

FOOD OF PHEASANT TAILED JACANA, *HYDROPHASIANUS CHIRURGUS*, IN PUNJAB, PAKISTAN

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ABSTRACT

The study was designed to collect information on food and feeding preferences of Pheasant Tailed Jacana, *Hydrophasianus chirurgus*, in its summering grounds of the Punjab, Pakistan. Studies were recorded to find their optimal range in the favor of this species. In the phytosociological studies of the habitat distribution and frequency of rooted vegetation species were recorded to understand their association with the species, which shows 31 species distributed in 4 vegetation types with in the habitats that were lies in study areas, the studies on biology of this bird were focused on food and feeding, food consumption which revealed that 56.3% of its food was consist of plant matter and 27.3% on animal matter.

Key words: Pheasant Tailed Jacana, Food, Punjab, Pakistan

INTRODUCTION

Pheasant Tailed Jacana (*Hydrophasianus chirurgus*) has adapted very specific habitat conditions, i.e. slow moving or almost stagnant, permanent freshwater bodies, shallow enough to hold rooted aquatic vegetation having floating broad leaves. The shallow wetlands, adapted as habitat by the Pheasant-tailed Jacana, are generally extremely productive, and constitute areas with a rich source of food for man, his livestock and also for breeding, wintering, and migrating birds.

Pheasant Tailed Jacana prefers insects, larvae, spawns of mollusks and amphibians. They also like to eat freshwater snails, small bivalves, mollusks, while some portion of their diet consists of seeds and succulents parts of water plants. Lal (2004) studied that the preferred method of foraging was slow movement across floating water weeds, from where they picked the insects, larvae, spawns of mollusks, amphibians and fed largely upon freshwater snails. Jenni (1974) studied the feeding habits of Jacana and found that they feed on insects from the surface of vegetation but usually feed on ovule of water lilies. The present study attempts to describe the food and feeding preferences of Pheasant-tailed Jacana in its summering grounds of the Punjab, Pakistan.

MATERIALS AND METHODS

The Punjab (27.56 –34.00°N, 69.36 – 75.22°E) in the north-eastern province of Pakistan spreads over area 205,344 km². The eastern boundaries of the province touches India, while Kashmir falls in the north, Khyber Pukhtunkhwa (KPK) and Balochistan in the west and Sindh touches southern boundaries of the province. The western extremities of the Himalayas penetrate the north

western limits of the province, while rest of the province is occupied by the Indus Plains, which represents a gradual natural north-south slope.

A total of 43 stomachs, along with their contents, of Pheasant-tailed Jacana were obtained from the birds freshly killed by gun shooting from four localities of the Punjab (Pakistan) between 2004 and 2007. Each stomach was opened in the field and its contents were flushed with distilled water and placed in a Petri dish. The identifiable parts of stomach content were visually separated and identified by comparing these with the identified samples collected from the area. The animal parts were directly identified up to the lowest possible taxonomic level by using available identification keys (algae: Bold and Wynne, 1987; animals: Tonapi: 1980; Huet 1986; Mellieby, 1986; Willoughby, 1976). The number of pieces of different food species were counted and expressed as relative proportion of the total content.

$$\text{Relative frequency (\%)} = \frac{\text{Total number of fragments of specie}}{\text{Total number of fragments analyzed}} \times 100$$

Means and standard errors of mean (SEM) of different food items were calculated by using normal statistical methods (Mather, 1964, Sokal and Rohlf, 1969). Constancy of appearance of each food item was determined using plant ecology techniques (Mueller and Ellenberg, 1974).

$$\text{Frequency (\%)} = \frac{\text{Number of samples showing species}}{\text{Total number of sampling point}} \times 100$$

Birds were observed in the field for a period of 60 seconds, during different field tours, while picking up the food and recorded as field notes. During this period the number of the total feeding attempts and the successful ones were recorded directly as observed in the field. The successful attempts finally terminating in the final engulf of the food picked was also recorded through

field observations and engulf rate was calculated by dividing the successful engulfs by the total successful picks. The distance traveled for feeding from the nest was recorded as the best possible approximation.

RESULTS

Table 1 summarizes the feeding preferences of Pheasant tailed Jacanas on the basis of their stomach contents.

Biotic Factors

Planktons

Algae: The algal biota has been represented by four families, i.e. Chlorophyta, Cyanophyta, Bacillariophyta and Euglenophyta. Marala was especially rich in the algal biota, where members of all the four families appeared in significantly high numbers as compared with the other localities. The count at all the other localities remained at significantly lower level (<200000) showing very minor fluctuations. At Marala there was a very prominent summer bloom of all the algal groups, rising very steeply between April and May and a decline in winters beyond December.

Protozoa: The mixed population of the protozoans maintained a count of 500 and 1500. During different parts of the year, with very minor fluctuations. The population of the protozoa at all locations increased between April and June, which gradually dropped down in July. The level of population was maintained for rest of the year, with a bloom appearing at Qadirabad in January-February and a higher population at Balloki during April. The protozoan populations were relatively lower at Marala, while population levels of other three localities were not different.

Rotifers: The population of Rotifers was significantly higher at Qadirabad and Sulemanki (which were not significantly different from one another at 0.05 level), followed by Balloki. Populations at Marala remained at the lowest level in all the seasonal samples. The population of the group was generally higher during April – June periods at all the localities, with a decline in the subsequent months, till January when the population levels showing rise.

Cladocerans: The population levels of cladocerans remained low at Marala (500 – 1,000), while medium population levels were recorded for Balloki (1,000 – 1,500), except for May when it showed a sharp increase 4,500, while relatively higher levels of populations was exhibited at Qadirabad and Balloki (1,500 – 2100). The cladoceran population exhibited some degree of seasonal fluctuation, generally a higher population was present during January – May (June) and lower population levels in the July – December period. Such a pattern appeared at all the localities under present analysis with some degree of variation.

Copepods: The copepod populations at the different sites exhibited a similar pattern of fluctuations, with higher between January / February and June, followed by lower populations in the later half of the year. The population levels were significantly ($p < 0.05$) at Marala, while higher populations were exhibited at other three study sites, which were not significantly different from one another.

Table 2- 9 represent the phytoplankton and zooplankton composition of the four studied lakes.

Rooted Vegetation: A total of 32 species of rooted plant species have been identified from the four water bodies, holding appreciable populations of the Pheasant-tailed Jacana. These species are distributed at different depth of water or in the immediate vicinity of such water bodies. Each pond had a different composition of vegetation composition, depending upon its physico-biotic conditions (Table 10). The species having floating were represented by four species, i.e., *Nelumbo micifera*, *N. alba*, *Nymphaea lotus* and *Trapa bispinosa*, which were associated with five other species, i.e., *Eichhornia crasipes*, *Hydrilla verticillata*, *Vallisneria spiralis*, *Psittia stratiotes* and *Chara* sp., which provided a thick floating mat in the water. Every pond had one or more of these species, appearing in different combinations. The species, like, *Arundo donax*, *Typha augustata*, *Panicum paludosum* and *Phragmites karka* were present in shallow waters in the peripheral area of different ponds in high constancies. All the other species were present in the areas surrounding the ponds, yet were associated with the water bodies.

Table 1. Feeding preference of Pheasant-tailed Jacana population summering in different lakes of Punjab Pakistan during 2004-2007

Food Species	Food		Availability (%)	Preference index (contents/ availability)
	Stomach contents (%)	Direct Sighting		
Animal Matter	39.8		27.3	1.49
<i>Chaoborus</i> sp. (larvae)	12.6	-	3.2	3.93
Carpenter ant	9.3	+	10.2	0.91
Mollusks	5.4	+	9.3	0.58
<i>Donacia piscatrix</i>	4.8	-	4.6	1.04
Unidentified animal matter	7.7			
Plant Matter	41.0		56.3	0.73
Seeds	7.9	-	12.4	0.63
Blades of marsh grass	4.7	-	9.3	0.51
Anthers	3.6	+	9.7	0.37
Algae	2.9	-	6.2	0.46
Unidentified plant matter	21.9	-	18.7	
Unidentified	19.2	-	-	-

+ Presence, - Absent

Table 2. Mean zooplankton population during April 2003 to March 2007 at site 1 (Head Marala)

Months 2004-2007	Protozoans (Mean $\pm$ S.E.)	Rotifers (Mean $\pm$ S.E.)	Cladocerans (Mean $\pm$ S.E.)	Copepods (Mean $\pm$ S.E.)
April	850.4 $\pm$ 65.0	793.7 $\pm$ 195.0	1079.2 $\pm$ 138.9	1072.9 $\pm$ 101.0
May	1291.3 $\pm$ 89.8	1026.1 $\pm$ 107.0	1050.5 $\pm$ 165.5	1056.7 $\pm$ 46.6
June	1401.8 $\pm$ 79.0	1339.1 $\pm$ 160.2	675.4 $\pm$ 580.4	1107.5 $\pm$ 270.3
July	921.7 $\pm$ 64.5	638.2 $\pm$ 198.5	938.1 $\pm$ 44.4	843.5 $\pm$ 79.9
August	882.1 $\pm$ 42.4	557.4 $\pm$ 242.5	892.0 $\pm$ 39.0	843.5 $\pm$ 66.0
September	731.8 $\pm$ 21.1	486.1 $\pm$ 139.3	794.2 $\pm$ 50.5	712.1 $\pm$ 77.8
October	680.5 $\pm$ 6.6	512.6 $\pm$ 122.7	722.1 $\pm$ 16.7	671.0 $\pm$ 80.2
November	611.3 $\pm$ 44.6	489.5 $\pm$ 127.1	659.8 $\pm$ 19.2	597.8 $\pm$ 74.0
December	505.4 $\pm$ 53.6	462.9 $\pm$ 33.5	583.6 $\pm$ 24.5	512.5 $\pm$ 66.7
January	503.9 $\pm$ 35.3	516.8 $\pm$ 35.9	687.7 $\pm$ 8.7	634.5 $\pm$ 47.3
February	447.2 $\pm$ 38.3	458.4 $\pm$ 29.2	691.3 $\pm$ 61.4	631.2 $\pm$ 175.3
March	702.5 $\pm$ 24.5	624.8 $\pm$ 161.7	828.3 $\pm$ 53.4	913.1 $\pm$ 203.6

Table 3. Mean Zooplankton population during April 2003 to March 2007 at site 2 (Head Qadirabad)

Months 2004-2007	Protozoans (Mean $\pm$ S.E.)	Rotifers (Mean $\pm$ S.E.)	Cladocerans (Mean $\pm$ S.E.)	Copepods (Mean $\pm$ S.E.)
April	1417.5 $\pm$ 129.8	1467.6 $\pm$ 62.8	1498.2 $\pm$ 79.1	1553.2 $\pm$ 55.9
May	1542.3 $\pm$ 56.3	1874.8 $\pm$ 67.0	1999.5 $\pm$ 67.2	2046.1 $\pm$ 76.5
June	1817.0 $\pm$ 179.3	2002.0 $\pm$ 76.5	2192.3 $\pm$ 1.7	2113.2 $\pm$ 40.6
July	1609.8 $\pm$ 204.0	1800.7 $\pm$ 52.6	2018.3 $\pm$ 2.1	1850.7 $\pm$ 45.4
August	1493.0 $\pm$ 185.5	1683.3 $\pm$ 82.6	1910.0 $\pm$ 27.5	1778.8 $\pm$ 32.6
September	1324.9 $\pm$ 203.0	1613.9 $\pm$ 89.0	1758.7 $\pm$ 25.2	1640.1 $\pm$ 29.7
October	1232.5 $\pm$ 186.5	1499.1 $\pm$ 10.6	1702.1 $\pm$ 70.3	1572.9 $\pm$ 62.1
November	1165.1 $\pm$ 200.0	1413.4 $\pm$ 53.1	1527.7 $\pm$ 19.8	1431.3 $\pm$ 21.2
December	1097.7 $\pm$ 152.2	1299.0 $\pm$ 54.5	1261.5 $\pm$ 86.2	1248.1 $\pm$ 72.1
January	1844.1 $\pm$ 727.5	1111.5 $\pm$ 16.1	1179.0 $\pm$ 50.1	1194.4 $\pm$ 35.8
February	3149.9 $\pm$ 2112.2	1317.0 $\pm$ 250.7	1045.5 $\pm$ 39.5	1117.8 $\pm$ 24.7
March	1219.8 $\pm$ 131.4	1230.0 $\pm$ 78.8	1197.6 $\pm$ 59.1	1282.1 $\pm$ 11.1

Table 4. Mean zooplankton population during April 2003 to March 2007 at site 3 (Head Balloki)

Months 2004-2007	Protozoans (Mean $\pm$ S.E.)	Rotifers (Mean $\pm$ S.E.)	Cladocerans (Mean $\pm$ S.E.)	Copepods (Mean $\pm$ S.E.)
April	2955.0 $\pm$ 1691.1	1447.2 $\pm$ 18.0	1708.8 $\pm$ 109.5	1480.5 $\pm$ 149.8
May	1636.3 $\pm$ 197.6	1776.9 $\pm$ 7.5	4595.7 $\pm$ 2574.5	1489.0 $\pm$ 223.3
June	1755.5 $\pm$ 126.5	1417.9 $\pm$ 223.7	2133.5 $\pm$ 4.2	1765.1 $\pm$ 65.6
July	1280.7 $\pm$ 2.6	1148.9 $\pm$ 53.3	1453.3 $\pm$ 55.9	1637.8 $\pm$ 61.5
August	1148.9 $\pm$ 16.0	1093.8 $\pm$ 9.2	1335.9 $\pm$ 58.2	1484.9 $\pm$ 111.5
September	1213.6 $\pm$ 109.5	1029.2 $\pm$ 127.0	1178.8 $\pm$ 147.0	1448.1 $\pm$ 76.8
October	1008.1 $\pm$ 8.2	891.6 $\pm$ 203.6	1172.1 $\pm$ 113.7	1191.5 $\pm$ 37.0
November	932.9 $\pm$ 56.6	937.6 $\pm$ 167.1	1040.1 $\pm$ 156.4	1335.9 $\pm$ 149.7
December	938.9 $\pm$ 71.5	909.4 $\pm$ 104.6	1082.3 $\pm$ 115.1	1240.5 $\pm$ 144.3
January	881.0 $\pm$ 82.3	931.8 $\pm$ 64.5	1137.4 $\pm$ 271.2	1156.2 $\pm$ 158.2
February	920.9 $\pm$ 64.6	981.8 $\pm$ 12.1	1550.4 $\pm$ 67.3	1227.3 $\pm$ 176.0
March	1047.0 $\pm$ 50.9	1208.8 $\pm$ 121.8	1592.8 $\pm$ 6.5	1339.0 $\pm$ 116.8

Table 5. Mean Zooplankton population during April 2003 to March 2007 at site 4 (Head Sulemanki)

Months	Protozoans (Mean $\pm$ S.E.)	Rotifers (Mean $\pm$ S.E.)	Cladocerans (Mean $\pm$ S.E.)	Copepods (Mean $\pm$ S.E.)
April	1277.4 $\pm$ 52.89	1403.6 $\pm$ 49.27	1576.8 $\pm$ 41.0	1424.7 $\pm$ 98.8
May	1558.0 $\pm$ 7.08	1701.4 $\pm$ 108.96	1849.0 $\pm$ 115.4	1648.0 $\pm$ 118.0
June	1856.7 $\pm$ 71.79	1915.4 $\pm$ 97.39	2077.0 $\pm$ 110.5	1845.5 $\pm$ 110.7
July	1649.4 $\pm$ 109.01	1715.0 $\pm$ 47.79	1959.3 $\pm$ 145.6	1715.2 $\pm$ 76.7
August	1584.6 $\pm$ 109.01	1565.3 $\pm$ 45.33	1846.4 $\pm$ 122.7	1589.8 $\pm$ 53.4
September	1584.9 $\pm$ 76.27	1473.8 $\pm$ 25.56	1737.3 $\pm$ 101.9	1524.7 $\pm$ 44.0
October	1409.9 $\pm$ 83.38	1392.5 $\pm$ 50.20	1630.0 $\pm$ 83.9	1539.7 $\pm$ 6.2
November	1368.2 $\pm$ 59.47	1380.6 $\pm$ 38.07	1539.8 $\pm$ 89.1	1255.1 $\pm$ 60.9
December	1321.3 $\pm$ 49.68	1296.03 $\pm$ 6.25	1449.6 $\pm$ 98.9	1274.0 $\pm$ 41.1
January	791.7 $\pm$ 78.77	1109.2 $\pm$ 338.09	1257.7 $\pm$ 25.4	1141.6 $\pm$ 78.1
February	1003.6 $\pm$ 183.80	983.0 $\pm$ 19.70	1077.2 $\pm$ 23.1	1022.6 $\pm$ 21.8
March	1225.2 $\pm$ 116.65	1158.4 $\pm$ 73.00	1233.1 $\pm$ 21.6	1203.3 $\pm$ 72.6

Table 6. Mean phytoplankton population during April 2003 to March 2007 at site 1 (Head Marala)

Months 2004-2007	Chlorophyceae (Mean $\pm$ S.E.)	Cyanophyceae (Mean $\pm$ S.E.)	Bacillorphyceae (Mean $\pm$ S.E.)	Euglenophyceae (Mean $\pm$ S.E.)
April	243108.3 $\pm$ 11589.92	217816.7 $\pm$ 18261.9	210158.3 $\pm$ 18780.83	208450 $\pm$ 16803.03
May	1232383 $\pm$ 983759.3	1128825 $\pm$ 37385.1	942400 $\pm$ 772550.2	889083.3 $\pm$ 712696.4
June	1342242 $\pm$ 1006591	1339367 $\pm$ 1055224	1230717 $\pm$ 1039616	1072325 $\pm$ 873681.6
July	1067675 $\pm$ 788455.6	1036017 $\pm$ 777852.1	913975 $\pm$ 750766.6	850441.7 $\pm$ 682183
August	1251367 $\pm$ 1031309	1173233 $\pm$ 958046.5	1132008 $\pm$ 953224.4	850441.7 $\pm$ 682183
September	1102817 $\pm$ 930135.9	1018533 $\pm$ 851130.2	955183.3 $\pm$ 805508.6	802050 $\pm$ 632517.2
October	807083.3 $\pm$ 633485.4	719066.7 $\pm$ 548520.8	598850 $\pm$ 459455.9	602466.7 $\pm$ 446138.3
November	836975 $\pm$ 695088.5	797683.3 $\pm$ 629095.8	805908.3 $\pm$ 654672.5	740908.3 $\pm$ 598337.7
December	162122.7 $\pm$ 28478.33	745108.3 $\pm$ 591870.4	685325 $\pm$ 546338.3	740908.3 $\pm$ 598337.7
January	150358.3 $\pm$ 21122.47	242191.7 $\pm$ 63716.49	147391.7 $\pm$ 19642.67	146008.3 $\pm$ 18404.52
February	124575 $\pm$ 7590.619	138341.7 $\pm$ 16517.47	132525 $\pm$ 7743.438	131291.7 $\pm$ 8393.255
March	222941.7 $\pm$ 5114.936	366216.7 $\pm$ 160921.1	205391.7 $\pm$ 19611.28	205650 $\pm$ 22537.03

Table 7. Mean phytoplankton population during April 2003 to March 2007 at site 2 (Head Qadirabad)

Months 2004-2007	Chlorophytae (Mean $\pm$ S.E.)	Cyanophytae (Mean $\pm$ S.E.)	Bacillorphytae (Mean $\pm$ S.E.)	Euglenophytae (Mean $\pm$ S.E.)
April	148416.7 $\pm$ 13503.34	145750 $\pm$ 13281.41	143166.7 $\pm$ 13208.53	141666.7 $\pm$ 10841.02
May	161333.3 $\pm$ 10993.69	158083.3 $\pm$ 12457.71	155166.7 $\pm$ 12873.04	138908.3 $\pm$ 13671.52
June	170583.3 $\pm$ 935.698	160250 $\pm$ 11544.3	156250 $\pm$ 12507.5	152666.7 $\pm$ 13590.23
July	165500 $\pm$ 6084.475	157000 $\pm$ 12161.24	152083.3 $\pm$ 14202.65	148083.3 $\pm$ 13167.46
August	147741.7 $\pm$ 22652.77	153666.7 $\pm$ 14488.74	150083.3 $\pm$ 14331.15	137866.7 $\pm$ 22150.27
September	151916.7 $\pm$ 15496.19	148000 $\pm$ 15685.05	144833.3 $\pm$ 15699.21	140416.7 $\pm$ 15084.02
October	148916.7 $\pm$ 16227.76	143833.3 $\pm$ 16026.89	133916.7 $\pm$ 23669.75	130500 $\pm$ 18750
November	147250 $\pm$ 15792.27	142833.3 $\pm$ 15183.83	140750 $\pm$ 14750.71	135416.7 $\pm$ 15712.48
December	142000 $\pm$ 14126.66	139750 $\pm$ 14000	137583.3 $\pm$ 11723.67	133916.7 $\pm$ 10857.35
January	138083.3 $\pm$ 14419.56	136333.3 $\pm$ 13296.56	134916.7 $\pm$ 11496.68 $\pm$	131833.3 $\pm$ 10348.44
February	106875 $\pm$ 17722.25	122583.3 $\pm$ 9081.039	122666.7 $\pm$ 8094.923	121083.3 $\pm$ 7086.274
March	138916.7 $\pm$ 13647.6	136416.7 $\pm$ 12496.94	476166.7 $\pm$ 330722.2	133916.7 $\pm$ 10390.63

Table 8. Mean phytoplankton population during April 2003 to March 2007 at site 3 (Head Balloki)

Months 2004-2007	Chlorophytae (Mean $\pm$ S.E.)	Cyanophytae (Mean $\pm$ S.E.)	Bacillorphytae (Mean $\pm$ S.E.)	Euglenophytae (Mean $\pm$ S.E.)
April	147416.7 $\pm$ 8013.444	141825 $\pm$ 17094.08	150000 $\pm$ 4175.823	1143501 $\pm$ 992501.2
May	172750 $\pm$ 1909.407	167333.3 $\pm$ 1364.225	150175 $\pm$ 13343.05	155833.3 $\pm$ 1481.366
June	177166.7 $\pm$ 1445.779	173416.7 $\pm$ 1543.355	156750 $\pm$ 11177.54	151083.3 $\pm$ 12317.28
July	174833.3 $\pm$ 927.9607	168916.7 $\pm$ 1166.667	156750 $\pm$ 11177.54	155750 $\pm$ 1010.363
August	171166.7 $\pm$ 440.9586	165416.7 $\pm$ 83.33333	158000 $\pm$ 1802.776	150752 $\pm$ 3575.589
September	168750 $\pm$ 1701.715	150083.3 $\pm$ 12923.92	142750 $\pm$ 11113.99	99666.67 $\pm$ 42817.77
October	163916.7 $\pm$ 870.0255	159416.7 $\pm$ 1827.643	151916.7 $\pm$ 4011.269	140250 $\pm$ 4901.105
November	159500 $\pm$ 250	154250 $\pm$ 144.3376	145750 $\pm$ 2742.414	136250 $\pm$ 5857.687
December	156250 $\pm$ 144.3376	149666.7 $\pm$ 2631.276	143000 $\pm$ 3031.089	133916.7 $\pm$ 6567.491
January	294750 $\pm$ 150198.3	142666.7 $\pm$ 7150.66	134166.7 $\pm$ 4486.864	130416.7 $\pm$ 4258.162
February	138083.3 $\pm$ 4787.861	133833.3 $\pm$ 5029.772	130500 $\pm$ 5220.153	127583.3 $\pm$ 4942.025
March	148083.3 $\pm$ 6215.46	143666.7 $\pm$ 6567.491	231833.3 $\pm$ 85579.19	135416.7 $\pm$ 6007.518

T-able 9. Mean phytoplankton population during April 2003 to March 2007 at site 4 (Head Sulemanki)

Months	Chlorophytae (Mean $\pm$ S.E.)	Cyanophytae (Mean $\pm$ S.E.)	Bacillorphytae (Mean $\pm$ S.E.)	Euglenophytae (Mean $\pm$ S.E.)
April	157000 $\pm$ 5008.326	154000 $\pm$ 5375.484	148416.7 $\pm$ 4189.106	144250 $\pm$ 3875.672
May	165166.7 $\pm$ 1781.463	156666.7 $\pm$ 2042.942	150833.3 $\pm$ 3150.176	136333.3 $\pm$ 8146.233
June	118166.7 $\pm$ 50235.76	164083.3 $\pm$ 5198.825	155500 $\pm$ 6568.549	143333.3 $\pm$ 364.507
July	166166.7 $\pm$ 2093.309	161000 $\pm$ 1282.9	152000 $\pm$ 5530.22	141833.3 $\pm$ 6711.826
August	162833.3 $\pm$ 2185.813	154666.7 $\pm$ 3811.532	152000 $\pm$ 5530.22	128866.7 $\pm$ 15677.38
September	150750 $\pm$ 10004.17	149333.3 $\pm$ 3979.985	143500 $\pm$ 5965.177	263833.3 $\pm$ 128347.3
October	154833.3 $\pm$ 1481.366	142750 $\pm$ 4023.369	137583.3 $\pm$ 5144.441	133083.3 $\pm$ 5613.105
November	147750 $\pm$ 2155.42	138083.3 $\pm$ 3742.585	132500 $\pm$ 4582.576	134500 $\pm$ 5669.73
December	143916.7 $\pm$ 2171.469	133750 $\pm$ 5398.688	130833.3 $\pm$ 5042.183	125416.7 $\pm$ 5216.826
January	138583.3 $\pm$ 2209.512	134583.3 $\pm$ 2265.38	130000 $\pm$ 3617.089	123000 $\pm$ 4481.443
February	129666.7 $\pm$ 3536.516	128416.7 $\pm$ 2301.871	123916.7 $\pm$ 2476.276	119333.3 $\pm$ 1922.094
March	148416.7 $\pm$ 4306.81	143333.3 $\pm$ 3345.81	139083.3 $\pm$ 1959.663	134000 $\pm$ 1154.701

Table 10. Plant species prevalence in the habitat of Pheasant tailed Jacana at four study sites

Site 1 (Head Marala)				Site 2 (Head Qadirabad)			
Pond1	Pond2	Pond3	Pond4	Pond1	Pond2	Pond3	Pond4
<i>Typha angustata</i> ****	<i>Lotus corniculatus</i> ****	<i>Chara</i> ****	<i>Pistia striotes</i> ****	<i>Lotus corniculatus</i> ****	<i>Typha angustata</i> ****	<i>Arundonax</i> ****	<i>Lotus corniculatus</i> ****
<i>Arundonax</i> ***	<i>Panicum</i> ***	<i>Hydrilla verticillata</i> ***	<i>Arundonax</i> ***	<i>Arundonax</i> ***	<i>Lotus corniculatus</i> ***	<i>Lotus corniculatus</i> ***	<i>typha</i>
<i>Lotus corniculatus</i> **	<i>Cyperus</i> **	<i>Vallisneria</i> **	<i>Phragmites karka</i> **	<i>typha angustata</i> **	<i>Arundonax</i> **	<i>typha</i>	<i>Alaphantana</i> ***
<i>Pistia striotes</i> *	<i>Naru</i> *	<i>Lotus corniculatus</i> *	<i>Eishornia</i> *	<i>Cyperus</i> *	<i>Naru</i> *	<i>Phragmites karka</i> *	<i>Nymphaea alba</i> **
<i>Naru</i> *	<i>Eishornia</i> *	<i>Nymphaea alba</i> *	<i>panicum</i> *	<i>Panicum</i> *	<i>Panicum</i> *	<i>Nymphaea alba</i> *	<i>Hydrilla verticillata</i> *
<i>Cyperus</i> *	<i>Nymphaea alba</i> *	<i>Akson</i> *	<i>Cyperus</i> *	<i>Chara</i> *	<i>Hydrilla verticillata</i> *	<i>typha angustata</i> *	<i>Vallisneria</i> *
<i>Hydrilla verticillata</i> *		<i>Typha angustata</i> *	<i>Naru</i> *	<i>Hydrilla verticillata</i> *	<i>Chara</i> *		<i>Naru</i> *
<i>Vallisneria</i> *		<i>Naru</i> *		<i>Vallisneria</i> *	<i>Tripholium</i> *		
		<i>Arundonax</i> *			<i>Triticum indica</i> *		
****Highest prevalence, ***High prevalence, **Common prevalence, *Less prevalence							
Site 3 (Head Balloki)				Site 4 (Head Sulemanki)			
Pond1	Pond2	Pond3	Pond4	Pond1	Pond2	Pond3	Pond4
<i>Eishornia</i> ****	<i>Pistia striotes</i> ****	<i>Nymphaea alba</i> ****	<i>Trapa</i> ****	<i>Lotus corniculatus</i> ****	<i>Eishornia</i> ****	<i>Arundonax</i> ****	<i>Lotus corniculatus</i> ****
<i>Lotus corniculatus</i> ***	<i>Eishornia</i> ***	<i>Lotus corniculatus</i> ***	<i>Panicum</i> ***	<i>Cyperus</i> ***	<i>Lotus corniculatus</i> ***	<i>typha angustata</i> ***	<i>Cyperus</i> ***
<i>Cyperus</i> **	<i>Arundonax</i> **	<i>Cyperus</i> **	<i>Eishornia</i> **	<i>panicum</i> **	<i>Arundonax</i> **	<i>Cyperus</i> **	<i>Pistia striotes</i> **
<i>Typha Alaphantana</i> *	<i>Typha Alaphantana</i> *	<i>Arundonax</i> *	<i>Naru</i> *	<i>Naru</i> *	<i>typha Alaphantana</i> *	<i>Lotus corniculatus</i> *	<i>Arundonax</i> *
<i>Arundonax</i> *	<i>Typha angustata</i> *	<i>Saccharum spontaneum</i> *	<i>Oryza stiva</i> *	<i>Typha Alaphantana</i> *	<i>Pistia striotes</i> *	<i>Hydrilla verticillata</i> *	<i>Naru</i> *
<i>Pistia striotes</i> *	<i>Cyperus</i> *	<i>Hydrilla verticillata</i> *	<i>Saccharum spontaneum</i> *	<i>Typha angustata</i> *	<i>Cyperus</i> *	<i>Chara</i> *	<i>Eishornia</i> *
<i>Naru</i> *	<i>Naru</i> *	<i>Vallisneria</i> *	<i>Akson</i> *	<i>Hydrilla verticillata</i> *	<i>Hydrilla verticillata</i> *	<i>Saccharum spontaneum</i> *	<i>Nymphaea alba</i> *
<i>Tripholium</i> *		<i>Naru</i> *		<i>Vallisneria</i> *	<i>Chara</i> *	<i>Saccharum munja</i> *	<i>Cyperus</i> *
****Highest	prevalence,	***High	prevalence,	**Common	prevalence,	*Less	prevalences

Cont.

DISCUSSION

Pheasant-tailed Jacana places almost equal reliance on the animal and plant matter for meeting the requirements of its food (Khan and Mughal, 2014 and 2015). No previous report on the quantitative feeding preference of this species is available. The general remarks have suggested that this bird species depends upon insects and invertebrates, seeds (Hyman *et al.*, 1986), larvae of invertebrate (Woodcock, 1980) and water chestnut (Butchart, 1998, Lal, 2004).

Roberts (1991), while discussing the birds of Pakistan reported that the species preferred to consume insect larvae, and spawns of mollusks, amphibian, bivalve mollusks, seeds and succulent plants. The present report partly confirms the observations of Roberts (*loc cit*), though it suggest that this jacana species places a higher reliance of *Chaoborus* sp. larvae, followed by *Camponotus* sp., while small mollusks and *Donacia piscatrix* were consumed in relatively lower frequencies. Seeds of aquatic plants, leaves of marsh grasses were more frequently consumed, while anthers of the plants and floating algae also contributed an appreciable proportion. No data is presently in hand on the relative distribution of these food species in nature and hence no inference can be drawn on the preference of the species.

The selection of the food by a species of animal is a compromise between the dietary requirements of the animal/animals, the adaptation of the species to efficiently pick upon the food item and the availability of such food items in nature. The present report concerns with a specific area and for a specific season. Reports from other parts/ water bodies and the seasons might give a different list of the food species and a different levels of consumption. Pheasant tailed Jacana inherited definite set of morphological, physiological and behavioral features and take variety of food items.

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