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"FEEDING BEHAVIOUR AND SUCCESS OF CATTLE EGRET (BUBULCUS IBIS) INHABITING RURAL AND URBEN AREA OF LAXMANGARH CITY, RAJASTHAN, INDIA

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INTRODUCTION:-

Any living organism requires considerable amount of energy for the survival and reproduction. Because, birds do not accumulate enough reserve food in their body as compared to high daily energy expenditure; constant food intake is essential on day to day basis to fulfill energy demand. Bird living in mosaic of natural habitat Patches may face space and time constraints while securing their energy requirements. Therefore, foraging strategies adapted by birds are one of the major interesting fields.

Kushlan (1978 a) Summarized various aspects of feeding ecology of wading birds. Vast literature on foraging ecology of wading exists, but egrets are much less explored. Very little is known about the stomach contents of the egrets, feeding ecology of the Cattle egrets apart from general description given by Ali and Ripley (1983) and Hancock et al. (1992). Several studies have been conducted at Punjab (Singh, N., N.S. Sodhi and S. Khera 1988, Sodhi, N.S. 1985, 1986, 1987) and at Chandigarh (Sodhi, N.S. 1986 b). These studies revealed that habitat utilization by the Cattle egret is non-stereotypic and varied in different localities. It evinced to the problem of habitat selection in the Cattle egret that might be influenced by constraints of foraging behavior and availability of food.

Seasonal variation in food abundance often influences habitat use pattern. Seasonal rainfall pattern changes availability of food in birds. For most of the wadding birds, Critical seasonality is created by wet and dry cycles of weather (Kushlan 1978 a). Most of wading birds forage early in the morning and are more likely to forage in flocks Soctt, D. (1984). Although early morning feeding is explained in part by the Proceeding night long fast, early feeding may also be the result of a Predictable and temporary increased availability of prey. Hafneret al. (1993) found that timing of flock feeding and tempral variation in foraging success of little egrets in the Cambridge of France were explained by low dissolved oxygen levels in water during the morning, soon after sunrise, dissolved oxygen increased as a result of the diurnal portion of plant respiration and capture rates decreased rapidly. Many egrets undertook regional movements with seasonal change in prey availability Jenni, (D.A. 1973, Grubb, T.C. 1976, Meyerrick 1962

Mukhrjee, A. 2000) which allows utilizing productive habitats available in other areas. Some egrets altered habitat use to exploit sequential availability of food in different habitat (Grubb 1976, Hafner, H. and M. Fasola 1992). Seasonal variation in habitat use is also recorded in the Cattle egret (Thompson, D.H. 1977, Hafner, H and M Fasola 1992). However, seasonal pattern of habitat selection and its relation to food availability could not be established by researchers. Therefore, it was studied during this study.

Feeding & breeding ecology of bird species could influences substantially by drought. Each species may differ in response to cope with the impacts of drought that usually exerted through scarcity of food. During drought reduced breeding performance were recorded in many egrets due to scarcity of food (Grubb, T.C. 1976, Thompson, D.H. 1977, Dinsmor, J.J. 1973). Some species of egrets observed to undertake regional movements in response to reduced food supply (Banner, G.S. 1994, Geering D.J. 1993, Hafnee, H. and Britton 1983, Meyerricks, A.J. 1962, Mukherjee 2000, Sodhi N.S. 1989 b). Whereas in some birds, expansion of foraging niche or habitat use (fish and caccamise 1985) and shift in diet occurred under shortage of food. Wading birds may forage on food left by humans. In Africa, Marabou storks frequently eat offal from slaughter house (Hancock et al. 1992), an easy extension of their natural habitat of eating carcasses of large wild animals. Powell and Powell (1986) described routine consumption of bait fish from local human residents among Great blue herons in Florida Bay, and showed that some birds specializes in begging bait fish from resident. Reliance on human food source may become particularly important when other foraging choices become restricted.

Population of the Cattle egret in arid zone of Rajasthan often experiences drought. Geering, D.J. (1993) has studied some aspects of ecology of the egrets colonies in North-costal New South Walse during drought and Sharah, H.A., E.A. Ali and I.D. Mohammed (2008) has also studied the feeding behaviour of the Cattle egret (Bubulcusibes) in Northeastern Arid Zone of Nigeria. They are both recorded that habitat used by Cattle egret at walse and Nigeria during drought found different from that of observed at other Placesduring normal season. Ciconiiform groups of wading birds appear to specialize in one of two main foraging strategies, visual and non-visual tactile foraging (Kushlan 1978 a). Generally egrets follow the tactile foraging and adapted mainly to probing. Uses of various other feeding techniques by egrets reflect behavioural adaptation to capture various type of prey in different habitats (Kushlan 1978 a, Elgood 1979).

MATERIALS AND METHODS

The study area was surveyed before starting actual research to classify various foraging grounds (Microhabitats or microclimates) as per Seshkumar (1982). All the microhabitat was visited once a week during 2010-2012 and number of foraging birds counted to decide preference for habitats in summer; monsoon, and winter seasons. Observations were made by using Olympus binoculars (10X50) to record number of Cattle egret found in different microhabitats.

The Cattle egret observed in aquatic and terrestrial habitats were separately recorded to avoid confusion due to diurnal foraging rhythm. Foraging behavior were observed to be in singles, pairs and flocks in farmlands, grassland, alongside grazing livestock as they search, catch, kill, tear and swallow their preys. Sex ratio of the foraging and nesting bird populations were determined, using double lens binoculars. When the Cattle egret occupied terrestrial habitats during morning and evening time and gathered at aquatic habitat during noon hours. Such diurnal foraging rhythm was studied at least, once a month and observations were made throughout the day at aholly interval covering all feeding sites. Intensified during critical time when it shifted habitat during morning between 7:30 – 12.00 h and afternoon between 3.00 – 5.30 h SHARH (2008) to determine time allocated by the Cattle egret at both types of habitats. The student t-test was used to determine the statistical significance between any two seasons.

The observations were taken in seven microhabitats viz. waste water body (WWB), municipal garbage dumping station (MGDS), animal dead body dumping station (ADBDS), agriculture field (AF), sand dune (SD), forest area (FA) and grazing field (GF). The birds forage in single, pairs and in flocks. Actively feeding individual was selected as a focal bird and attempts were made to cover different individual found in a various feeding sites. Focal bird was constantly watched for 4 to 10 minutes from a distance of 10 to 30 m. Observations on feeding behavior such as, number of steps, probes, food items taken, scanning for predator (vigilance) and other activities (i.e. preening, hopping, encounters etc.) were recorded in voice recorder and data were analyzed in the Laboratory. These all events were also recorded in movie by using Sony handicap & Nikon Coolpix camera 110 and data were analyzed in computer. Time allocated in various foraging activities including steps probing, handling time of food item, vigilance and other behavior were derived from the recorded data to formulate time budget of the Cattle egret foraging in seven microhabitats. From the recorded data variables; steps/min, probes/min, steps, probe, probing success (%) food intake rate (No/min and g/min) were also calculated.

Nomenclature to describe various feeding behaviors of the Cattle egret was followed as per Kushlan (1974 a, 1978 b).

FEEDINGBEHAVIOR

1. **Probing:** The placing of the slightly open bill into the substrate and closing the tip on encounter of the prey.

(a) **Shallow probing –** Less than quarter deep insertion of the bill into sediment.

(b) **Deep probing--** More than quarter deep insertion of the bill into the sediment.

(c) **Step probing –** The birds probes while stepping.

(d) **Multiple probing –** The birds probes at the same spot from shallow to deep.

(e) **Stationary probing –** Applying shallow, deep, or multiple probing around the body while standing at one location.

2. **Standing fly catching:** Catches air born prey while standing.
3. **Pecking:** Picks up the food material from the surface of the substrate.
4. **Bill dragging/grabbing:** The bird drags its bill through the loose substrate.
5. **Flipping:** Turns over objects like dry Cattle dung or stones to feed underneath.
6. **Foot raking:** Bird racks the substratum with its foot to get out the hidden prey.
7. **Groping:** The bird holds open bill into the water and lift it up.
8. **Hopping:** Flies short distance and alight.
9. **Head swaying:** Moves head from side to side out of water.
10. **Head swinging:** Moves bill from side to side in water.
11. **Running:** Moving quickly, or in this study, chasing a moving or flying insects.

FORAGINGBEHAVIOR

1. **Steps:** Bird walks slowly to fast from one feeding spot to another.
2. **Neck Shake:** Bird shakes its neck to remove unwanted adhesive material, or to get rid of flying insect.
3. **Body Shake:** The bird fluff lies feathers and shake itself.
4. **Vigilance:** The bird's attention is drawn by someone in the neighborhood. Its neck is been straighten and its bill is lifted a little upwards (Draulanset al. 1988).
5. **Preening:** The bird arranges its feathers on the feeding ground.
6. **Resting:** The bird stops feeding. It stands on its one foot or sits on the substratum.

. Packing a visual feeding technique was applied in all the microhabitat with relatively less in FA and SD. Bill dragging, flipping, and foot raking were used rarely; depending upon the situation and type of prey. In sand dunes (SD), the egrets used stepping and probing to dig out the insects (Beetles) was also seen in the GF where the egret was feeding on dung maggots.

The Cattle egret feeds on a wide range of prey, particularly insects, especially grasshoppers, crickets, flies and moths, as well as spiders, frogs, and earthworms. The species is usually found with Cattle and other large grazing and browsing animals, and catches small creatures disturbed by the mammals studies have shown that Cattle egret foraging success is much higher when foraging near a large animal than when feeding singly. When foraging with Cattle, it has been shown to be 3.6 times more successful in capturing prey than foraging alone.

Table: 2 show the applicability of the probing subtle. Shallow probing was applied in all microhabitats but success rate was greater in MGDS and ADBDS, whereas deep probing was mainly applied in all the microhabitats while it occasionally occurs in the ADBDS, SD and GF. Step probing was also found to be used commonly with a little preference

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in MGDS. Another frequently exercised subtle was multiple probing. It was most commonly applied in all the microhabitats with least preference to GF. Below is a 5 minute excerpt from my field observation recorded in video recording moiré and voice recorder.

Foraging- Prey density recorded in all classified microhabitats has been highlighted in the table:3 Cattle egrets commonly forage in flocks with domesticated Cattle and other mammalian livestock (Heatwole 1965; Jenni 1969),In the study area Cattle egrets mixed with Little egret, white ibis, Black ibis.In all foraging study highest average of the prey in 1 square meter quadrate was **50.2** insects recorded in the MGDS, and more than highest average of the prey in **1** square meter quadrate was **54** insects recorded in GF whereas lowest prey density was recorded in **SD** with 1.7 preys items square meter.

Food density and number of feeding attempts by the Cattle egret were noticed relatively higher in the WWB, MGDS and ADBDS. Feeding attempts in the GF and the AFH were higher than the FA and **SD** even though density of food was recorded more or less equal. Highest average of the feeding attempts with **9.8** per minute was recorded in the **ADBDS**. And minimum average attempts per minute were **3.05** in the **FA**. These variations in the feeding attempts were also obtained by applying analysis of variance.

Table: 1 Application of various feeding behaviors of the egret observed in the seven microhabitats,

Occurs, x = Occasionally occurs, - = Does not occur

Microhabitat → **Behaviour ↓**	**WWB**	**MGDS**	**ADBDS**	**AFH**	**SD**	**FA**	**GF**
Deep probing	+	+	x	+	+	+	x
Stop probing	+	x	+	+	+	+	+
Multiple probing	+	+	+	+	+	+	+
Standing-fly-catching	-	x	x	-	x	x	x
Packing	x	x	+	x	+	+	x
Bill dragging	x	x	-	-	x	x	-
Flipping	x	-	-	x	+	+	x
Foot racking	x	x	x	x	x	x	x
Groping	-	-	-	-	-	-	-

WWB = Waste Water Bodies

MGDS = Municipal Garbage Dumping Station

ADBDS = Animal Dead Bodies Dumping Station

AFH = Agriculture Farm House

SD = Sand Dunes

FA = Forest Area

GF = Grazing Field

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Table: 2 Feeding rate success, foraging and food density recorded in the 7 microhabitats, Data are presented as the mean value. Percent successful feeding attempts in parenthesis.

	Observations att/min	Success/min	Steps/ min	Feeding (min)/30 min	Food density/m2 with 15 an depth
WWB	4.44	0.48 (10.80)	5.20	28.60	10.20
MGDS	7.87	6.15 (78.15)	3.60	36.80	50.20
ADBDS	8.76	8.16 (93.15)	4.40	26.20	13.60
AFH	6.13	0.74 (12.07)	36.60	15.60	2.60
SD	4.11	0.47 (11.43)	39.80	14.20	1.70
FA	3.04	0.25 (8.21)	32.80	12.00	2.80
GF	2.49	0.21 (8.43)	21.30	10.80	54

Att = Feeding attempts

Success = Successful attempts

Food density is given as a number of prey items.

TIMEBUDGET

Various activity of a forager recorded to analysis the time consumed in each activity. It reveals that the relatively little percent of time has been spent in a body maintenance behaviour in the WWB, MGDS and ADBDS. Whereas highest percent time with 18.20% was spent in resting in the GF by Cattle egret. But resting in the WWB and AFH was not seen.

Mainly the egrets was noticed to feed extensively in the WWB, MGDS, ADBDS and GF where it spent more than 80-90% time in feeding and noticed to minimize walking time to less than 10%. The lowest time devoted in feeding was found in FA i.e. **40.21%** and maximum time devoted in walking was also found in FA i.e. 42.14%.

Vigilance was a frequent behaviour performed on all the defined microhabitats with the maximum 8.40% times in the AFH and minimum 00.45% in the ADBDS.

Interactions took place while foraging in a flock in all microhabitats except GF. Maximum interactions were observed in ADBDS with 02.50% time and minimum in GF with 00.00%.

Table: 3 Time budget of foraging behaviour of the egrets recorded in the 7 microhabitats. Data are presented as the percent time.

= Sample Size with 1 sample = 30 min

Habitat Foraging Activity	WWB N=7	MGDS N=208	ADBDS N=7	AFH N=15	SD N=16	FA N=14	GF N=20
Preening	00.36	00.66	00.00	01.54	01.18	01.38	01.43
Neck Shake	00.16	00.28	00.08	00.16	00.48	00.38	00.08
Body Shake	00.12	00.02	00.00	00.09	00.11	00.08	00.22
Resting	00.00	05.26	08.50	00.00	06.14	07.65	19.46
Vigilance	04.16	05.80	00.48	08.46	08.10	08.45	04.56
Interaction	00.42	01.84	02.48	00.09	00.07	00.16	00.00
Walk (Steps)	06.12	05.44	07.30	32.26	34.18	43.20	26.96

Feeding	88.66	80.70	81.16	57.40	49.74	38.70	47.29

WWB =Waste Water Bodies, MGDS=Municipal Garbage Dumping Station, ADBDS=Animal Dead Bodies Dumping Station, AFH =Agriculture FarmHouse, SD=Sand Dunes, =Forest Area, GF=Grazing Field.

DISCUSSION

A non-visual tactile forager was Characterized by the primary feeding techniques to capture its prey present 2underneath the any type of substratum. Its selection for the particular seven microhabitats and ten feeding techniques were apparently inherited from the generations living in the arid zone of Rajasthan, which were exploiting the available seven microhabitats. Because there is no evidence of any single general theory which explains habitat selection. The Cattle egret used various feeding techniques and behaviors in different microhabitats. However, it is primarily non-visual tactile forager, feeds mainly by walking slowly and probing into substrate. Almost all egrets use probing as a principal technique to capture prey (Hancock et al. 1992). Walking slowly is very common feeding behaviour used by most wading bird species (Kushlan 1978 a). In the Cattle egret it was mainly associated with probing. The egret applies various probing techniques which depend upon the type of prey, type of hard or soft substratum, depth at prey was available, and mobility and density of prey. But abundant density of prey on the surface of the substratum in the ADBDS results visual feeding niche, which could play a beneficiary role in adapting various foraging grounds. This statement rationalizes by essence for its pursuant towards exploiting various terrestrial microhabitats successfully, though it is secondarily a water-bird species. It exhibits several feeding behaviors demonstrates its flexibility in its activity level with response to the nature of the habitat, morphological and physiological features of prey and availability of prey, such as feeding ground with relatively higher prey density allow the egrets to apply universal techniques; stand and feed (Kushlan 1978). Given a repertoire of potential feeding behavior, the Cattle egret probably chooses any behaviour based on success rate or not energy return to fit its current need.

Though feeding repertoire of the Cattle egret was restricted mainly to probing and walking slowly, subtle variations were recorded in frequency occurrence of behaviour in different foraging habitats. The variations were probably attributed to different degree of food dispersion in various habitats. The Cattle egret use walking slowly less often and probing more frequently in habitats such as WWB, MGDS, where success rate was relatively higher due to abundant food in discrete patches. The reverse phenomenon was observed in habitats like AFH, FA, GF and SD where food items were found widely dispersed in low density. Such variation in frequency, use of feeding behaviours allows the Cattle egret to explore various microhabitats energetically in efficient way.

Feeding techniques such as aerial fly-catching and groping were restricted to some microhabitats and used in any one situation. Aerial fly-catching seems to be a passive feeding technique in which the bird wants to avoid the disturbance of an airborne prey. Looking at an overall applications of grabbing airborne, it is considered a secondary behaviour of feeding. Whereas application of groping is seen rare in the water due to its niche selection preference and may be because the bird is not dependent on water such as Little egret (Ali, S. 1941,Ali and Ripley 1983).A special use of feet in foraging is sighted as common among waders Meyerriecks 1959, 1966, 1971, Kushlan 1978. Heatwole 1965, Grubb 1976, Jenni 1973).

However, foot racking is employed in a particular situation by the egret to capture moving prey like spiders, hidden underneath the loose substratum. Further, habit of feeding on slow ground dwelling insects may dissuade to run after relatively fast moving insects. According to Kushlan (1978), bird is more likely to choose behaviour based on its success rate or on the time between successes. Application of packing instead principally used non-visual tactile method by the egret in the ADBDS showed relevancy towards successful attempts due to abundance of the prey items around the carcasses rather underneath the substratum. Whereas well scattered prey underneath the soft mud in the WWB reinforces the chance of escaping one shallow or deep probing. Hence, multiple probing is employed cardinally adapting to that ecosystem. In other microhabitats with the relatively lower prey density, the bird takes more steps in search of a better feeding spot by declining its feeding rate on the cost of a higher searching time. Likewise, depending upon the situation, foraging tactics, may change from habitat to habitat and minute to minute.

Among body maintenance behaviours, preening is performed moderately to devote major time in feeding. Moreover preening is mainly practiced during the pre-roosting and roosting time at the end of the day. Application of head shake and bill shake applied when its is necessary to release unwanted wet and soft soil attached to the bill. Body shake following fluffing up feathers is practicable in removing flying ectoparasite settled on the body.Ornithologists assumed that, in addition to looking for mates, birds flock to reduce the risk of predation or to increase their foraging success. Flocking reduces the risk of predation in at least two ways. First, a flock has more eyes to detect predators than does a single bird. Second, flocking offers safety in numbers because individuals crowding near the center of the flock are shielded from predation by those on its periphery. Flocking makes singling out a target more difficult for attacking predators (Caraco 1979). Likewise, flocking can enhance foraging success either by increasing the probability of searching and exploring food resources. In flocking unknowing individuals can follow the knowledgeable ones to the best feeding sites (Ward and Zahavi 1973, Soni,K.C.2008) or they may learn or copy the successful foraging techniques of their flock mates (Krebs et al. 1972). Thus flocking reduces the risk of predation and enhances one's feeding rate.

Function of social gathering in bird is often emphasized as anti-predation behaviour. In large aggregation, a predator could be detected more easily by mutual awareness of flock members than by an individual bird. Therefore single individual is more likely to become target of predators. If adult Cattle egret are feeding in flocks to reduce their risk of

predation, such behaviour would have two effects on their foraging behaviour. First, birds in large groups exhibit significantly fewer scanning efforts than would those feeding in small flocks or as singletons. Birds in large groups should look up less often and for briefer periods because other flock members would be in effect, sharing this responsibility. Second, birds feeding in large groups forage more efficiently (i.e., capture prey more frequently and with fewer steps and probes) because they would be spending more time looking for prey and less time looking up for predators. Precaution on fear being expressed in scanning while foraging is seen directly responsive to the disturbance. As other wading birds, the egrets also rest during the brightest hours of the day when predation risk may be high at feeding ground. Therefore they gather at well exposed aquatic habitat and muddy shore for resting. An inattentive foraging flock seek highest period in vigilance than anywhere else. Vigilance act is seen when anything suspicious is approaching near to the flock; such as motor vehicle in MGDS, street dogs in the ADBDS and human interference in the sewage and other microhabitats. It is least required in the carrion where flock size in large so alertness among individuals is moderate, feeding success in high.

Bird species that face seasonal fluctuation in availability of food have two alternatives; (1) they may shift to feeding on other food resources or (2) may move to other area where original food resource is available (Seedikoya, et al. 2005, Mukherjee, 2000, Siegfried 1971). Cattle egret seems to follow former pattern. Rainfall pattern and environmental changes associated with it has shown to influence. Seasonality in bird species (Siegfried 1971). Rainfall pattern affects phenological condition of grazing land, seasonal crops and thus food availability. Hence, seasonal changes in availability of food play a dominant role in habitat use pattern in Cattle egret. Seasonal variation in the number of egret in various microhabitats is appeared largely attributed to seasonal condition of the feeding grounds and its impact on the availability of food. Kushlan (1978) recorded similar observations on wading birds feeding in aggregation due to patchily distribution of food. In MGDS, food is available to the egrets throughout the year which allow then to forage in different seasons. Feeding in a group on the restricted resources may render benefit to individuals. Kushlan (1976) has also recorded the positive relationship between higher food density with the larger flock size has been reported in Great – blue heron (Ardeaheroidias).

Sewage is also exploited regularly by the egret except during the rich rainy days, which drain the settled water with the bounty of insects. Whereas microhabitat such as AFH in rainy season flourishes with several insects and allow the egret to feed upon insects. The GF is lush-full during the monsoon and allow the egret to prey upon its mesa-fauna, but the same ecosystem use to remain arid during winters and summers. Moreover, during the regular precipitation time, unlimited food supplies do not restrict the egret to feed at any particular site. Seasonal variation in resource availability plays dominating role in evolution of species and communities (Grubb 1976). Apparently this could be correlated to the egret, which is secondarily a waterfowl species but for mostly found to forage in the man-made terrestrial microhabitats.

According to Krebs (1974) and external parameters like flocking affect the foraging success. Draulans and Van Vessem (1985) noticed that the Grey heron (ArdeaCinerea) in their study area do not forage longer due to larger flocks. But according to Kushlan (1978), foraging in aggregation is advantageous as it decreases searching time between the food patches. Moreover, in aggregation, because of mutual awareness, scanning time effectively gets reduced. Solitary forager must remain more alert against potential predators, and hence waste time and energy which affect the foraging efficiency. Aggregation may not necessarily cause the feeding inter ference as reported by Gross – custard (1970) on the foraging flocks of pectoral sandpiper (Calidrismelanotus). Our observations in the Cattle egret feeding on MGDS agree with them. Increased conflicts among feeding egrets during the winter is relevant due to higher aggregation and higher food density in MGDS, but do not influence the flock to leave the site. Foraging about of any predator can be divided into pursuit time searching time and handling time (Soni K.C.2008). For non-visual tactile forager, pursuit time is zero because first contact with the prey is the moment of capture (Soni K.C.2008).. Since the Cattle egret is non-visual tactile forager, searching for food is most important because it determines the foraging efficiency. Abundance and distribution of food items differ in various habitats which have profound influence on searching time. According to Scott 1984, the Cattle egret expends the highest time in walking while searching food in terrestrial habitats where food items are found dispersed in wide area in relatively low density. Availability of plentiful food in discrete patches decreases searching time as in WWB, MGDS and ADBDS.

Even though there is a seasonal variation in the flock foraging strategy and the food availability in the MGDS, the exploitation of the MGDS remain regular with the relevant variation in flock size. This may be because even the lowest densities of food in the garbage do not result in increase of searching time potentially. Albeit it is recorded that the egret makes less attempts in the garbage when density increases during the winter normally it shows a positive correlation between the density of prey and feeding attempts due to short searching time, (Hafner and Fasola 1992). Whereas types of prey in the garbage are small and slow dwelling. Hence, with the higher density of prey more items are caught per attempt. As the Cattle egret is a tactile forager to which density of food profoundly influences searching time. Hence, there is a differential preference of different microhabitats and even differential preference of any one microhabitat seasonally. The number of foraging microhabitats used by the Cattle egrets is substantially influenced by the drought. In the years with normal rain, habitat us pattern is quite stereotypic, during which Cattle egret occupies usually less microhabitats, but when rainfall is less, the Cattle egret utilizes all seven microhabitats, due to scarcity of food.

Foraging efficiency depends on increase in handling time and the prey escape. Kushlan (1978), says white ibis responds to robbing pressure by selectively releasing most preys. The Cattle egret selects slow moving small size prey to maintain handling time zero and avoid kleptoparasitism in a flock kleptoparasitism is not observed in Cattle egret. However, surprisingly for unknown reason the Cattle egret some time releases large vegetative material without eating even after attempting to handle it. Such a common behaviourcannot be accounted for any specific reason. In creased handling time cannot explain this behaviour as handling time is significantly less when it is left than it is successfully consumed and perhaps it may be due to rotten character of food items.

Cattle egret derives its all nutritional requirements from the small size insects like fly maggots and cocoons, which also provide it facility to come to the some resources patches like some other wading bird. Like other wading birds, the Cattle egret also reserves the right to fight with other partners as it maintains feeding space and keep itself at a distance. Similar behaviour is reported in some wading birds (Kushlan 1981). Every species requires comfortable space among them while foraging, and therefore when crowding increases, interaction likely to increase. In some vertebrates number of aggressive encounters per individual increase with the group size regardless to space. The majority of encounters anon the egrets are recorded in MGDS and ADBDS where crowding is denser in a smaller area. In birds, the group size influences the rate of aggression by increasing both the number of encounters and interactions per individual (Hafner and Fasola 1992). Beside tactile prey searching techniques, an aggregated mixed flock foraging tendency of the egrets also bring a close proximity with other species and increases social conspecific and heterospecific interactions (Grubb 1976, Kushlan 1978).

Major occurrence of heteospecific interactions in AFH, GF and WWB is apparently relevant to lower food density and of course presence of different avifauna. Because of lower food density, covering relatively larger area in search of a prey would certainly increase the chance of any forager to come in a close contact with other foraging birds. But the egrets do not lose any heterospecific interaction against smaller species which can anyway win seldom over larger opponents (Kushlan 1978).

Occurrences of passive interactions among the Cattle egret are foremast neglected by not responding like many other flocks feeding avian species. The majority of the passive interactions are recorded as losing incidence in wading birds (Erwin 1983). They may not guard the feeding spot. Further, heterospecific interactions of the egret in MGDS are recorded chiefly with Black ibis, which feed in flying insects. As Black ibis run to catch the airborne prey, they are likely to conflict with the birds standing and feeding in the same area as they do. Adapting the social foraging patterns. The egret captures a prey as per size and behaviour of the prey. Success of capturing is dependent mainly on feeding techniques and apparatus of the egret as reported in storks also. The density of prey is considered a critical factor in prey capture as discussed Kushlan (1978) in other wading birds.

Change in habitat in diurnal foraging rhythm, provides changes in components of diet. It is important because in terrestrial habitat the Cattle egret consume vegetative as well as animal diet. In aquatic habitats, the Cattle egret found to feed mainly on chironomous larvae from sewage and captures other insects from waste water bodies. A wide range of food utility by the egret suggests that it would consume whatever could be captured by its primarily tactile foraging method. The food of the Cattle egret belongs to three categories like Herons & Little & Large egret (Siegfried 1971). The first category is terrestrial ground dwelling animals mainly dung beetles, second is dung fauna, and third was aquatic burrowing or free swimming insects. Its diet somehow resembles to the diet of its close relatives viz. Intermediate egret (Mckilligan 1990) and grey heron (Moser 1986). As these prey species are slow and hidden in sediments, non-visual methods of capturing the prey is employed. Capability of exploiting various microhabitats and accepting wide range of prey, the egret may be characterized as a generalists. Further, it searches its prey rather pursuing the same, which proclaims its plasticity in food selection and confirms it as generalists diversity in prey of the egret from vegetative material to Arthropods, Annelids and Amphibians in several foraging grounds clearly evokes the strategic adaptation for the resource utilization the Cattle egret accepts less profitable prey encountered while foraging. Because it can be consumed quickly without reducing foraging efficiency. It's feeding on many potentially harmful insects in crop fields shows its tremendous role in crop protection in the arid zone of Rajasthan. It also feeds on enormous quantity of harmful insects in the WWB and MGDS which denotes its important role in the ecosystem by removing harmful insects' fauna. Even-though food intake rate is much less in WWB than terrestrial habitats. Nutritive value of Chironomous larvae is not yet known in the egrets. However, its importance can be envisaged from the fact that the Cattle egret is often recorded to rely mainly on food available in ditches.

Foraging activity of the egret exhibits proportionally constant rhythm with the day length. Its resting in aquatic habitat during the mid-day is noticed similar to other waders (Kushlan 1978). Because of dark plumage, the Cattle egret it required regulation of thermal heat in the summer season by keeping itself to the proximity of limited water bodies (Kushlan 1978). The flock size of Cattle egret reduces during drought in the study area. It is because of low food availability. The bird uses MGDS and WWB which have food even during drought. But due to rich precipitation unlimited water and food resources are available to the egret. Thus the birds disperse in and around the study area. During winter, the flock size of this egret increases at limited feeding habitats available.

Assuming thirst can be the primary reason to visit an aquatic site, certainly at one time the egret has to fly to the aquatic habitat where it can also spend some time for social activities such as preening etc. Similar behaviour is also reported in other wading birds (Ward and Zahavi 1973). The generality of the plumage color gregariousness relationship and a social pattern are also the reasons for the egret to aggregate at disperse at one time. Typical calls and uttering sounds such as Rick Rack, Rick rack Rick-Rick Are made by few individuals before leaving the water body and rest follow them are responsible for aggregation of the Cattle egret.

Several diurnal species also feed during the night (Mukherjee 1971). Kushlan (1978) has also reported seldom occurrence of night feeding by egrets & Ibises.

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CURRICULUM VITAL

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Career Objectve: To be associated with an organization where I can enhance my skill and knowledge front line challenging position to perform the best of my capacity and provide me scope for upward movement to be a successful person in term of achievement and recognition.

Key Strength:

- Self-motivated and enthusiastic and confident.
- Positive attitude.
- Good communication skill.
- Endorsed with organizing and leader ship qualities.

Educational Qualification:

- P.G. in Zoology in year 1998-99 (from MDS Ajmer, with first division 60 %)
- B.SC. (Botany, Chemistry & Zoology) from University of Rajasthan Jaipur (with First division 64%
- Senior Secondary from R.B.S.E., Ajmer (Raj.) in 1993 (with II division)
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Professional Qualification:

- Ph.D. Pursuing from Maharaja Ganga Singh Govt. University, Bikaner
- M.Phil. from Global University Nagland in July 2009. (WithIs division 71%)
- B.Ed. from MLS University, Udaipur (Rajasthan) (IInd in theory &Ist in Practical)
- M.A. in Education from IASE, Sardarshahar, 2008 (with 64%)

Professional Experience:

- Working as a lecturer in the department of Zoology at Shri B.D. Todi College, Lachhmangarh (Sikar)
- Since 19 July 2004. Worked as a senior teacher during session 1999-2004 (May)
- Worked as a science lecture in Sh. NathmalTodi B.Ed. College, Lachhmangarh (Sikar) during 2007-10.

Project/Traning/Seminor

- Participated in many National Seminar, workshop & symposia.

- Working as a Principal investigator for Minor Research Project sponsored by UGC.
- Working as ain charge of women cell since 5 years.
- Organized a workshop on Aids in the department of Zoology.
- Taken session on AIDS counseling and lecture on many diseases program me are organized by various institutes.

Publications:

- I presented paper in nation seminar organized by Lohia P.G. Govt. College, Churu on the "Seasonal" variation and environmental stress on the Cattle egret" and abstract is published.
- Some article on various disease are published in a monthly magazine "Parmhiteshi"

Extra-Curricular Activity:

Award/Selection

- Awardee from "AIDS control programme" organized by departs of AIDS Delhi.
- Awardee from "Environmental department of Rajasthan Govt." in 1994-95, 1995-96.
- All Co-curricular activities are actively participated by me.
- Games and sport are also played me.
- I select at state level Volly ball player.
- Actively participated the national literacy mission, NSS, Yojnamanch etc.
- Worked as a casual announcer and compeer for many programmers at FM radio station, Churu. Working as a cultural programmeincharge from las sin years.
- Presently I taken the charge of NSS programme officer.
- Working as an internal and external examiner appointed from Universities.
- Working as an academic consular for the "IGNOU"
- I select a member of BOS (Board of studies) in Universities of Rajasthan.
- Warked as PI (Partner institute) coordinator conducted by IGNOU at Sh. B.D. Todi College, Lachhmangarh (Sikar)
- Working as anincharge for "Shikayatprakosth during union election and all acedamic year at B.D. Todi College, Lachhmagarh (Sikar).

Language:

Hindi, English, Marwari

Cultural Activities:

- Six first prizes are won at Lohia P.G. College, Churu in different cultural activities.
- Conducted many cultural programmeorganizsed by Govt. and Non Govt. organization like programme of republic day conduct by me with anchoring organized by SDM.