

Distribution of Common Coot (*Fulica atra*) Collected from Wet Lands of Punjab, Pakistan

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Abstract:- Population survey was conducted to evaluate the population of common coot (*Fulica atra*) and ten years population trend at Chashma Barrage (29883±6458), Taunsa Barrage (4198±515), Uchali Lake (7253±1466), Head Qadirabad (2789±785), Head Marala (3226±984), Head Rasool (3261±84), Khabbeki Lack (1486±230), Head Sulaimanki (1809±180), Jhalar Lake (526±206) and Head Islam (1779±257). The population at Chashma barrage was statistically highly significant as compared to other wetlands. The overall year wise abundance and relative abundance of different wet lands were recorded. To evaluate the food preference, total weight of gut (63.98±3.946), total weight of gizzard (26.99 ± 1.325), weight of food material (3.59±0.187), gizzard weight without food material (23.39± 1.244), weight of seed (1.24± 0.075), weight of vegetation (1.65±0.103) and weight of other material (0.69±0.067) were calculated. The comparison between male and female gave results that the total weight of gut, total weight of gizzard, weight of food material, Gizzard weight without food material and weight of other material was statistically highly significant and weight of seed, weight of vegetation was statistically significant. Total 10 species of plants were identified, in which *Najasgraminea* (75.0%), *Hydrillaverticillata* (72.5%), *Nymphaea nouchali* (67.5%), *Vallisneria spiralis* (65%), *Commelina benghalensis* (60.0%), *Dichanthium annulatum* (57.5%), *Cyperus alopecuroides* (47.5%), *Potamogeton nodosus* (35.0%), *Polygonum barbatum* (32.5%) and *Trapa natans* (15.0%). The richness, abundance, Shannon's variety list, Simpson's variety record and evenness for gizzard contents were calculated. Among the 40 samples, 19 samples were found infected in by parasites of seven types of Gastro-intestinal parasites were distinguished and recorded as *Amidostomum anseris*, *Capillaria contorta*, *Strongyloides avium*, *Echinoparyphium recurvatum*, *Notocotylus attenuatus*, and *Giardia sp.* *D. balacea* was recorded among the six wetlands. *S. avium* and *N. attenuatus* were recorded among the four wetlands, *A. anseris*, *E. recurvatum* and *Giardia sp.* were recorded among the three wetlands, and *C. contorta* were recorded among the two wetlands. The current study provides the information for the management planning, conservation and improvement of habitat of common coot. The knowledge of parasites can be helpful to grasp the host-parasite interactions and give important standard data to the assessment of fitness and wellbeing status of this species.

Keywords:- Endo parasite , Common coot , Wetlands , Punjab , Pakistan.

I. INTRODUCTION

Many birds from Europe and central Asian countries migrate towards Pakistan during winter. There is only one fly way in Pakistan and seven fly ways in whole world. The birds come to Pakistan along with the Indus River by flying over Karakoram, Suleiman ranges and Hindukush (Aliet al, 2005).

Waterfowl is a general term used for members of the family Anatidae belonging to order Anseriformes that comprise about 146 species in 43 genera. The family has distribution in different countries, occurring all the world's continents. They are generally herbivorous and are monogamous breeders. Several species migrate the whole year. Common coot, *Fulica atra* Linnaeus, 1758, is one of the migratory birds. It belongs to order Gruiformes and family Rallidae. Members of rail family migrate towards Pakistan. *Fulica atra* is occasional travelling bird and it comes from Siberia and other Russian states during winter from October to spring every year and inhabit the sea going environment of Sindh province (Roberts, 1991). Their body makes up around two-thirds, that are about 50- 60 cm and wingspan of 81-98 cm (Cramp et al, 1977) and weighs 0.72–1.58 kg (Manralet al, 2013).

➤ Distribution

Common coot is found breeding in main continents including Asia, Africa, Europe and Australia. It prefers to live near shallow waters with muddy bottoms that are rich with vegetation. Moreover, changes in migratory developments, distances and frequencies results in different distribution variety of common coot (Brochet et al, 2010). Common coot mostly occurs in Japan, Northeastern Algeria, Central Europe, New Zealand, Northeast France, Pakistan and China. Common coot lives in the regions with warm and temperate environment. In Japan, in 1980 the population of *Fulica atra* has considerably increased especially in the areas of Kanto, Honshu, Tohoku, Kinki, Chubu and Kyushu (Hashimoto et al., 2013). A similar increase in the coot population has been noted in South Korea since 2002. In Central Europe, Central Moravia and Republic serves as breeding grounds for common coot (Straková et al, 2015).

A wider distribution of common coot was found along the freshwater lakes where it can find good quality vegetation, therefore large flocks of coot can be seen in salt water Lake of Bourges (Northeast Algeria). In Pakistan, it is reported at several wetlands such as Bahawalnagar

(Sulmanki head works), Jassar (River Ravi), Sialkot, Chailanwala, Hafizabad (Qadirabad head works), Mianwali (Chasma barrage), Shahpur (Jehlum Bridge), Rampur marsh areas, Nammal Lake, Jahlar lake, Uchali lake, Khabbaki lake and Rawallake. Karachi and the adjoining places which are rich with plains, hills, and rivers, with diversified physical features serves as breeding ground for many domestic and international bird species. More than 35% of the common coot population is saturated in Karachi, 21% in Punjab while the rest is distributed in K.P.K and the Baluchistan (Ali et al, 2005).

According to recent surveys, Manchhar Lake located in Northeast of District Jamshoro, is one of the favorite spots for international migratory birds specifically for Common coot. In winter, these birds migrate towards Southeast Asia, where Karachi serves as the main hub for their breeding (Huang et al., 2012). Kati Bunber located in District Thatha serves as the second largest site for these birds in Sindh. During the migrating season, these two sites in Sindh has the highest intake rate for migratory birds. Similarly, in Punjab, Taunsa Barrage is the main site that harbors many bird species including *Fulica atra*, *Egretta garzetta*, *Aythya ferina* and *Bubulcus ibis* etc. *Fulica atra* accounts for around 14% of all the resident and migrating birds (Bibi and Ali, 2013).

The migrating coots have been noted at Chaman in March (Tieehurst, JBNHS, 1927 b), part of the population migrates across Baluchistan and through Chitral in late April and early May (Clark, 1991). It is an occasional sporadic breeder on some of the larger Sind lakes and likewise on

band Kushdil Khan lake (Minert, 1920) in Baluchistan but this is exceptional; the entire population normally departing in late spring to northern breeding grounds in the USSR. Though still an abundant visitor, loss of habitat to agricultural drainage schemes in its breeding areas has undoubtedly greatly reduced the winter migrant population to Pakistan. (Jessen et al, 1970).

Extensive wetland surveys in the early 1970s and water fowl censuses revealed the biggest population of common coot in the whole of Pakistan on Khinjar lake surface area. In 1972 (Fred Koning, IWRB report) here an estimated 71000 were counted. On 13 January 1987, an estimated 79,670 waterfowl were counted (IWRB) wetlands report for Pakistan prepared by the National Council for Wildlife, Islamabad. The author counted over 300 on Kushdil Khan lake on 22 June but no evidence of breeding in that year, but Christison did find a solitary nest in 1938 on that lake which was the only breeding record for Baluchistan that he could find (JBNHS, 1942). During May, visit to Zanginawar, there were still about 2000 birds and local game watchers asserted that 600 or 700 pairs nested each year on the lake. During frequent summer visits to the main lakes of lower Sind (by the author) in only 3 out of 10 years a total of 3 to one dozen coots have been noted over summering (usually in company with purple Gallinules), but no evidence of breeding was obtained. The last date noted for birds on spring passage was 7 April at Rawallake in Rawalpindi district. Each winter during boat trips around the tidal lagoons of Ghizri and Keamari, a few individual coots are encountered (Finney et al, 2005).

II. MATERIALS AND METHODS

➤ Study Area

Ten wetlands (Head Qadirabad, Head Marala, Head Rasool, Chashma Barrage, Tunas Barrage, Jhalar Lake, Uchali Lake, Khabbaki Lake, Head Islam and Head Sulaimanki) were selected for the census and sample collection. These wetlands had complex earthly and oceanic environment of common coot as well as with respect to a few other transient birds.

Table 1 List of Wetlands with Status and Location

Sr#	Wetlands	Status	Location (Latitude; Longitude)
1	Head Qadirabad	Wildlife sanctuary	32.2974° N; 73.5020° E
2	Head Marala	Game reserve	32.7624° N; 74.4644° E
3	Head Rasool	Game reserve	32.6827° N; 73.5183° E
4	Head Islam	Game reserve	29.8258° N; 72.5508° E
5	Head Sulaimanki	Game reserve	30.3790° N; 73.8642° E
6	Chashma Barrage	Wildlife sanctuary	32.4359° N; 71.3803° E
7	Taunsa Barrage	Wildlife sanctuary	30.7055° N; 70.6577° E
8	Khabbaki Lake	Wildlife sanctuary	32.6219° N; 72.2141° E
9	Uchali complex Lake	Wildlife Sanctuary	32.5600° N; 72.0200° E
10	Jhalar Lake	Wildlife Sanctuary	32.4981° N; 72.0876° E

➤ Population Survey

Ten wetlands were surveyed for common coot (*Fulica atra*) population counts in mid-winter (January) 2019. Study was directed by walking and by boat, in early from 7:00 am to 10:00 am and in late from 2:00 pm to 5:00 pm and average of both timings was taken. The Banks of heads and Barrages were surveyed by walking while pond areas were surveyed by using wood ship.

Total count approach was applied following Bibby & Burgess (1992), care could be taken that the birds were no longer counted twice. Binoculars (10×50 mm) Telemaster and Minolta speedy model 841 Zoom-scope (15x -60 x .60mm) was used to categorize the bird species following Roberts (1991) and Ali and Ripley (1995 & 2001).

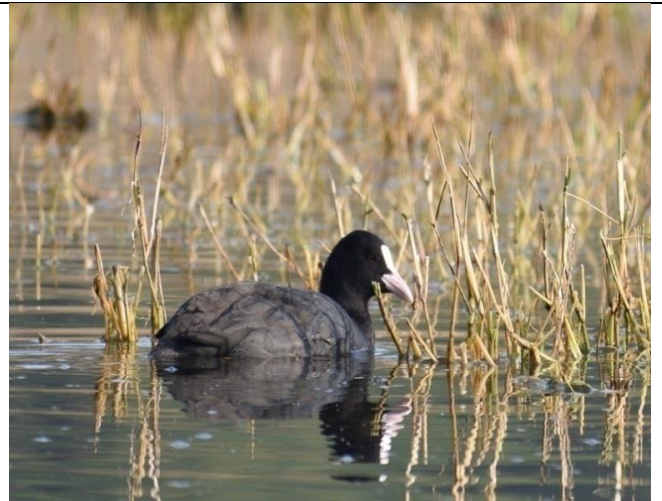




Fig 1 Common Coot (*Fulicaatra*) Captured at Different Wetlands During Survey

III. RESULTS

➤ Distribution

During the present study, the population survey was conducted to evaluate the population of common coot (*Fulicaatra*) at ten wetlands of the Punjab, Pakistan during mid-winter (January) maximum population was recorded at Chashma Barrage (14276), which leads Uchali Lake (7319), Taunsa Barrage (6625), Head Marala (1650), Head Rasool (1377), Khabbeki lake (1351), Head Sulaimanki (1189), Head Islam (873) and Head Qadirabad (810). The least population was recorded at Jhalar lake (140) during the survey of 2019. To evaluate the population trend of common coot (*Fulicaatra*) in different wetlands of Punjab, the data of last nine years survey was collected from the Punjab Wildlife Research Center, Gatwala, Faisalabad.

Therefore, ten-year data of population were compiled and statistically analyzed. The mean population of ten year was calculated yearly. The overall range was 11000-70730 birds (29883 ± 6458) at Chashma Barrage, 1700-6010 birds (4198 ± 515) at Taunsa Barrage, 400-13779 birds (7253 ± 1466) at Uchali Lake, 89-7013 birds (2789 ± 785) at Head Qadirabad, 760-11083 birds (3226 ± 984) at Head Marala, 300-8875 birds (3261 ± 261) at Head Rasool, 110-2400 birds (1486 ± 230) at Khabbeki Lake, 1189-2670 birds (1809 ± 180) at Head Sulaimanki, 70-1400 birds (526 ± 206) at Jhalar Lake, 873-3090 birds (1779 ± 257) at Head Islam (Table 2).

The main population of Chashma barrage was statistically highly significant ($P < 0.05$) as compared to other wetlands. Year wise population of all wetlands differed non-significantly (Table 3). The mean abundance of all the wetlands illustrated that maximum birds were at Chashma Barrage while other differed non significantly and minimum

birds were at Jhalar Lake (Fig. 2). The overall year wise abundance showed that population of common coot increased from 2010-2014, and was maximum in the year of 2015, while population decreased gradually from year 2016 to 2019 (Fig. 3). The overall year wise abundance of all wetlands was calculated (Fig-4). The abundance at Chashma Barrage (Fig-5) showed that population increased from 2010 to 2015 and then gradually decreased from 2016 to 2019. The abundance at Taunsa Barrage (Fig-6) showed that population of common coot gradually increased from 2010 to 2019. The abundance at Uchali Lake (Fig-7) showed that the population of common coot continually increased from 2010 to 2019. The abundance at Head Qadirabad (Fig-8) showed that the population of common coot increased from 2010 to 2014 then decreased from 2015 to 2019. The abundance at Head Marala (Fig-9) showed that the population of common coot increased from 2010 to 2014 then decreased from 2015 to 2019. The abundance at Head Rasool (Fig-10) showed that the population of common coot increased from 2010 to 2013 then decreased from 2014 to 2019. The abundance at Khabbeki Lake (Fig-11) showed that the population of common coot gradually decreased from 2010 to 2019. The abundance at Head Sulaimanki (Fig-12) showed that the population of common coot decreased from year 2010 to 2019. The abundance at Jhalar Lake (Fig-13) showed that the population of common coot increased from year 2010 to 2014 and gradually decreased from 2015 to 2019. The abundance at Head Islam (Fig-14) showed that the population of common coot gradually decreased from 2010 to 2019. The maximum relative abundance of Chashma Barrage (53.8%) which leads to Uchali Lake (11.9%), Taunsa Barrage (7.6%), Head Rasool (5.9%), Head Marala (5.8%), Head Qadirabad (5.0%), Head Sulaimanki (3.3%), Head Islam (3.2%), Khabbeki (2.7%) and minimum was of Jhalar Lake (0.9%) (Fig-15).

Table 2 Comparison of Means for Ten-year Population’s Trends of Common Coot in Wetlands of Punjab

Waterland	Year											Mean	SD	SE
	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019			
Chashma Barrage	11000	11288	11115	33600	52060	45116	70730	42242	24169	13120	14276	29883A	20422	6458
Taunsa Barrage	1700	1562	2586	4791	4267	4466	4418	6010	5160	4590	6625	4198BC	1628	515
Ucchali Lack	400	1009	8200	11522	4080	5149	13779	8318	-	12753	7319	7253B	4637	1466
Head Qadirabad	89	120	4012	5370	7013	4330	5113	2424	1240	160	810	2789BC	2481	785
Head Marala	960	760	2910	2380	6221	11083	4886	2000	1540	1100	1650	3226BC	3112	984
Head Rasool	300	1108	1730	1805	6312	4400	5430	8875	3209	1325	1377	3261BC	2683	848
Khabbeki	1740	2400	2100	1740	330	110	1751	2215	1468	1143	1351	1486BC	729	230
Head Sulaimanki	2670	2542	2560	1950	1875	1868	1254	1369	1345	1276	1189	1809BC	571	180
Jhalar Lack	70	142	366	680	2105	468	1400	157	135	126	140	526C	653	206
Head Islam	2790	3014	1670	1578	3090	1831	1250	1309	1120	1043	873	1779BC	814	257
Mean	2172	2395	3725	6542	8735	7882	11001	7492	4376	3664	3561			
SD	3263	3278	3336	10024	15374	13452	21316	12586	7565	5040	4518			
SE	1032	1036	1055	3170	4862	4254	6741	3980	2392	1594	1429			

Mean having comparative letter in a section are genuinely non-critical (P>0.05).
SD = Standard deviation; SE = Standard mistake of mean

Table 3 Analysis of Variance Table for Ten-Year Population’s Trends of Common Coot in Wetlands of Punjab

Source of variation	Degrees of freedom	Sum of squares	Mean squares	F-value
Year	9	784981990	87220221	1.96 ^{NS}
Wetland	9	7585876422	842875158	18.89**
Error	80	3568728432	44609105	
Total	98			

NS = Non-significant (P>0.05); * = Significant (P<0.05); ** = Huge significant (P<0.01)

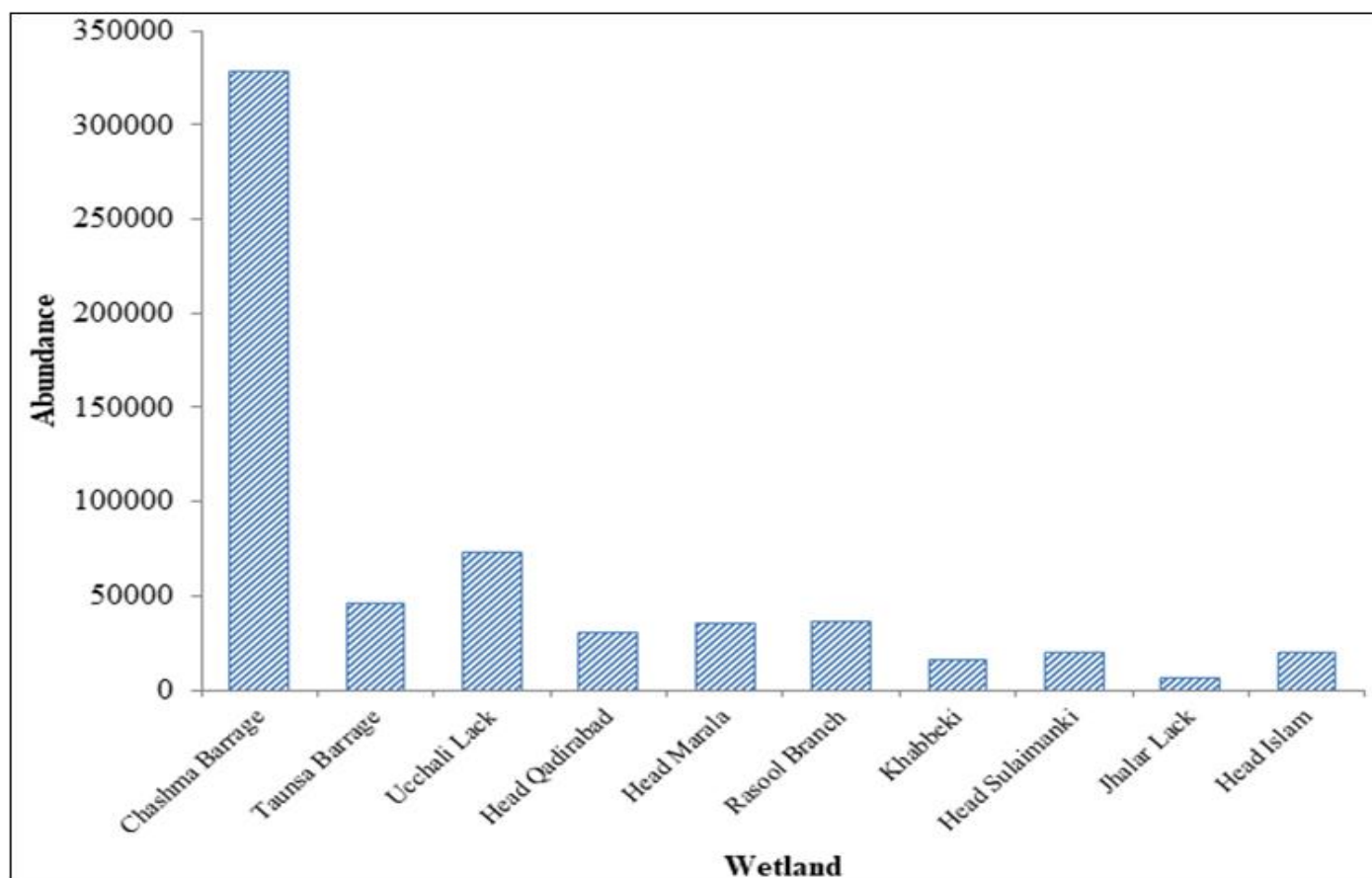


Fig 2 Overall Location-Wise Comparison of Means for Ten year Populations Trends of Common Coot in Wetlands of Punjab

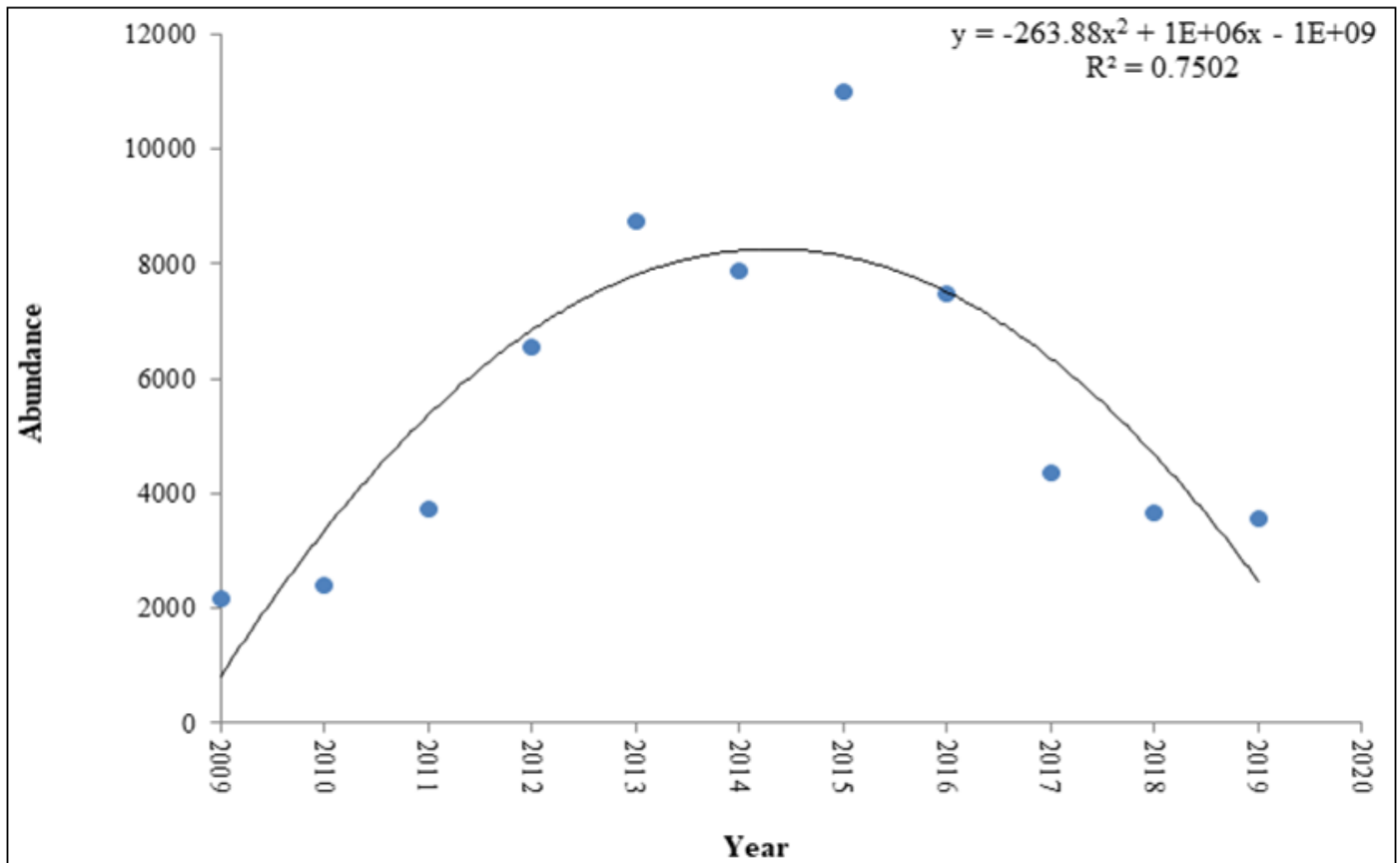


Fig 3 Overall year wise Abundance of Common Coot in Wetlands of Punjab

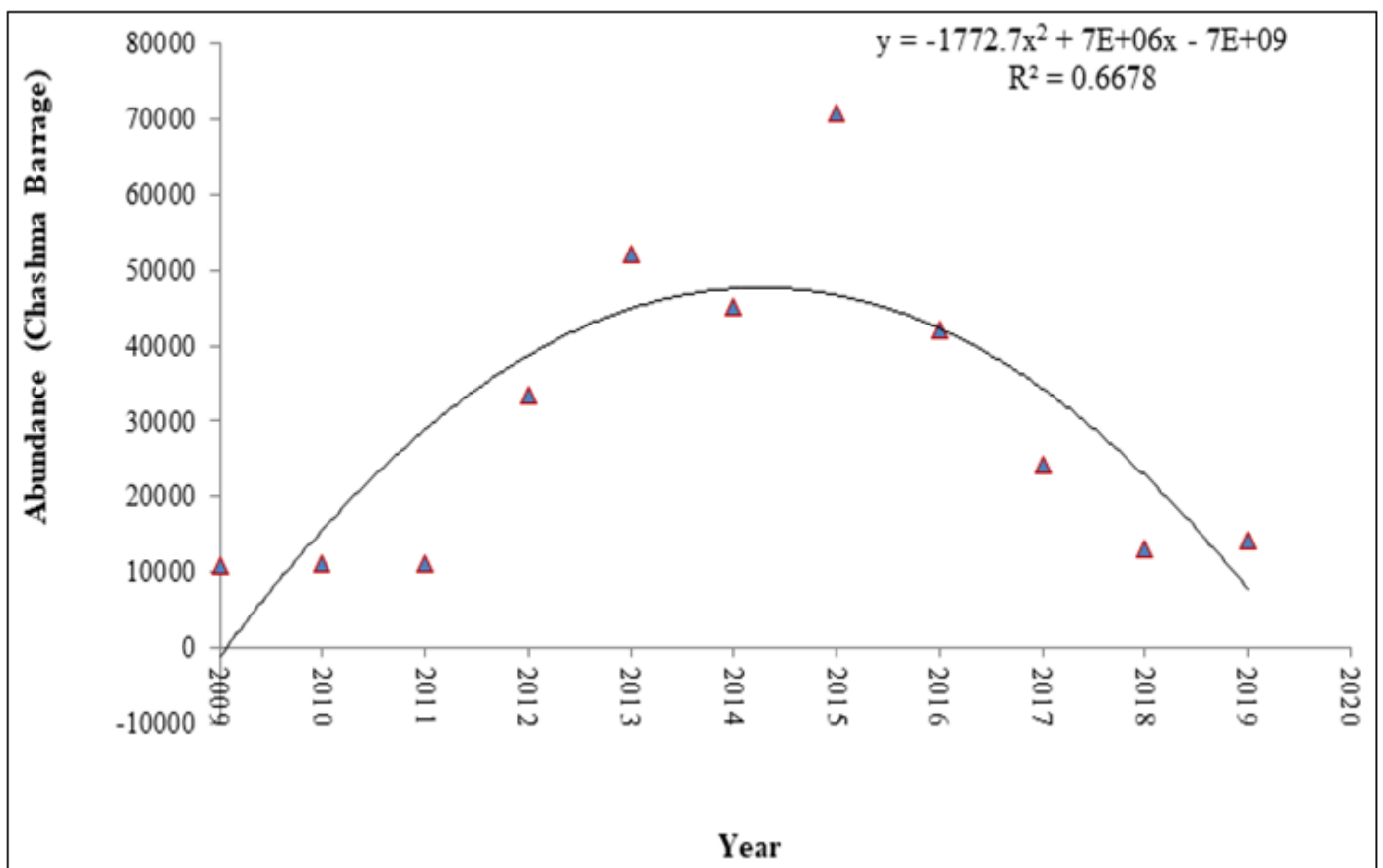


Fig 4 Comparison of Ten-year Abundance of Common Coot at Chashma Barrage

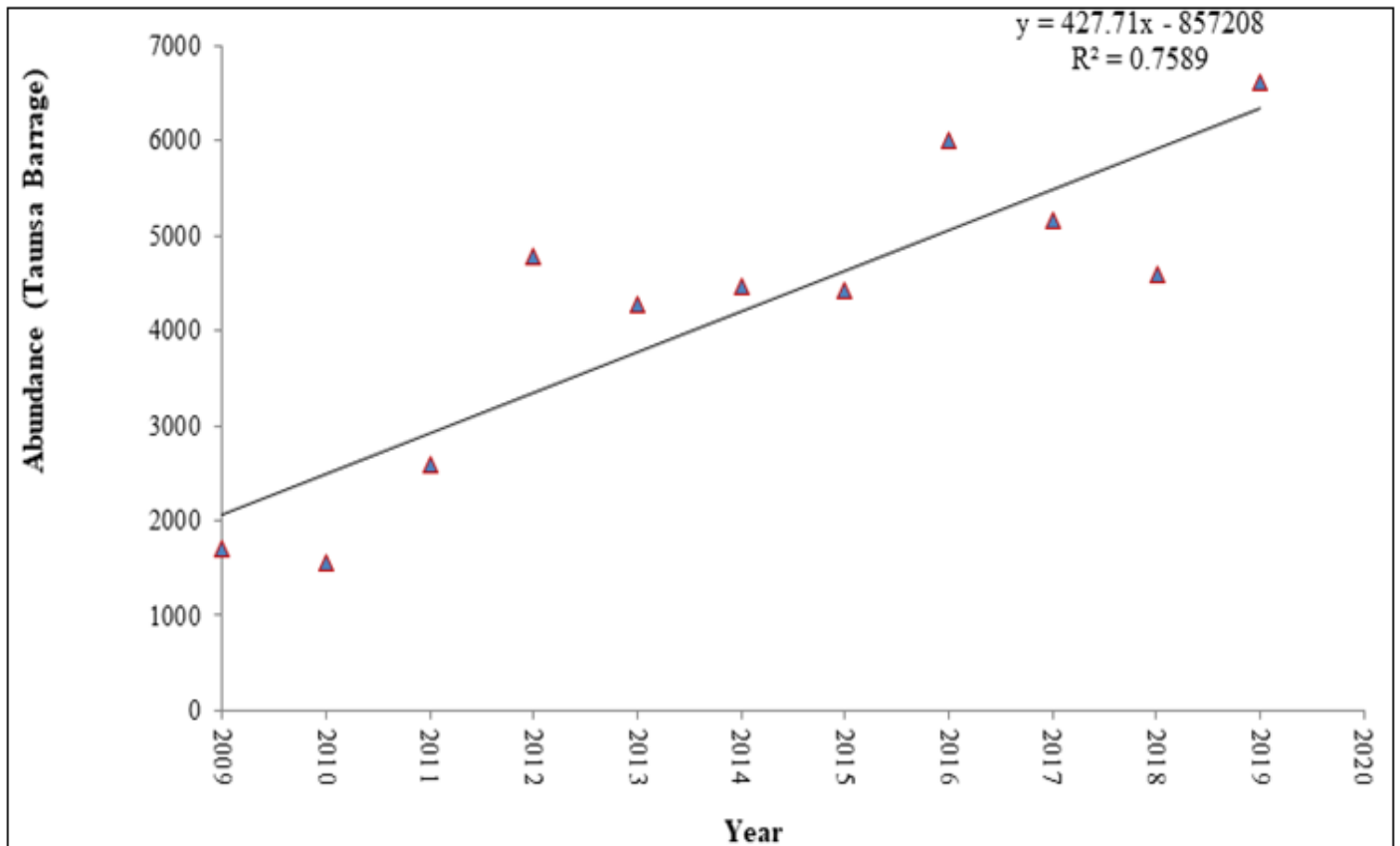


Fig 5 Comparison of Ten-year Abundance of Common Coot at Taunsa Barrage

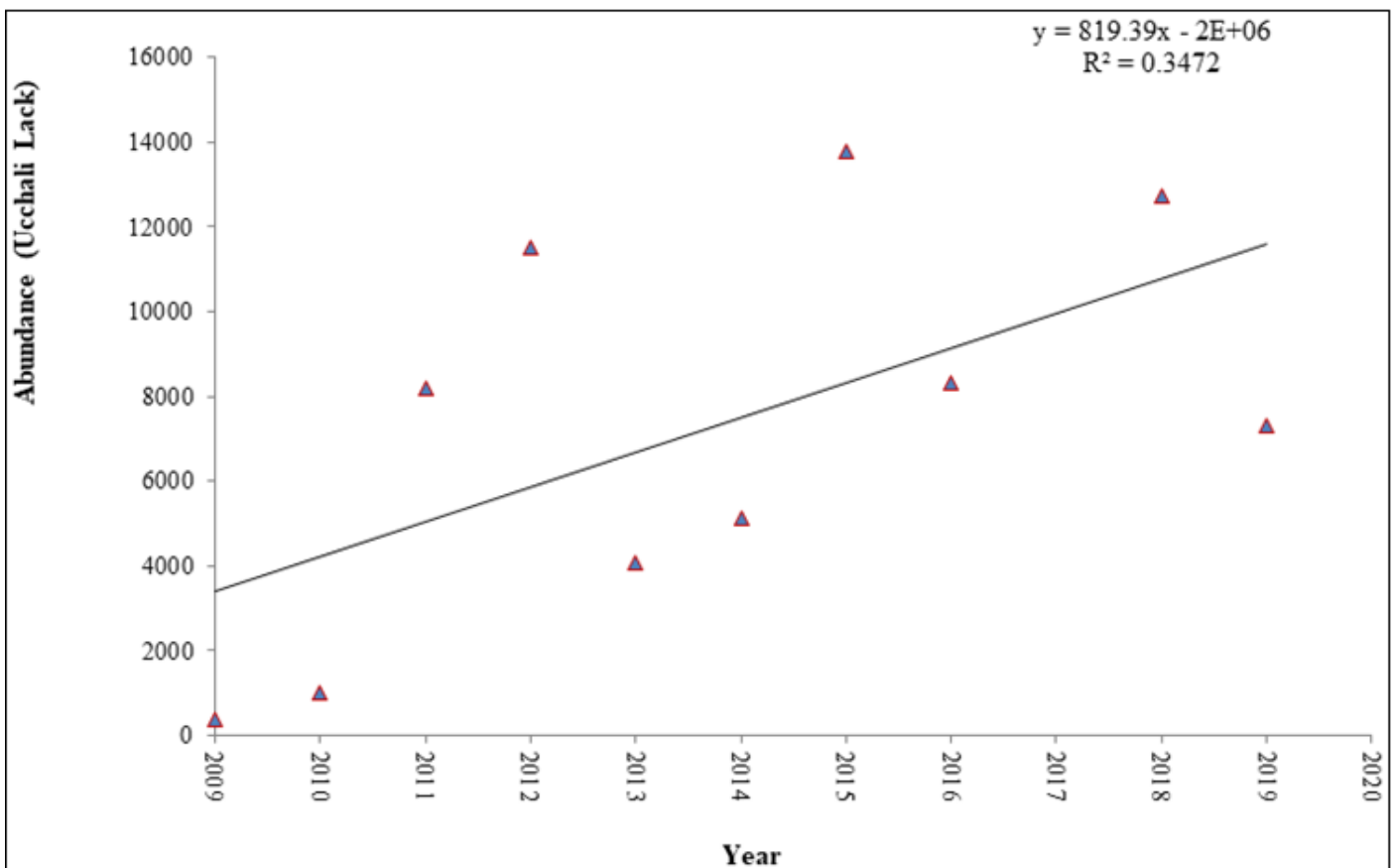


Fig 6 Comparison of Ten-year Abundance of Common Coot at Uccchali Lake

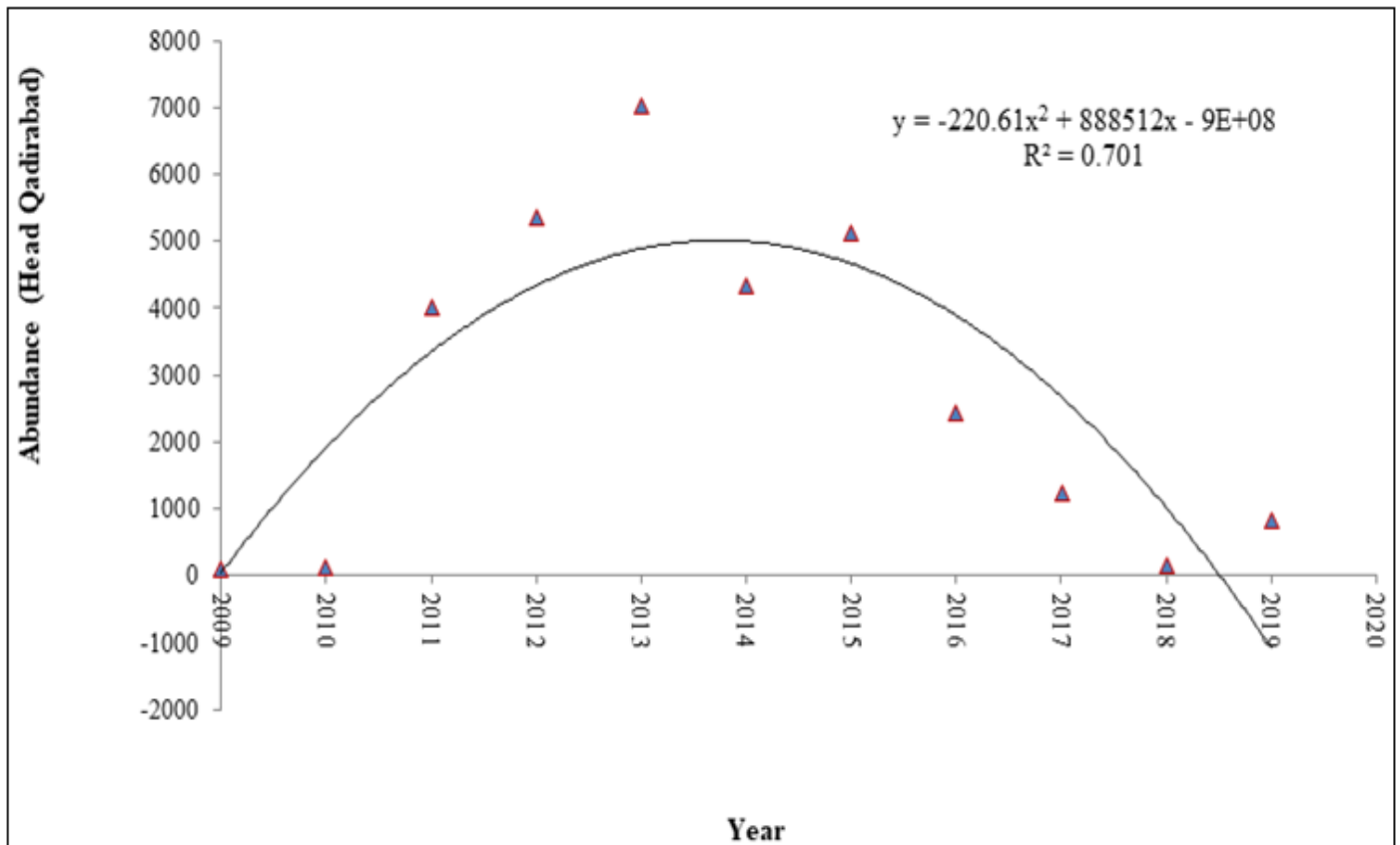


Fig 7 Comparison of Ten-year Abundance of Common Coot at Head Qadirabad

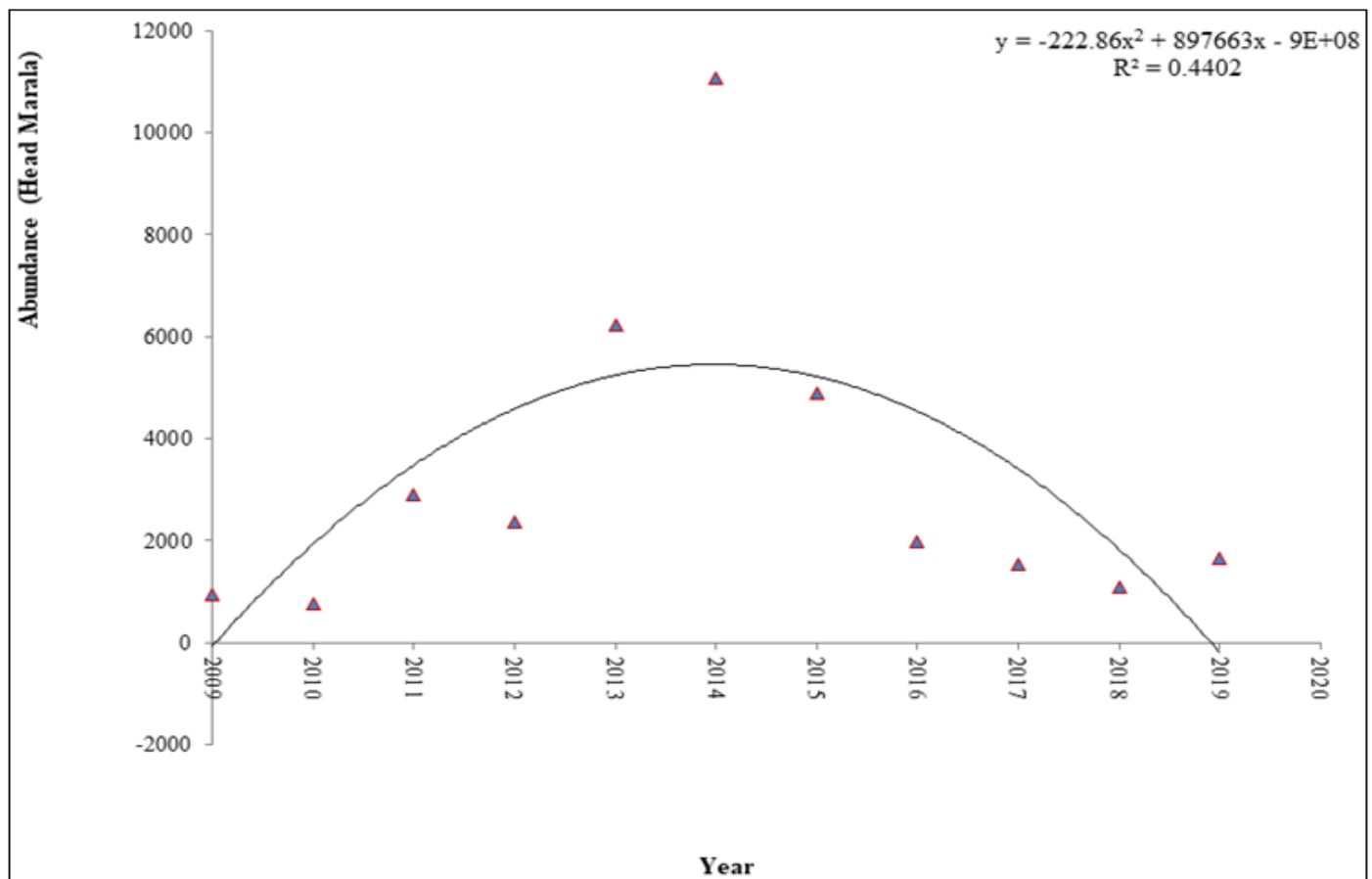


Fig 8 Comparison of Ten year Abundance of Common Coot at Head Marala

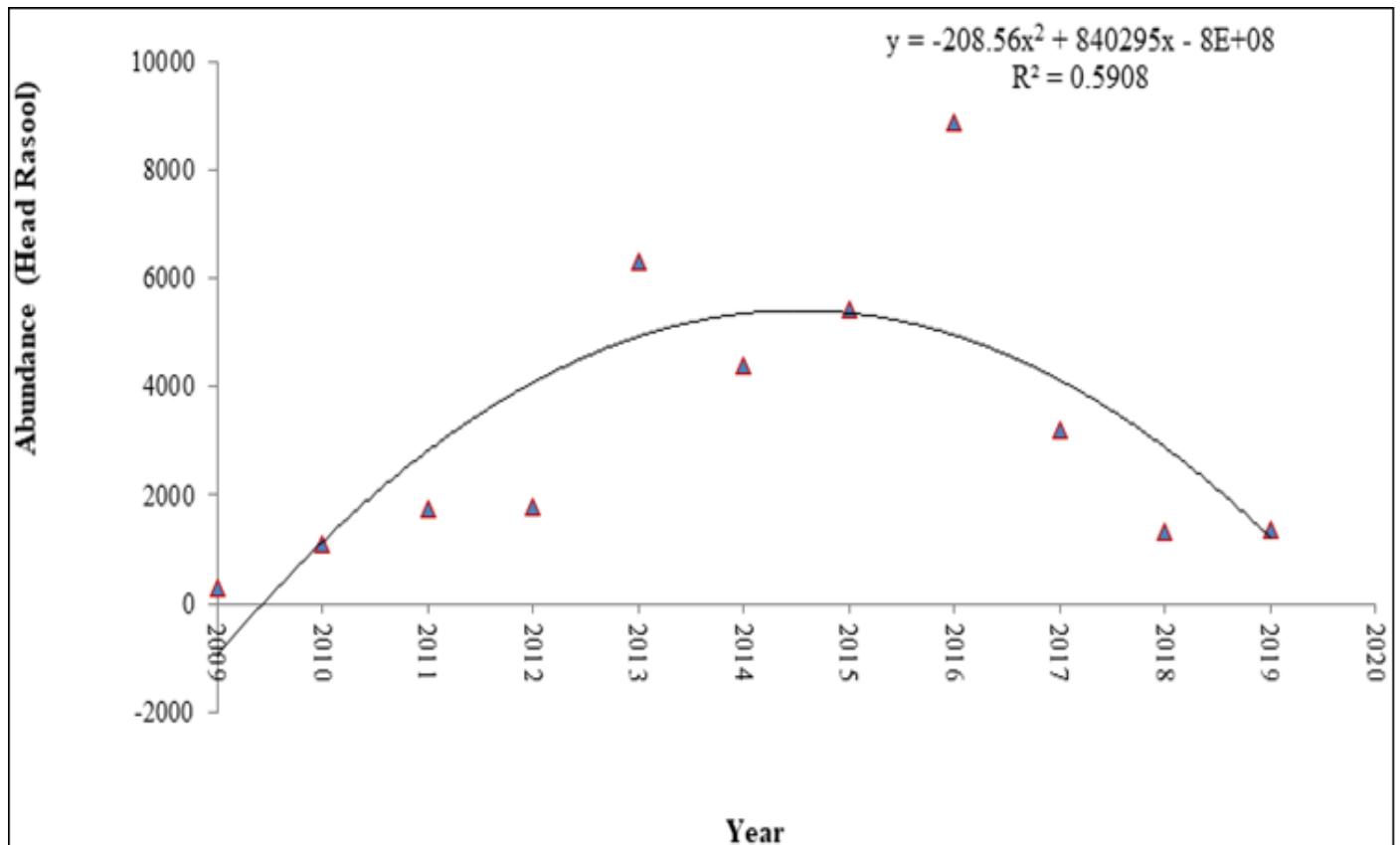


Fig 9 Comparison of Ten year Abundance of Common Coot at Head Rasool

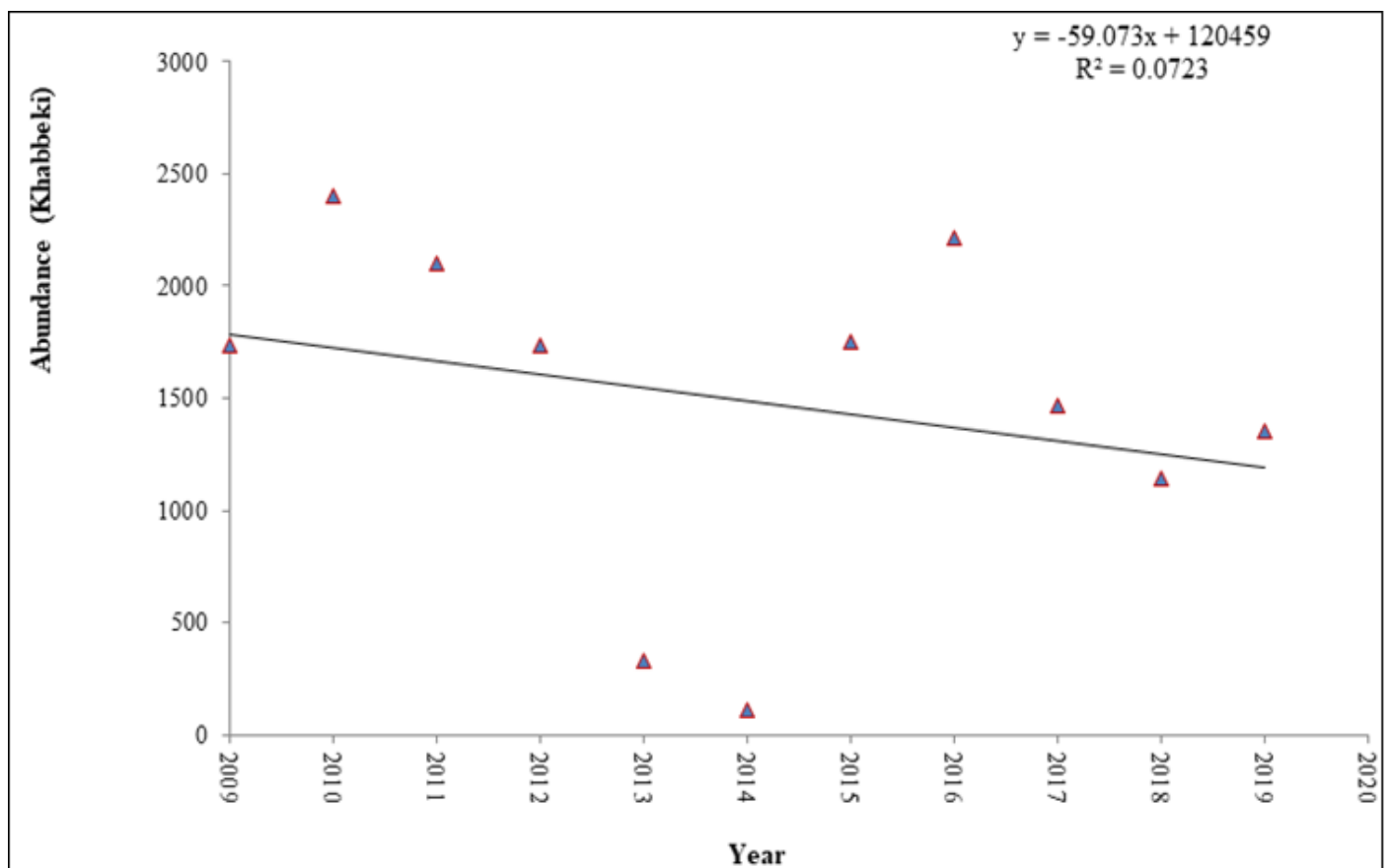


Fig 10 Comparison of Ten year Abundance of Common Coot at Khabbeki Lake

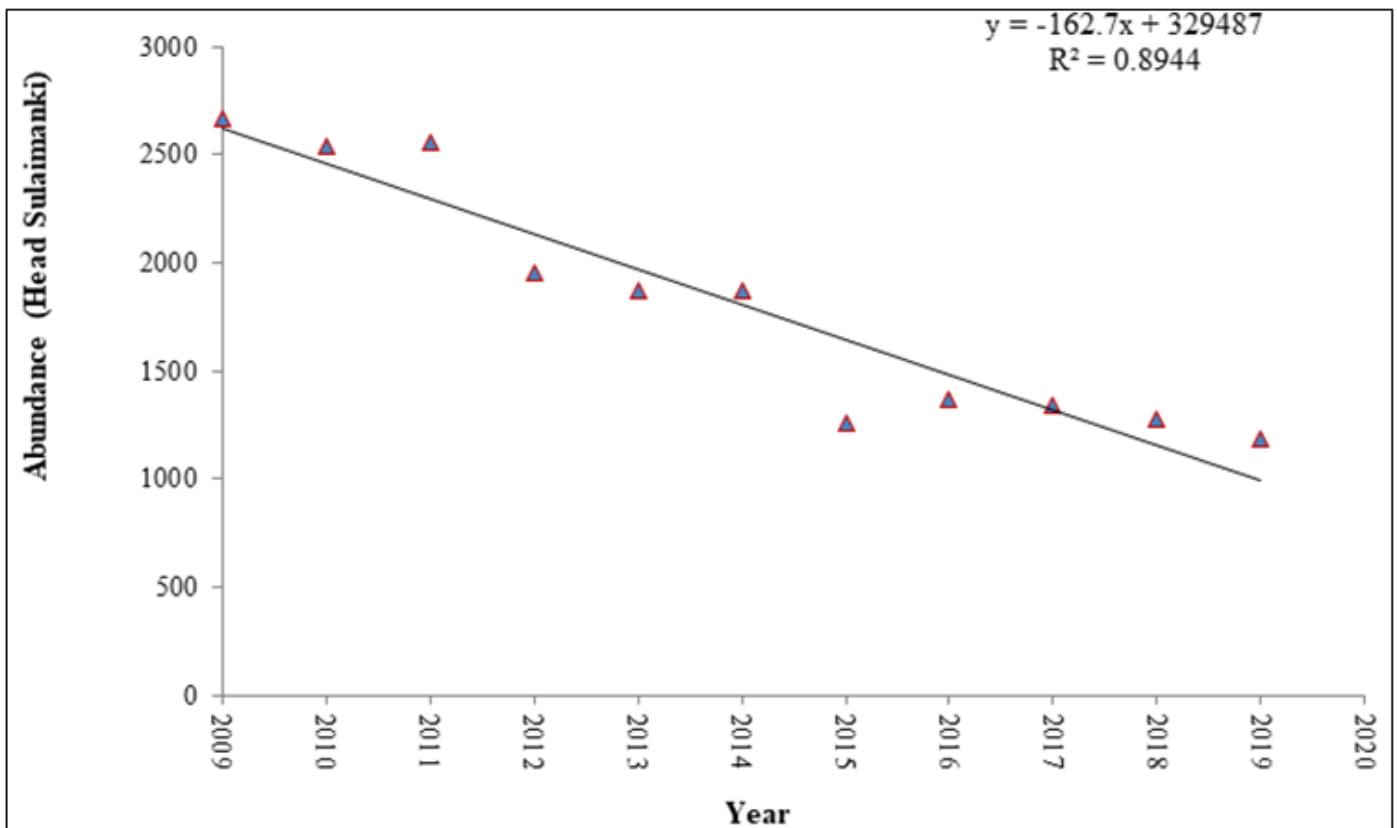


Fig 11 The Comparison of Ten year Abundance of Common Coot at Head Sulaimanki

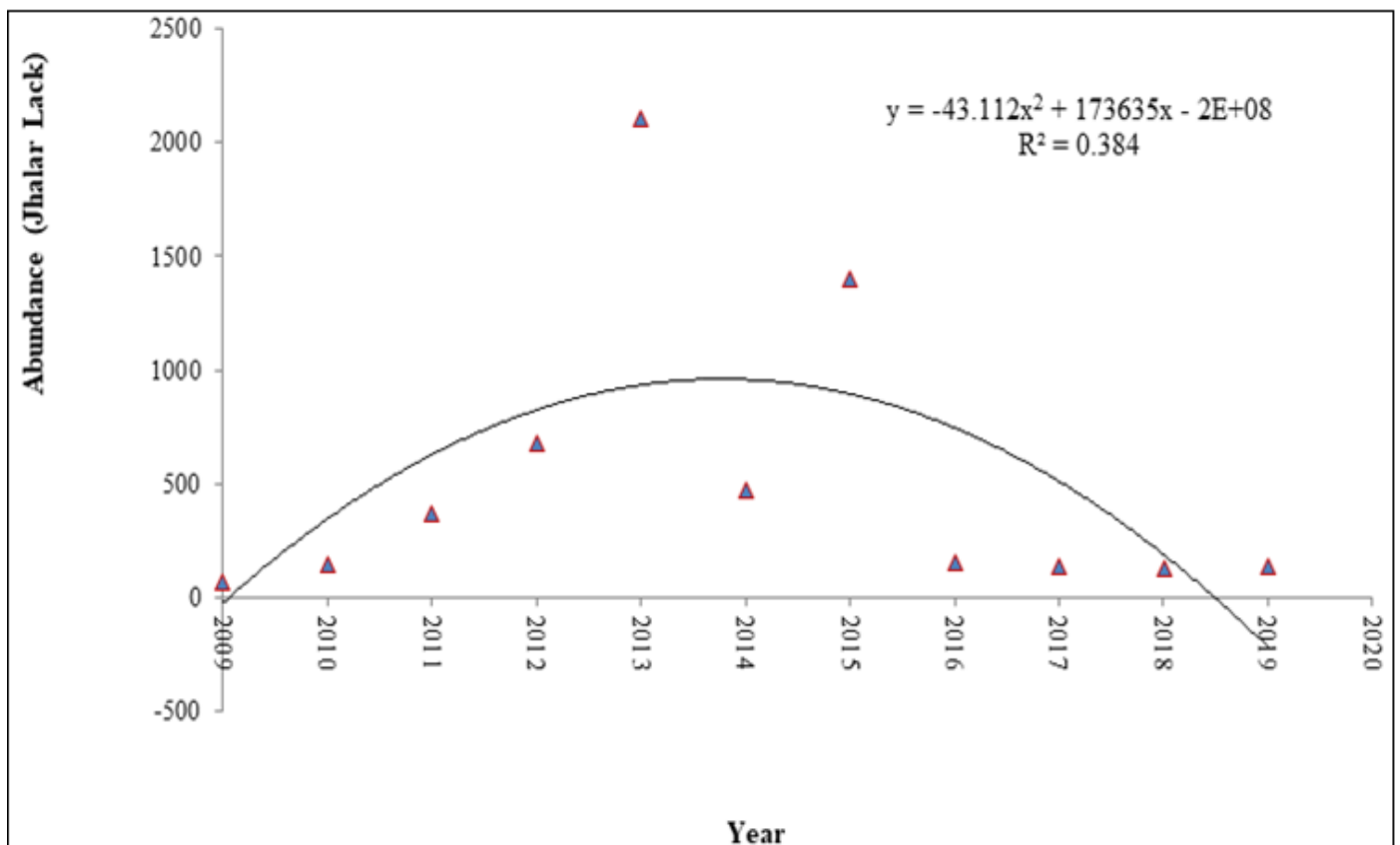


Fig 12 The Comparison of Ten-year Abundance of Common Coot at Jhalar Lake

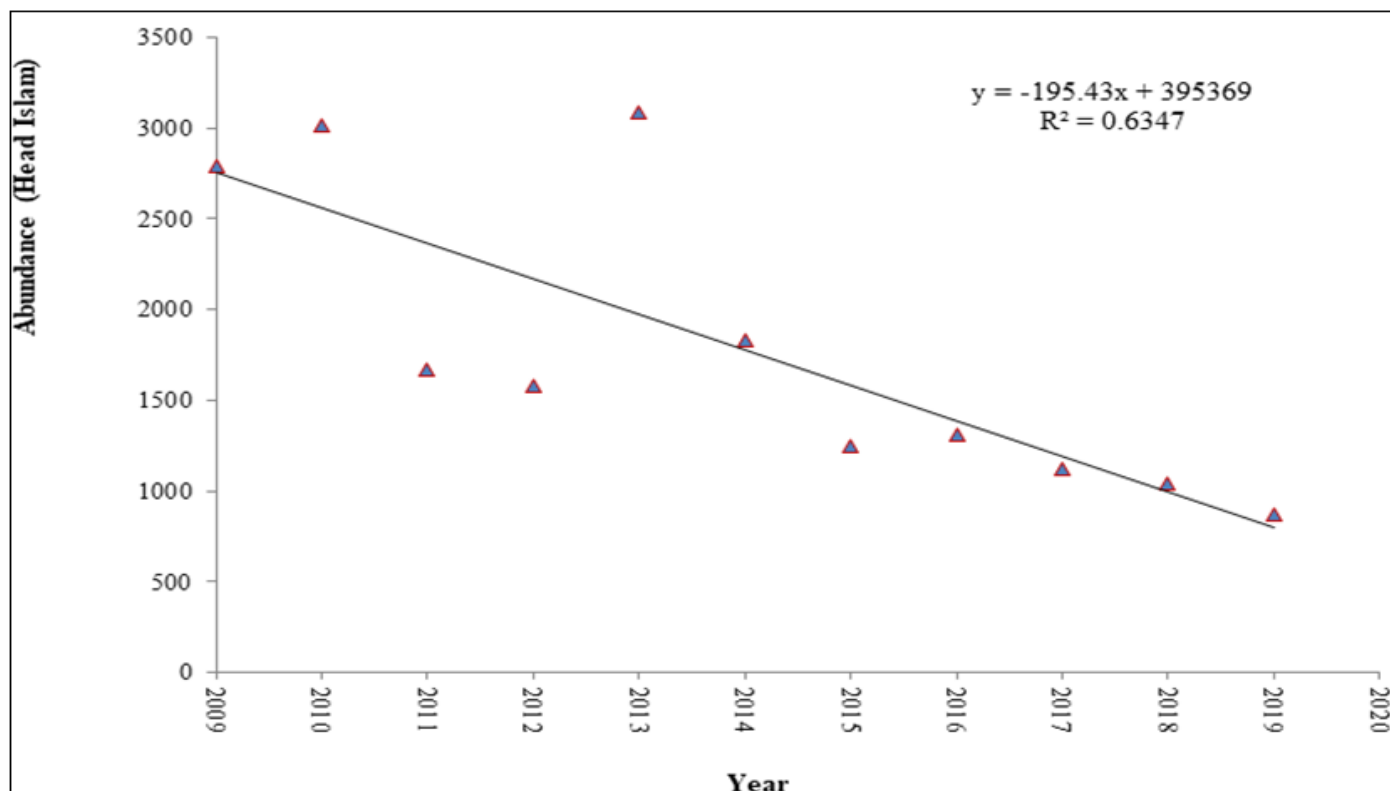


Fig 13 The Comparison of Ten year Abundance of Common Coot at Head Islam

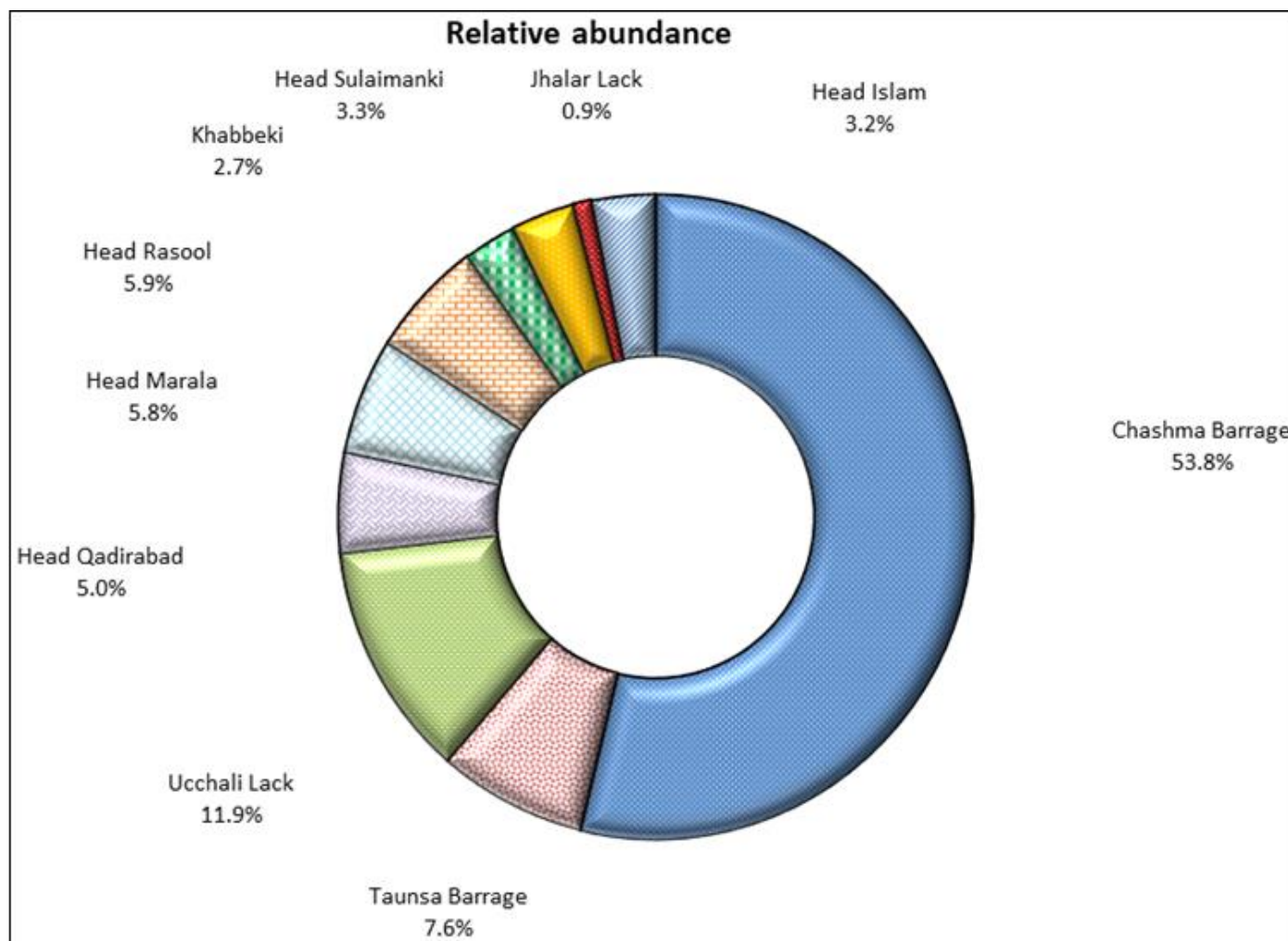


Fig 14 Overall Relative abundance of Common Coot in wetlands of Punjab

IV. CONCLUSION

It is concluded that many birds migrate from Europe and central Asian countries towards Pakistan during winter. Main breeding continents includes Asia, Africa, Europe and Australia. Common coot mostly occurs in Japan , Northeastern Algeria, Central Europe, New Zealand, Pakistan and china.

A wider distribution of common coot was found a long the fresh water lakes where it can find good quality vegetation. Coots can be seen in salt water lakes of Bourges (northeast Algeria). During our survey in Pakistan, it is reported at several wetlands such as Bahawalnagar (Sulmanki head works), Jassar (River Ravi) Sialkot , Chailanwala, Hafizabad (Qadirabad head works), Mianwali (Chasma barrage) Shahpur (Jehlum Bridge) , Rampur Nammal Lake , Jhalar lake , Uchalli lake , khabbaki lake and Rawal lake.

35% of the common coot population is situated in Karachi ,21% in Punjab while the rest is distributed in KPK and Baluchistan (Ali et Al , 2005) .

From ten wetlands (Head Qadirabad, Head marala , Head Rasool ,chashma barrage, khabbaki lake . Head Islam and head Sulaimanki were selected for census and sample collection.

Maximum population was recorded at chasma barrage (14276), which lead to uchali lake (7319) , Taunsa barrage (6625) , Head marala (1650) Head Rasool (1377) , khabbaki lake (1351) , Head Sulaimanki (1189) , Head Islam (873) and Head Qadirabad (810) . Least population was recorded at Jhalar lake (140) during survey of 2019.

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