観 察 記 録

1) 1972年8月8日～10日、スダジイ(コジイ)が優占する照葉樹林内、およびそれに隣接した、シイの若齢木にイヌツゲやオオバヤシャブシ、クロモジなどが多く混じった林で、同時に最高9羽を観察した。確認方法は、チュルチュルチュルと聞こえる囀り、ヒーッ、ヒーッと聞こえる鳴き声、および最短距離 1.5m からの目撃による。

2) 同年9月17日、同所にて幸丸政明氏が2～3羽の囀りを記録。

3) 1973年4月10日、作業所内を流れる小川沿いの、照葉樹林と落葉樹林が接するところで囀っている1羽を観察。翌11日には、アブラギリの造林地とスギの造林地の境で1羽、クスの造林地で2羽、それに隣接した竹林にて1羽、それぞれ囀り・鳴き声・目撃のすべてで確認。

4) 同年4月24日、クスの造林地で囀る1羽を確認。翌25日にはおらず。

確認方法が採集によらない観察だけのものであるため、確実性を欠く面もあるが、次に述べるいくつかの点から、これらの記録がイイジマムシクイのものであることに間違いがないものと確信する。第1に、この種の囀りには近縁のセンダイムシクイやメボソムシクイに似た面があり、節まわしがそれらにそっくりなところもある(樋口, 1971)が、前記したチュルチュルチュルと聞こえる囀りは、明らかにそれら2種と区別できること。第2に、ヒーッとかヒッとか聞こえる鳴き声は、エゾムシクイが時々出す以外は、メボソムシクイやセンダイムシクイでは殆んど聞かれず、一方、イイジマムシクイでは、明らかに警戒していると思われる時以外にも、非常に頻繁に出し、これらの場合にもそうであった点。第3に、近距離からの観察により、外観上最も良く似ているセン

ダイムシクイに見られる白っぽい頭中央線やそれに沿った黒斑のないことを確かめたこと。第4に、鳥のほうから観察者に向かって近寄ってくるのが何度かあったが、これに類した行動は、伊豆諸島で繁殖するイイジマムシクイで多く見られること、などである。

青野作業所一帯ではセンダイムシクイが繁殖し、イイジマムシクイが観察できた時期にも見られた。この場合、興味あることに、前記した状況からもわかるように、イイジマムシクイはセンダイムシクイが生息している落葉広葉樹林には見られず、照葉樹林や、落葉樹林でも照葉樹林やスギ林に接した暗い部分にいたることが多かった。

なお、ごく稀ではあるが、イイジマムシクイには伊豆諸島内でも越冬する個体があり、近年記録された例として、次のものがある。

1. 八丈島名古付近, 1971年12月18日, 茂田良光氏1羽観察。

2. 三宅島あおさ山神社内, 1972年12月10日, 佐藤行雄氏1羽観察。

3. 三宅島坪田部落美晴館付近, 1973年2月18日, 佐藤行雄氏2羽観察。このうちの1羽は、カラーリングにより、筆者と佐藤氏で1972年の繁殖期に同島伊豆部落で個体識別したものであることがわかった。

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Ecological Studies of Biomass of the Peafowl (*Pavo cristatus*)

Indra Kumar SHARMA

孔雀の個体群に関する生態学的研究

要 約: インドでは、孔雀は神聖な鳥として扱われ、国鳥となっているが、同時に個体数が多いので農作物に対する害鳥となっている。従って大農場のある村落では、個体数も密度も最大である。しかし大庭園では、餌の関係から一般に考えられているほど個体数は多くない。

一方餌の少ない谷間や不毛の村落、天敵動物の多い地域では、その個体数は著しく少ない。

また人間が彼らの個体数の増減に大きな影響を及ぼしている。このほか植生、天敵動物、気象なども個体群に重大な影響を及ぼしている。

性比は一般に雌のほうがすこし高いが、上述の不毛の地ではその逆の現象が見られる。

このように孔雀はインドでは人間生活と密接な関係を持っているが、その個体群の動態に関する研究は殆どなかった。ここではその生態と個体群の動態に関して述べたい。

Introduction

The peafowl enjoys status of sacred bird and the national bird of India, because of that it enjoys protection by Indian masses, on account of that biomass of the peafowl is extraordinary high in several parts of India. As the peafowl is pest to agriculture, high population of it causes much nuisance to farmers so farmers hate this charming magnificent bird. Former ornithologists have not studied biomass of the peafowl. BLANFORD (1898) narrates forest, bushy ground near water and cultivated areas are favourite habitats of the peafowl. BAKER (1930) narrates the peafowl is found at every village and at streams of hills. FINN (1911) narrates it prefers to live near water. WHISTLER (1949) narrates low hills with stream, cultivated areas are its popular habitats. ALI (1968) narrates dence scrub jungle, deciduous jungle and foot of hill as favourite habitats of the peafowl. I studied ecological aspects of biomass of the peafowl at various typical habitats at and around Jodhpur in 1972.

Method and Procedure

Several typical habitats of the peafowl were selected for the study purpose around Jodhpur in the radius of 25 km. Peafowl were counted rapidly in mass at food sites and roost sites which could give fairly accurate number of the peafowls at the habitat as almost all peafowls gather for food and roost otherwise they remain scattered. Here habitats I mean a particular area where peafowls of one place usually reside and move for food, rest and roost. In arid area at a small village the few peafowls reside there, there that is one habitat of the peafowl in a large region. At large town of fertile area peafowls of a village

reside at different corners with rather variable environments with their own territories that constitute several habitats of the peafowl in a region.

Physical Conditions of Jodhpur

Jodhpur is situated at 26°N latitude and 73°E longitude at altitude of 242 meters M.S.L. It is a semi-arid region having some quite arid areas as well as green oasis of agriculture farms and large gardens. Annual rainfall is 365 mm, the rains are mainly in July-August 240 mm monsoons. Maximum temperature occurs in June 45°C and minimum in January 4°C.

Habitats and Populations of the Peafowl

Ratanada

It is suburb of Jodhpur having some large residential gardens and some religious people feed them together with pigeons and other birds. There are four peacocks and four peahens. Peafowls emigrated here from Raikabagh Palace garden and Umed Bhavan Palace garden due to population pressure at the native habitat. Total population comes to eight at the habitat in the area of 1.8 km² that makes population density 5.5 (whole figure five) peafowls per square kilometers. Sex ratio comes to 1:1 male to female (cock to hen).

Rail House Colony

At suburb of Jodhpur there is large garden at the residence of Divisional Superintendent of Railways besides that there are several other fair size large residential gardens in the adjoining area of bungalows of other officers. Few religious people also feed grains to local peafowls near the road passing through the bungalows. There are four peacocks and five peahens in the habitat of area 0.8 km² that makes the density 11.2 and sex ratio 1:1.2 male to female.

Umed Bhavan Palace

It is a large palace of the former ruler with large garden at small hill with scrub jungle, situated about two kilometers from the city area. Local people and staff personnels feed food grains to the peafowl. There are eleven peacocks and fourteen peahens in the area of about 0.7 km² making population density 17.5 peafowls per square kilometers and sex ratio comes to 1:1.22 male to female.

Mahamandir Farm

It is a medium size agriculture farm at out

Fig. 1. Peafowls picking grains fed by the people of village.

skirt of urban area. Local people feed enough quantity of food grains to the peafowl. There are 18 peacocks and 23 peahens at the habitat in the area of about 1.2 km² making density 34.1 peafowls per km². Sex ratio is 1 : 1.27 male to female.

Mandore Gardens

It is a large public garden 10 km away from urban area. Here there is large enough area of lawn and shrubbery, some supplementary food is acquired from adjoining human locality and at valley areas. Here there are 8 peacocks and 8 peahens in the area of 3 km² making the population density 5.3 peafowls per square kilometers and sex ratio of 1 : 1 male to female.

Surpura Village

It is an agriculture farm area 15 km from the city. Here cultivation is done throughout the year and villagers feed food grains to peafowl and other birds at the squares of the village. Here there are 53 peacocks and 72 peahens in the area of about 3.5 km² making the population density 35.7 peafowls per square kilometers and sex ratio 1 : 1.33 male to female.

Nandadi Village

It is a small village where some cultivation is done during rainy season. Peafowls acquire food from cultivated land and partially from jungle area and the local people also feed them. Here there are 3 peacocks and three peahens. These live in large area of 5 km², that makes 1.2 peafowls per square kilometer density and sex ratio 1 : 1 male to female.

Beriganga Valley

It is light forest valley 15 km from Jodhpur with a perennial stream. Peafowls acquire food in the jungle of valley and plain near by. There are three peacocks and two peahens in the area of 3 km², that makes population density of 1.6 peafowls per square kilometers, the sex ratio comes to 3 : 2 male to female.

Table 1. Various aspects of population of the peafowl at some typical habitat Jodhpur in April 1972

Habitat	Biotope	Density	Sex ratio
Ratanada	8	5.3	1 : 1.00
Rail House	9	11.2	1 : 1.25
Umed Bhavan	25	17.5	1 : 1.22
Mahamandir	41	34.1	1 : 1.27
Mandore	16	5.3	1 : 1.00
Surpure	135	35.7	1 : 1.33
Nandadi	6	1.2	1 : 1.10
Beriganga	5	1.6	1.5 : 1.00

Study of biotope, population density and sex ratio at various habitats (Table 1) reveals that biotope is

highest at Surpura village where there are large evergreen agriculture farms and the local people feed supplementary food of food grains. Biotope is also enough high at the agriculture farm of Mahamandir where local people feed grains. Population is fairly high at large garden (Umed Bhavan) where local people feed food grains to the peafowl. Population of the peafowl is not high at large garden of Mandore where supplementary food of grains is not available to the peafowl. Biotopes are poor at arid village i.e. Nandadi and valley i.e. Beriganga having scarcity of food throughout the year. This shows evergreen agriculture farms where the local people feed the peafowls makes largest biotope of the peafowl.

Population density also shows somewhat similar trend of biotope, highest at village having large agriculture farms and food grains fed by the local people and it is lowest at small arid village having cultivation only once a year having scarcity of food most of the year. Population density is comparatively higher at gardens where local people feed some food grains there the peafowl has not to wonder large area in search of food and shelter otherwise large home range makes the population density lower.

The tables also reveals that sex ratio of male is slightly poor than female in general, female ratio increases with fertility (food availability) of the habitat, at some what hardy habitat female ratio turns poor, according to my observations it is because female (peahen) is delicate by nature, she cannot withstand hard life to wonder long distances in search of food and adverse climate of the habitat. Peahens suffer much at valley where enough number of carnivora animals hunt incubating peahens. Secondly male chick is hardly in nature so he can withstand hard life of the habitat where as female chick comparatively perishes in adverse conditions of arid habitat.

Vegetation and Population Density

Vegetation provide food and shelter to the peafowl. Grasses and cereal crops provide abundance of food of seeds (or grains) and leaves blades, shrubs also provide some food to the peafowl of their seeds and sprouts. Because of enough food supply at grassland or crop fields, population of the peafowl is found high at agriculture farms. Trees are required only for rest and roost purpose, requirement of them is few in number hence habitat having large number of trees but less abundance of grasses there, population of the peafowl is found less as it was found less in Mandore gardens and Beriganga valley. Agriculture farms make a ideal habitat for the peafowl having abundance of grasses (or cereal crops) for food and the few trees growing in farms serves for rest and roost because of that population of the peafowl is found highest at agriculture farms.

It was observed that from less green habitat significant number of peafowls particularly peahens migrate to close by more green habitat a farm or garden for adequate food and shelter in the draught weather that is from April to June and they return back on commence of rainy season i.e. July when grasses again grow and trees sprouts making the native habitat amiable enough to live.

Man and Population of the Peafowl

It was observed that man has effected the population of the peafowl both positive as well as negative.

Positive Role by Man

Local people of Jodhpur have played extraordinary positive role in increasing population of the peafowl at several places in several ways. Here local people consider the peafowl as a sacred bird hence they feed food grains and in this way they solve its major problem of food in the semiarid and arid region. Because of plenty of food natality rate increases and mortality rate decreases as man provides protection to nest of the peahen from carnivora that greatly increases the population of the peafowl. Because of that reason population of the peafowl is very high at villages like Surpura.

Local people never hunt or kill the peafowl, neither they permit others to do so, hence mortality rate of the peafowl is very low and that is only by natural death or rarely by some carnivora. There are several places in India where the peafowl was not considered sacred bird but it was treated as game bird at such places it got vanished or became rare. Here at some military colonies where outsider non-religious persons who do not consider the peafowl as sacred bird population of the peafowl has got very low by illegal stealth poaching by them. Some notorious boys and wicked persons occasionally rob nests of the peafowl and harm to population growth of the peafowl.

Carnivora Animals and Population of the Peafowl

The dog is the most serious enemy of the peafowl as it robs large number of nests and brood of the peafowl hence population growth becomes very poor at habitats infested with stray dogs. Mahamandir farm is infested with stray dogs hence population of the peafowl not reached to climax otherwise it is very suitable habitat. Dog, wolf, cat and panther etc. are natural enemies of the peafowl but they seldom succeed to kill the adult peafowl but fairly harm population growth in jungle as the dog does in urban and semi-urban habitats by robbing nests and broods of the peafowl at valleys i.e. Beriganga.

Effect of Climate on Population

It was observed that weather directly or indirectly effects population of the peafowl. At arid region weather is mostly extreme so suitable (amiable) period

for breeding is very short one, hence there breeding occurs less than that habitats of fertile areas having amiable weather for longer period as large percentage of peahens population gets chance to breed and when nest has been robbed she may breed second time in prolong breeding season.

It was observed that irregular and less rains in July-August (breeding season) highly decrease breeding of the peafowl which reduces population growth. Rains also effect grasses and crops thus effect food availability at the habitat throughout the year. In this way rains indirectly effects population growth of the peafowl.

As already discussed that in summer in semi-arid regions delicate natured peafowls particularly peahens migrate from drier habitat to close by greener habitat for adequate food and shelter against scorching heat as dry habitat there is scarcity of food (vegetables and seeds) and dense shade trees and shrubs for midday cool resort. It was observed that about 20 to 50% of the population of dry habitats migrate to close by greener habitat depending upon conditions of the native habitat and vicinity of amiable greener habitat and its capacity to accomodate number peafowls without strain of over population. In this way population of habitat in a semi-arid region fluctuates with weather, it decreases in summer at an arid habitat and increases at fertile green habitat and become normal again in rainy season.

Sex Ratio and Population Growth of the Peafowl at the Habitat

It is obvious from the table that sex ratio of the peafowl is slightly higher than peacock at average habitat hence breeding potentiality is high as actual reproductive partner is large enough in number. As the peacock does not take part in parental care one peacock can fertilize large number of peahens. It is to be noted that only 50 to 60% peahens at the habitat breed other do not because of under or over age or other adverse factors retarding breeding activities. Many ornithologists as Blanford, Whistler and Baker etc. have narrated that peacock keeps harem of several peahens, according to my observations it is not true. Sex ratio (Table 1) of habitat reveals that there cannot be harem of several peahens with a peacock as ratio of hens is only slightly above cock second no group sex segregation is observed in the peafowl as found in some primates and ungulates. Sex ratio of peahen is found lower at arid habitat that is ecological advantageous as because of low number of hens there would be lower breeding and hence there would be lower breeding and hence there would be less starvation of brood and population at an arid habitat.

Natality Success and Population of the Peafowl

It was observed that breeding is higher at fertile

habitats but natality success depends upon survival of nests and brood, that was found good where there are less number of carnivora animals particularly stray dogs. Habitats infested with stray dogs shower poor natality success (16%) means the breeding is high but population dynamics is low hence population cannot reach to the climax. At Surpura village population of the peafowl is high because breeding success (natality success) is high (53%), at Mahamandir population is not high as it should be, as natality success is poor because of habitat infested with stray dogs. At Beriganga valley also population is poor because of natality success is poor because of robbing of large number of nests by predator animals as foxes, jackals and wolves.

Mortality and Population of the Peafowl at Habitats

Here peafowl is protected bird so its mortality by man is nil hence population does not decrease because of hunting as it happens to game birds. Formerly at some regions the peafowl was not protected and was considered as game bird, there its population decreases to rare or vanished altogether. As the local people feed the peafowl it does not suffer death due to starvation. There is no serious predator animal to the adult peafowl so such mortality is also extremely low hence population of the peafowl is found far high even at semi-arid habitats. At habitats of jungles having large number of predator animals less quantity of food and poaching by some savage tribes mortality of the peafowl is high enough hence population of the peafowl is found meagre at such habitats.

Dispersal of Population

It was observed that when a habitat becomes over populated in respect to availability of food and rest and roost space some versatile peacocks and few peahens move to some distant places in search of food and shelter if they find suitable place with this point of view of adequate food and shelter within the radius of three kilometers, they gradually settle there and make such place as their new habitat. These settle there and make such place as new habitat. There their population may increase in successive years if favourable conditions as adequate food shelter and safety at the habitat prevails. At much hardy place

only one or two peacocks emigrate there, there the population remain stationary for years until some one dies or killed or peahen or peahens emigrate there and breeding begins to occur. Such emigration was observed from Umed Bhavan Palace to Ratanada which has been discussed earlier.

It was observed that if carnivora animal frequently visits at the habitat or some people often try to molest the peafowl, peafowls migrate to near by safe place, they may return back in the few days if threat to their life ceases at the native habitat they may return back in the few days otherwise the altered safe place becomes the permanent habitat.

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