Purva Mimaansa
A Multi-discipinary Bi-annual Research Journal
(Double Blind Peer Reviewed)

Vol. 8 No. 1-2, March-Sep. 2017
ISSN : 0976-0237

Parental investment and brood defense in Indian peafowl (Pavo cristatus) in district Ambala, Haryana.

Sarita Rana

Abstract

Peafowl belonging to family phasinidae of order Galliformes are the largest ground nesting birds known for its attractive and irradiant plumage. The aim of the study is to investigate the parental behavior and brood defense of the polygynous species in district Ambala of Haryana. An attempt is to relate parental behavior of peafowl with various variables influencing egg and brood defense. Peahens make rudimentary nest consists of nothing but a shallow scrap hidden under thorny bushes. Egg clutch comprise of 3-8 eggs of buff coloured eggs. Nest destruction and chick mortality is common in peafowl so birds have high potential of renesting. Newly hatched chicks are dry and well developed and able to move around in one or two hours. The peahen leads her nidifugous chicks to shelter in dense vegetation. Nesting female spends various stages in incubation period as shown in depending upon various environmental variables such as dozing, vigilant. Awake, preening and absent from eggs. Brood defense decreases with increase in offspring age from nestling to fledglings as fledglings can jump upto certain extent when predator approaches and can avoid threat. Parental investment increases with increase in offspring quality

Introduction

Peafowl is the largest of family phasianidae and common among most of the pheasants with extreme sexual dimorphism. The male possess highly specialized ornamental plumage with iridescent colours, erect crest whereas female do not possess long and beautiful rectrices as compared to male giving it a dull appearance. Both sexes moult after breeding season and moulting takes around two months. Feather regrows but growth is very slow as male train do not reach full size till following mating season. The preferred habitat include tall trees to roost and open grassland for breeding which provide adequate breeding sites. Peafowl is found in mixed flock of male, female and juveniles found foraging roosting and resting. Adult peafowl roost at night on tall trees in large groups but in daytime the segregate in small groups.

Species is ploygynous i.e. male with several females which is also called harem-defense-polygyny in which male is attended by the harem of four to five females. The female choice of mating depends upon the morphological characteristics of male i.e. number of eyespots on the train. Morphological characteristics of male reflect the male age, condition and which may be the indication of good genetic contribution to future progeny.

Breeding season continues since May to September but is related to the onset of monsoon as laying begins only after the first rainfall shower. Arrival of monsoon brings marked decrease in the temperature which facilitates male display and defending of lek territories. Mating begins in may

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and egg laying in June. Peahens make rudimentary nest consists of nothing but a shallow scrap hidden under thorny bushes. Egg clutch comprise of 3-8 eggs of buff coloured eggs. Nest destruction and chick mortality is common in peafowl so birds have high potential of renesting. Female start to incubate after clutch is complete and precocial chicks hatch in 28-30 days. The present study covers the various aspects of the parental behaviour of Indian peafowl o which no such extensive study have been made so far.

Study Area and Methodology.

The study was conducted in the district Ambala Since April 2014 to October 2016 in different villages of the district. The vegetation types of various villages were slightly different from each other and so helpful in predicting the effect of habitat types on the breeding behavior of Indian peafowl.

Mixed flocks of peafowl were followed before commencing of breeding season to observe the social behavior of Indian peafowl. Characteristics of mating lek were recorded. Nest sited were searched randomly or following the incubating female. Most behavior observations were taken using 60/80 Olumpus Binocular and Sony ILCE 5000 Camera with Zoom lens 300mm. Time budgets were analyzed using regular hour interval Daily routines of incubating females were recorded by observing female by 2 hours of interval. Time budgets were used as ndication of parental investment in nesting. Majority of analysis performed were non-parametric using SPSS 7.5 version.

Results

Chick growth and maternal behavior

Newly hatched chicks are dry and well developed and able to move around in one or two hours. The peahen leads her nidifugous chicks to shelter in dense vegetation. For first ten days chicks remain very close to mother. The chicks remain in loud vocal contact with mother which may attract predators so peahen had to take extensive care of chicks. After 12 15 days chicks can flutter over small hedges and fly over small distances. After four weeks develop small crest and two months later both sexes appear like immature females. For first six months chicks remain with mother. In following breeding season they may join same or different flocks.

Females become mature in two years and reproductive success may increase as female grows old. Male on other hand becomes sexually mature in three years. During first year male appears like females as growth of plumage and crest is not complete. Nesting female spends various stages in incubation period as shown in Fig. 1. depending upon various environmental variables. This may be sitting vigilant with head alert and neck feathers raised. Awake with eyes opened but not vigilant, dozzing with eyes closed and head under neck, preening, standing on eggs and absent from eggs.

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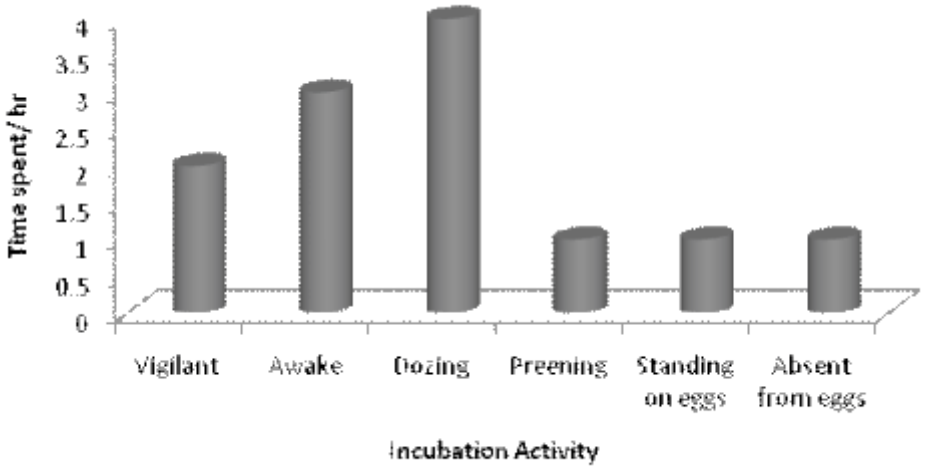

Fig.1 showing time spent in various incubation activities.

Various environ mental parameters have variable in flue on the various parametric varialbles during parental care starting from egg laying to hatching as shown in Table 1. Rich vegetation growth is necessary for survival of eggs and chicks and so clutch size and brood size increase in dense vegattion.

Table 1. Influence of various variables on parental behavior of peafowl.

	Clutch size (n)	Brood size (n)	Incubation period (Days)	Egg Weight (g)
Temperature	2-4	1-2	26-28	98
Vegetation growth	6-8	4-6	28-31	102
Rainfall	4-6	3-4	28-30	100
predation pressure	1-2	0-1	26-28	101

Brood Defense

Brood defense decreases with increase in offspring age from nestling to fledglings as fledglings can jump upto certain extent when predator approaches and can avoid threat. Parental investment increases with increase in offspring quality as more developed offspring have more probability of survival. So deterring of predator will consequently increase with increase in brood size. As parent age increases brood defense increases so older peahens show greater brood defense as compared to young females.

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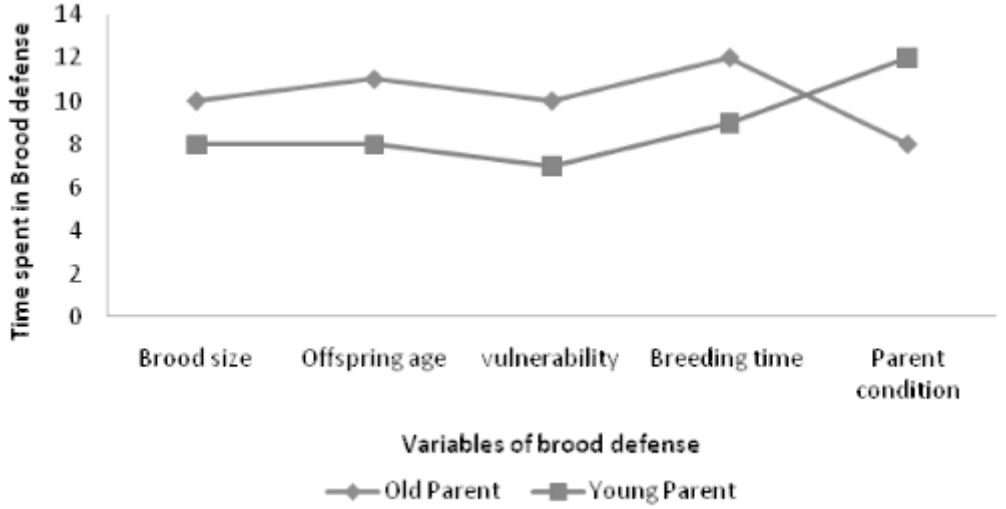

Fig.2. Comparison of Brood defenseVariables between Young and old Female Parent.

As the breeding season progresses brood defense increases. Later broods are defended more as compared to earlier broods due to decrease in chances of renesting during end of breeding season. Brood defense is shown more towards vulnerable chicks but decrease as chicks develop from hatchling to fledgling stage.

Discussion

In the may season at the beginning of egg laying many dump nests and single abandoned eggs were found .The female preferred thick vegetation cover or nesting. But growth of thick vegetation nettles peak during June –July. So egg laid during may are abandoned and not incubated by the female. Peahen in such cases prefers to abandon such early laid eggs instead of wasting it resources on such eggs. Dense vegetation cover provide concealment to eggs and nests so peahen prefer to nest in June when vegetation cover is at the peak Pichorim,M & Monteiro, F 2008.

Broody hens are easily distinguishable from non-broody hens as females with nest are always alone and march to and from nesting to breeding grounds. Neck feathers of broody females are fluffed and rest of plumage is bedraggled. Chicks hatch synchronously and female lead their precocial nests from nest to avoid predators. Unhatched eggs are abandoned even if they are piping. Newly hatched chicks may join other peahen to form gang broods or brood amalgamation which is parental behavior observed in peafowl. The degree o chick mortality decreases as chicks able to learn flight. Survival of chicks depends upon many factors like fitness of eggs and chicks, reproductive value of female and environmental factors. Clutch and chick fitness include clutch and brood size and quality and age. Parental reproductive includes parental age, experience and quality. Environmental factors include resource availability, predation level, time of breeding and brood competition Quader,S (1995)..

Availability of female to manufacture egg depends uon the availability of nutrients (protein fo for

yolk, fat for albumen production and calcium for shell). Any limitation on these resources may constrain egg size. Deterioration in environmental conditions leads to increase egg size and decreased clutch size. This is because large egg produce developed precocial youngs. Bur brood size decreases due decrease in availability of resources to female. An increase in egg size is adaptation of parents to equip their developing embryos with more nutrients to prodoce healthier chicks at time of hatching Santoshkumar, E and Balasubramanian, P (2010). Large eggs thus give rise to large offspring which may face competitive conditions better and withstand environmental pressure.

Nesting behaviour may contribute to offspring fitness. Nest preparation and maintenances may be is generally necessary for protection of clutch from predators parasites, temperature extremes. For species with uniparental care continuous nest attendance is not possible since incubating female have to leave nest for feeding Magnussen,E & Jensen,J.K 2010. While a parent is absent from nest clutch is at increased risk of predation. So parent contributes directly to the fitness of offspring. The level of parental investment may depend upon the parent age, experience and quality and also on the size, number of clutch and brood condition. Clutch size may decrease with increase in breeding season due to loss of resources and low vegetation cover Pablo, V., Oscar,G & JoseI.A (2010). Higher level of vigilance with large clutch and later stages of incubation Gabiel, luz., et.al. B 2010. With progressing breeding season vegetation cover, food availability decreases which lead to decrease in clutch but increase in egg size.

Parent may show different behavior towards predator as it may distract predator, it may avoid or abandon the chicks. This is because death of parents means death of offsprings and parent may loose the chance to breed again and produce another progeny Budgey,H.V. 1994. So different types of distractive behavior is show towards different types of predation pressure. Parental investment again increases with increase in brood size. In precocial species predator usually takes single offsping as compared to atricial chicks in which entire brood is predated. So Parental care is more in cases of increased brood size in which peahen ahd to pay more attention in protecting mobile precocial chicks.

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