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**THE POPULATION ESTIMATE OF PHEASANT TAILED JACANA,  
*HYDROPHASIANUS CHIRURGUS* IN WETLANDS OF PAKISTAN**

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**ABSTRACT**

Pheasant Tailed Jacana, *Hydrophasianus chirurgus*, is the only beautiful bird maintaining its presence in the abandoned wetlands of Punjab during the summer season. The population distribution appears, between 298 and 347, which was highest (83-96) at Marala and lowest (21-57) at Balloki, with density found to be highest (3/km<sup>2</sup>) and lowest (0.3/ km<sup>2</sup>), respectively. Being a migratory bird, March was observed as the start of arrival, and October was observed as completion of departure from the study areas.

**Keywords:** Pheasant Tailed Jacana, *Hydrophasianus chirurgus*, wetlands of Pakistan.

**INTRODUCTION**

*Hydrophasianus chirurgus*, also known as the Lotus Bird or Lily Trotter, is endemic to the South Asia, with its range of distribution extending from Pakistan, north Kashmir, India, Nepal, Sri Lanka, Burma to the mainland China through Myanmar, Taiwan, Java and Philippines (Baker *et al.*, 1929; Austin, 1962). The species has a wide distribution in a large body of the Indus

valley in Pakistan (Hassan, 2001), where it is especially frequent in swamps of the Nara area, Hadero Lake and Ghouspur and the rice growing areas of the Sindh, i.e., Hyderabad, Larkana and Thatta, and the Punjab, i.e., Sheikhpura, Gujranwala and Sialkot. The scattered individuals have, however, been spotted up to an altitude of some 2300 m above sea line in Murree Hills, Rawal Lake (Khan and Mughal, 2014,

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Yousaf and Manzoor, 2014), Azad Kashmir, Besham, Kohistan, Gilgit and Panji in the northwest and Bund Khushdil Khan in southwest (Balochistan). This jacana species has a resident status in the Sindh but is a regular summer visitor in the Punjab (Roberts, 1991; Mirza, 2007). This jacana species appears in good numbers in the water bodies created by barraging the rivers and impoundments associated with the head-works and barrages, including, Qadirabad, Marala, Sulemanki, Balloki, Rasool, Taunsa and Chasma, appearing along the rivers Satluj, Ravi and Chenab, along with small dams appearing at smaller rivers or hill torrents. The objective of study was the population dynamics of Jacana in different localities during different seasons.

#### **MATERIAL AND METHODS**

The four selected localities have the major population of the Pheasant-tailed Jacana, i.e., Head Marala, Head Qaderabad,

Head Balloki, and Head Sulemanki. They were visited on approximately the same dates of the different calendar months between April 2004 and March 2007. The favourable jacana habitat patches at each locality were divided into four study sites. A prominent place at each of the study sites was selected, from where the total habitat was visible and was used for the total count of the Pheasant-tailed Jacana, present at the individual site, using binoculars (8×40 mm) and spotting scope (15-60×60 mm). Care was taken to avoid double counts. Each of the birds sighted and recorded was separately counted as adult male or female or juvenile. The area under the favourable Pheasant-tailed Jacana habitat at each of the sampling sites was calculated using GPS positioning (MAGELLAN SporTrak CQlor) supported by GIS (ArcView GIS 3.3).

The census counts of the population were regarded as the population of the species exploiting the habitat at some

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specific time. For deriving the comparative population parameters of each site the population density of the bird population was calculated by dividing the population size with the estimated habitat area of each site and for each locality. The sex ratio (female to male ratio) was calculated by dividing the number of the adult females by the adult males. The adult to juvenile ratio was calculated by dividing the number of juveniles by the number of the adults, males, and females. The population data collected from different sites was pooled to derive different population parameters for different localities or the total population.

## RESULTS

### Distribution and Estimates

The data collected on the population of the adult Pheasant-tailed Jacana present in four localities of the Punjab is given in Table 1. Relatively higher numbers of the birds at Marala (83 - 96), Qadirabad (95 – 106) and Sulemanki (88 - 89) were present

compared to those present at Balloki (21 – 57). The number of the birds present at individual ponds of the different localities also exhibited variation. The density of the bird population was very high at Marala, where it ranged between 14.4 and 16.7 birds/ km<sup>2</sup>, as compared with other three localities, i.e., Sulemanki (3.0 -3.1 birds/ km<sup>2</sup>, Qadirabad (2.0 – 2.3 birds/ km<sup>2</sup>, and Balloki (0.3 -0.8 birds/ km<sup>2</sup>). The density figures, however, fluctuated between very high values of 40.0 birds/ km<sup>2</sup> in a pond in Marala to very low values of 0.1 birds/ km<sup>2</sup> at one of ponds of Balloki.

### Population Fluctuation

The collected data for three consecutive years, suggest that the population of this species was different in different years, with a relatively lower population during 2005 (298), followed by that during 2004 (323) and a higher population during 2006 (347).

**Table 1: Population density of Pheasant-tailed Jacana in different water bodies during 2004-06.**

Sampling Site	Area (km <sup>2</sup> )	2004		2005		2006		$\chi^2$
		No.	Density (per km)	No.	Density (per km)	No.	Density (per km)	
<b>Head Marala</b>	<b>5.75</b>	<b>92</b>	<b>16.0</b>	<b>83</b>	<b>14.4</b>	<b>96</b>	<b>16.7</b>	
zone 1	0.8	32	40.0	32	40.0	33	41.3	0.02
zone 2	3.51	21	6.0	23	6.6	23	6.6	0.12
zone 3	0.69	17	24.6	17	24.6	18	26.1	0.04
zone 4	0.75	22	29.3	21	28.0	22	29.3	0.03
<b>Head Qadirabad</b>	<b>46.9</b>	<b>95</b>	<b>2.0</b>	<b>106</b>	<b>2.3</b>	<b>105</b>	<b>2.2</b>	
zone 1	6.9	34	4.9	32	4.6	34	4.9	0.08
zone 2	19.6	26	1.3	28	1.4	28	1.4	0.10
zone 3	7.5	17	2.3	24	3.2	21	2.8	1.19
zone 4	12.9	18	1.4	22	1.7	22	1.7	0.52
<b>Head Balloki</b>	<b>68.09</b>	<b>48</b>	<b>0.7</b>	<b>21</b>	<b>0.3</b>	<b>57</b>	<b>0.8</b>	
zone 1	8.32	26	3.1	8	1.0	26	3.1	10.80
zone 2	13.57	7	0.5	5	0.4	7	0.5	0.42
zone 3	28	8	0.3	4	0.1	12	0.4	4.00
zone 4	19	7	0.4	4	0.2	12	0.6	4.26
<b>Head Sulemanki</b>	<b>28.95</b>	<b>88</b>	<b>3.0</b>	<b>88</b>	<b>3.0</b>	<b>89</b>	<b>3.1</b>	
zone 1	1.93	20	10.4	20	10.4	21	10.9	0.03
zone 2	12.84	28	2.2	28	2.2	27	2.1	0.02
zone 3	0.86	22	25.6	22	25.6	22	25.6	0.00
zone 4	13.32	18	1.4	18	1.4	19	1.4	0.04
<b>Total</b>	<b>150.5</b>	<b>323.0</b>	<b>2.1</b>	<b>308.0</b>	<b>143.5</b>	<b>347.0</b>	<b>2.4</b>	
<b>Pooled Chi square:</b>		21.49						
<b>Total Chi square:</b>		2.37						
<b>Heterogeneity Chi square:</b>		19.12						

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However, the difference between the years was not significant (chi-square, DF = 2, 3.72103, not significant at 0.05 level). The trend of a non significant difference between the years was exhibited by the individual populations of localities and the sampling zones, as exhibited by the values of the individual and the heterogeneity chi-square (Table 1).

### **Seasonal Fluctuation**

Table 2 presents the data on the number of the birds of this species at different localities during different parts of the year. The table suggests that there was no population of this species on any of the locality under present study between November and March. The appreciable population suddenly appeared between the March and April census and suddenly disappeared between October and November census from all the localities.

The population of this bird species exhibited a reasonably consistent pattern of

population fluctuation between different summer months (Figure 1). The April population exhibited a gradual rise between April and June, with a decline occurring between July and August, while population showed a sudden rise during September, which was followed by a decline during October. There have been some departures from this basic trend at isolated occasions, no September rise in the population of Balloki during 2004 and 2006, and a very prominent rise of the September population of Marala and Qadirabad during 2005.

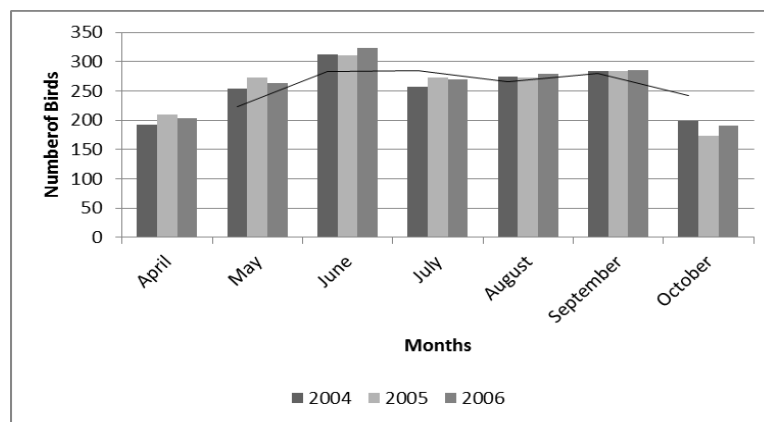
### **DISCUSSION**

The Pheasant-tailed Jacana is known to be associated with the relatively shallow water bodies having a good growth of the rooted plants with surface floating vegetative parts (Roberts, 1991). The bird species has been reported from the flooded fields with rice cultivation (Mirza, 2007; Khan and Mughal, 2014). With the development of the barrages and dams, the

**Table 2: Seasonal variation of Pheasant-tailed Jacana population during 2004-06 at four different locations.**

Months	2004					2005					2006				
	M	Q	B	S	Total	M	Q	B	S	Total	M	Q	B	S	Total
<b>April</b>	53	60	25	54	192	63	62	30	54	209	58	63	28	54	203
<b>May</b>	72	78	37	67	254	78	86	42	67	273	75	82	40	67	264
<b>June</b>	92	85	48	88	313	95	106	21	88	310	97	103	35	88	323
<b>July</b>	68	77	38	74	257	87	88	24	74	273	80	84	31	74	269
<b>August</b>	78	83	30	84	275	87	84	18	84	273	84	86	25	84	279
<b>September</b>	85	85	31	83	284	86	89	26	83	284	87	89	27	83	286
<b>October</b>	56	52	34	57	199	53	46	25	49	173	57	55	24	55	191

**M is for Marala, Qis for Qadirabad, B is for Balloki and S is for Sulemanki.**



**Figure 1: The population trend of Pheasant-tailed Jacana during different months of 2004-06. The population of bird is highest in June**



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man-made lakes have been created and the flood plains have been constructed. Under the circumstances, the major population of the waders and water birds has shifted to such lakes. A limited part of the total water body has the habitat which can support the jacana populations. The initial reconnaissance of the potential water bodies suggested that the major part of the population of the Pheasant-tailed Jacana was present on the ponds associated with the Marala, Qadirabad, Balloki and Sulemanki head-works. The lakes associated with the more westward located head-works/barrages did not support an appreciable population of this species, which probably did not exceed 50. The major part of the present study was thus concentrated on ponds appearing on these four water bodies. This is partly supported from the report of Azam *et al.* (2008) suggesting the spotting of 4 birds of this species at Chasma Barrage, while no bird could be spotted at Shahpur Dame,

Jinnah Barrage, Nammal Lake, Jhalar Lake, Uchali Lake and Kallar Kahar Lake, located in the western parts of the Punjab (Pakistan).

The present study suggested that a population of 300 – 400 individuals regularly summer in different water bodies, with some degree of variation between the years. No previous estimates are available on the population of this jacana species summering in Punjab or Pakistan. Casual distribution notes have, however, appeared at different times suggesting a wide distribution of the birds of this species over a range in the Indian subcontinent (Baker *et al.*, 1929; Oliver and Austin, 1962; Grizmek and Woodcock, 1980; Rao, 1981; Roberts, 1991; Husan, 2001, Lal, 2004, Mirza, 2007). The present is the first report directly attempting a population study on the summering population of this species in Punjab. The population census on the water birds carried out in winter suggested a

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population of 32 (1977), 0 (1998), 452 (1999), 477 (2000), 410 (2001), 334 (2002), 76 (2003 and 4 (2004) (Li and Mundkar, 2004, 2007). The population of this bird species has been reported to remain below 100 in Taiwan (Humititrou and Tateisi, 1940). Similar low populations (41 – 62 individuals) of the Bronze-winged Jacana (*Metopidius indicus*) (41-62) at Vembanur Lake (Butchart *et al.*, 1998). The jacana, as a group, requires very specific habitat, therefore the favourable habitat patches for the species are limited, and hence very large populations are not expected for some areas.

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