Sandpiper <i>C. ferruginea</i>	P	Isabelline Wheatear <i>O. isabellina</i>	B
Red-crested Pochard <i>Netta rufina</i>	P	Ruff <i>Philomachus pugnax</i>	P	Scrub Warbler <i>Scotocerca inquieta</i>	P
Common Pochard <i>Aythya ferina</i>	P	Red-necked Phalarope <i>Phalaropus lobatus</i>	P	Mustached Warbler <i>Acrocephalus melanopogon</i>	P
Tufted Duck <i>A. fuligula</i>	P	Armenian Gull <i>Larus armenicus</i>	B	Sedge Warbler <i>A. schoenobaenus</i>	P
White-tailed Eagle <i>Haliaeetus albicilla</i>	P	Black-headed Gull <i>L. ridibundus</i>	P	Great Reed Warbler <i>A. arundinaceus</i>	B
Marsh Harrier <i>Circus aeruginosus</i>	W	Lesser Black-backed Gull <i>L. fuscus</i>	P	Willow Warbler <i>Phylloscopus trochilus</i>	P
Hen Harrier <i>C. cyaneus</i>	W	Slender-billed Gull <i>L. genei</i>	P	Whitethroat <i>Sylvia communis</i>	P
Pallid Harrier <i>C. macrourus</i>	P	Gull-billed Tern <i>Sterna nilotica</i>	B	Spotted Flycatcher <i>Muscicapa striata</i>	P
Common Buzzard <i>Buteo buteo</i>	P	Whiskered Tern <i>Chlidonias hybrid</i>	B	Black-headed Bunting <i>Emberiza melanocephala</i>	B
Long-legged Buzzard <i>B. rufinus</i>	R	White-winged Black Tern <i>C. leucopterus</i>	B	Reed Bunting <i>E. schoeniclus</i>	W
Greater spotted Eagle <i>Aquila clanga</i>	P	Black Tern <i>C. niger</i>	P	Corn Bunting <i>Miliaria calandra</i>	R
Steppe Eagle <i>A. nipalensis</i>	P	Black-bellied Sandgrouse <i>Pterocles orientalis</i>	R	Desert Finch <i>Rhodospiza obsoletus</i>	P
Imperial Eagle <i>A. heliaca</i>	P	Rock Dove <i>Columba livia</i>	R	House Sparrow <i>Passer domesticus</i>	R
Golden Eagle <i>A. chrysaetos</i>	W	Turtle Dove <i>Streptopelia turtur</i>	P	Spanish Sparrow <i>P. hispaniolensis</i>	P
Common Kestrel <i>Falco tinnunculus</i>	R	Laughing Dove <i>S. senegalensis</i>	R	Common Starling <i>Sturnus vulgaris</i>	R
Hobby <i>F. subbuteo</i>	P	Little Owl <i>Athene noctua</i>	R	Eurasian Magpie <i>Pica pica</i>	R
Saker Falcon <i>F. cherrug</i>	P	Common Swift <i>Apus apus</i>	B	Rook <i>Corvus frugilegus</i>	R
Peregrine <i>F. peregrinus</i>	P	Blue-cheeked Bee eater <i>Merops persicus</i>	P	Hooded Crow <i>C. corone</i>	R
Common Quail <i>Coturnix coturnix</i>	B	Eurasian Bee-eater <i>M. apiaster</i>	B		