

Little cormorant (*Phalacrocorax niger*) was the largest population seen in the entire period of study. The maximum number of birds observed was in August (858). The maximum number of nest was in July (323). All the species except Pond heron (*Ardeola grayii*) have seen throughout the survey. Pond heron (*Ardeola grayii*) began to breed in the July and were extended to September. Both the number of birds and nest of pond heron were too low in the heronry. Only one nest of pond heron seen in the month of July. During the entire period of the study, >10 nests of pond heron were recorded. The peak number of birds and nest were observed in the month of September and August respectively (figure1&2). The oriental darter is a near threatened species [24]. Maximum number of birds (235±) and nests (158±) were recorded in August. The Little egret comes in the third position in the case of nests count as well as bird abundance. In October they were found to be most numerous, up to 108. The recorded maximum nest count was in September (71). The maximum number of birds and the nests of Indian cormorant (*Phalacrocorax fuscicollis*) were recorded in August.

We test the nesting tree preference of the five breeding bird species among the various species of nesting trees by using chi square test and P value obtained is zero means significance. It indicates that there is an association between the nesting tree species and bird species.

4.1 Nest Abundance of Breeding Birds

The maximum number of nests of each bird species recorded is different in different months. The high nest count was seen in August in the case of Indian cormorant, Oriental darter and Pond heron. Whereas Little cormorant and Little egret shows maximum nest abundance in the month of July and September respectively. Percentage of the nest occupancy in different trees during the peak period of observation is shown in the (table 2). There were about 25 nesting trees belonging to 8 species are observed in Kallettumkara Heronry (table1). The percent of nest abundance in these tree species varies according to the breeding bird species.

(a) Little Cormorant

The Little cormorant builds their nests as follows, more than 50% of nest abundance seen only in the *Albizia Saman* (55.10%) and less than 15% is seen in rest of the tree species. *Tamarindus indica* and *Mangefera indica* shows the least nest abundance about (2.47%). No nests of little cormorants were seen in *Cedrus deodara* (table 2).

(b) Indian Cormorant

Of the recorded nest abundance of wetland birds, Indian cormorants seemed to selects mainly two trees (*Albizia Saman* and *Delonix regia*) for breeding. Both trees show equal (50%) nest abundance. Nests were absent in all other tree species (table 2).

(c) Oriental Darter

Mainly 3 tree species were preferred by the Oriental darter, for nest construction which is varying in abundance. Most preferable tree species is *Tamarindus indica* (56.32%), second is *Albizia Saman* (30.37%), and third is the *Alstonia Scholaris* (13.29%). Oriental darter does not build nests in

Atrocarpus hetrophyllus, *Cedrus deodara*, *Delonix regia*, *Macaranga peltata* and *Mangefera indica* (table 2).

(d) Little Egret

They built nests most commonly in (*Atrocarpus hetrophyllus*, *Albizia Saman*, and *Mangefera indica*) Higher nest abundance is seen in *Albizia Saman* (53.52%) and lower in *Mangefera indica* (19.71%). The nests were absent *Cedrus deodara*, *Delonix regia*, *Macaranga peltata*, *Tamarindus indica* and *Alstonia Scholaris* (table 2).

(e) Pond Heron

The bird species Ponds heron prefer to breed only in the *Cedrus deodara*. Thus 100% of their nests were seen in the same tree (table 2).

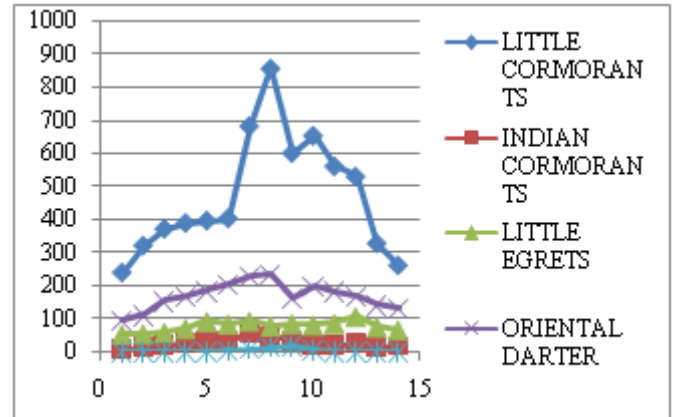


Figure 1: Bird abundance in the Heronry

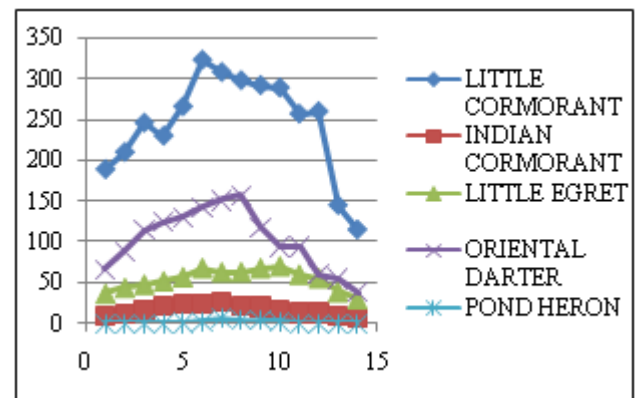


Figure 2: Nest abundance in the Heronry

Table 1: Nesting Tree Species

Sl. No	Tree Species	Height (m)	GBH (m)	Study sites
1	<i>Atrocarpus hetrophyllus</i>	12	1	Site 1
2	<i>Macaranga peltata</i>	16	1	
3	<i>Albizia Saman</i>	16	1.2	
4	<i>Albizia Saman</i>	17	2.75	
5	<i>Albizia Saman</i>	17	2.75	
6	<i>Albizia Saman</i>	17	3.6	
7	<i>Albizia Saman</i>	16	1.85	Site 2
8	<i>Atrocarpus heterophyllum</i>	14	1.55	
9	<i>Atrocarpus heterophyllum</i>	13	1.2	
10	<i>Alstonia Scholaris</i>	18	1.85	
11	<i>Delonix regia</i>	17	2	
12	<i>Tamarindus indica</i>	16	2.85	Site 3
13	<i>Mangefera indica</i>	15	2	
14	<i>Macaranga Peltata</i>	15	1	
15	<i>Albizia Saman</i>	17	2.3	

16	<i>Atrocarpus heterophyllus</i>	13	1.85	
17	<i>Tamarindus indica</i>	17	3.1	
18	<i>Alstonia Scholaris</i>	16	1.8	
19	<i>Atrocarpus heterophyllus</i>	13	1.75	Site 4
20	<i>Alstonia Scholaris</i>	16	2.2	
21	<i>Albizia Saman</i>	16	4.85	Site 5
22	<i>Delonix regia</i>	17	2.35	
23	<i>Delonix regia</i>	16	2.9	Site 6
24	<i>Atrocarpus heterophyllus</i>	11	1.55	
25	<i>Cedrus deodara</i>	12	1	Site 7

Atrocarpus heterophyllus(AH), *Macaranga peltata*(MP), *Albizia Saman*(ALS), *Alstonia Scholaris*(AS), *Delonix regia* (DR), *Tamarindus indica*(TI), *Mangifera indica*(MI), *Cedrus deodara*(CS)

Table 2: Percentage of Nest occupancy (%) in different trees during the peak period

Sl. No.	Tree species	LC	IC	OD	LE	PH
1	AH	13	0	0	26.8	0
2	CS	0	0	0	0	100
3	ALS	55.1	50	30.4	53.5	0
4	DR	15.2	50	0	0	0
5	TI	2.5	0	56.3	0	0
6	MP	4	0	0	0	0
7	MI	2.5	0	0	19.7	0
8	AS	7.7	0	13.3	0	0

LC (Little Cormorant), IC (Indian Cormorant), OD (Oriental Darter), LE (Little Egret), PO (Pond Heron)

5. Discussion

Based on this heronry no more previous published research works available now. This heronry was first located in the Government Model Polytechnic College Campus, of Kalletumkara in Thrissur district, Kerala, South India in 1995 and was reported by Mr. Jayachandran E S, faculty in this campus. The number of species, nests, and birds were too low at that time. Many of the trees in the railway station compound got cut down for line electrification in 2001 and hundreds of nests were fell down and large numbers of chicks were died. The KSEB also planned to cut the nesting trees in 2003, but this action was prevented by the timely intervention of bird watcher Mr. Rafy Kalletumkara and Rajkumar Namboothiri a former member of Kalletumkara panjayath and a nature lover. Previously there were many threats for the heronry like spoiling the nests and collecting nestlings for food and also for selling to liquor shops etc. After many conservation plans developed by the natural club the status of the heronry got improved.

The birds started nesting from May onwards due to the early rain. Little cormorants were the most common and largest populations in terms of bird count as well as the nests count. Similar result were obtained in Mangalavanam mangroves [5] and Kumarakam heronry [14]

The second largest nesting colonies found in the survey were Oriental darters. As per the information from the Water bird Census in India in 2002, only 489 Oriental Darters were recorded in the whole of India [13]. The population of Oriental Darter had declined in Kerala over the past three decades [22]. The South Asian biogeographically population

of Oriental Darter is estimated at 4000 individuals [23]. Surprisingly here it is found that though the oriental darter is a threatened species there were about 235± birds and 158± nests in the last week of August.

According to the previous reports, of January mid-winter water bird counts, the Oriental Darters breed in good number at Kumarakom heronry also [3]. The oriental darter was seen throughout the study period in this study. As the heronry is situated near the kole lands of Muriyad in Thrissur district, serves a suitable feeding ground to the breeding birds in this particular area. This may be one of the reason for the increasing the darter population in the heronry.

According to this study the little egret has the third position in nest count as well as bird abundance .It has been reported as the least numerous species in the Kumarakam heronry [14].

The maximum number of Indian Cormorant observed in this heronry was 26. But it was the second abundant species of Kumarakam heronry, 160 nests were recorded there [14]. Less than 10 nests of pond heron were recorded during the study period.

The Great Cormorants *Phalacrocorax carbo* displacing other colonial water birds in Kumarkam heronry [14]. Somewhat similar situation had been reported about this heronry earlier a huge tree *Tamarindus indica* was “conquered” by darters; thereby a number of little cormorants were shifted into other parts of the heronry viz, site1 and 4 etc [4]. According to this study, only few little cormorants also known to breed in *Tamarandus indicus* .But in the case of Oriental darters the most nest occupancy was seen in *Tamarindus indica* when compared to *Albizia Saman* and *Alstonia Scholaris*. Bigger size and larger canopy may be the reasons for choosing *Tamarindus indica* for breeding by Oriental darters.

Little cormorants breed in all the seven tree species except *Cedrus deodara* probably because of its limited branches. The reduced number of Little cormorant’s nests were seen in *Tamarindus indica* when compared to the other trees probably because of the “displacing” nature of Oriental darters [4].

Many Ornithologists suggested that the availability of nesting trees and nesting materials are the major factors which attract the birds to the nesting site along with food availability. Besides these, the nesting tree features including the size, height, canopy, number of branches are also have a vital role for selecting the nesting area.

The Little egret known to use 15 types of tree species for nest construction [9]. Here the bird preferred 4 tree species, and most nest occupancy is seen in the *Albizia Saman* probably because of its huge size, numerous branches and less competition from the mixed colony.

Indian Cormorants breed in viz. *Albizia Saman* and *Delonix regia*, which are preferred by most of the breeding birds in the heronry. *Cedrus deodara* was selected by the pond heron only. As the tree is situated a few distance from the other 6 sites of heronry may faces less competition and disturbances. The number of nests was less in *Cedrus deodara* when

comparing other tree species may be due to the limited canopy and minimum branches. Thereby other birds avoid it for breeding. The most nest occupancy is shown by *Albizia Saman* and was selected by as many birds probably because of its size, canopy and the presence of numerous lateral branches which supports plenty of nests.

The nest site selection always depends on the proximity of an aquatic habitat or river which supplies sufficient food [9]. This is true in the case of all species of breeding water birds in the study. As the heronry is situated both near the Thommana and Muriyad Kole wetland of Thrissur kole, in Kerala, South India, provide enough food for the growing young ones throughout the breeding season. The availability of nesting material, food, safety from predators and avoidance from disturbances are the major elementary necessities of the colonial breeding species in the heronry. By considering all these matters, the Kattettumkara heronry should be considered as most suitable breeding site for the wetland birds especially the Oriental darters. So the heronry requires special attention, and public awareness regarding water birds. It should be well preserved and legal protection must be implemented at the earliest.

6. Conclusion

Most of the heronries in Kerala are found within or close to human habitations. So both people and breeding birds have to suffer many difficulties. As this heronry is located near the railway station entrance and surrounding areas, due to mass defecation, rotting remains of fallen fish and it's the pungent smell have much disturbance to both passengers and their parked vehicles. So naturally they will think to destroy the heronry and this will result in adverse activities. We know that wetland birds and heronries are disappearing, due to human interference. So School level education and public awareness must be given regarding the importance of water birds as such as possible. This may helped to prevent the various anthropogenic activities like hunting and poaching of eggs and birds. This heronry also provides area for roosting as well breeding for other passerine bird species like crow, pigeon, myna, sunbirds etc. So the people have to think about the relevance regarding this place, and planting of more trees in this area should be promoted for all birds including the breeding colony.

7. Recommendations

Kallettumkara heronry supports the globally near threatened species of oriental darter in a very good number; it needs very much protection. Hence it should be declared as an important bird area (IBA) and we should most warmly welcome them here to have a peaceful breeding season in this area.

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