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Research Article

GALLIFORMES AND THEIR CONSERVATION ISSUES IN MIZORAM, NORTH EAST INDIA

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ABSTRACT
Galliformes, commonly referred to as 'gallinaceous birds' or 'game birds', is a large and diverse group of birds that comprises of 70 genera and 284 species, while 45 species of galliformes are known from India. Meanwhile proper record of Galliformes is not available in the state of Mizoram. Therefore a preliminary survey on galliformes was conducted from September 2012 - December 2013 in Mizoram with the aim to provide reliable information on their diversity, distribution range and their conservation issues in the tropical hilly state. The state of Mizoram, located in northeast India, is sandwiched by two international borders, *viz*. Bangladesh from the west and Myanmar from the east and south. It lies in the Indo-Myanmar Biodiversity Hotspot Area. In order to know the species composition and distribution, information was collected by field survey at important protected areas and secondary information from 245 villages covering all the eight districts. Analysis of secondary information and field survey data indicated that 10 species of Galliformes are present in Mizoram. Out of these, 6 species are Pheasants and other 4 species of Partridge. Among them are one endangered species (*Pavo muticus*), one vulnerable species (*Tragopan blythii*) and two near-threatened species (*Syrmaticus humiae* and *Arborophila atrogularis*). The four threatened species of Galliformes are patchily distributed in the higher altitudinal region on the eastern side of the state, bordering Myanmar. The other lower risk categories *(Arborophila rufogularis, Arborophila torqueola, Bambusicola fytchii, Lophura leucomelanos, Polyplectron bicalcaratum* and *Gallus gallus*) are found to be common and sparsely distributed all through the state. Anthropogenic pressures like habitat destruction due to shifting cultivation, logging, forest fire, deforestation, poaching and hunting, extraction of forest resources, tourism activities and lack of awareness are the main cause of rapid decline in galliformes population in Mizoram. Thereby appropriate conservation measures are discussed.

***Keywords**: Galliformes, Mizoram, Population, Threatened, Conservation, Pheasants and Partridge*

INTRODUCTION
Galliformes, commonly referred to as 'game birds', is a large and diverse group of birds in the world that comprises of 70 genera and 284 species (Keane *et al.*, 2003). Dickinson (2003) lists Megapodiidae (scrub fowl, brush-turkeys, mallee fowl), Cracidae (guans, chachalacas, curassows), Numididae (Guinea fowl), Odontophoridae (New world quails) and Phasianidae (grouse, turkeys, pheasants and partridges) under the Order Galliformes. These birds are well recognized for their ecological, socio-cultural, aesthetic and economic values, and have become an integral part of the people and their culture. In India, 45 species of Galliformes have been recorded which includes 1 megapode, 27 partridges, quails, francolins and snow cocks, and 17 pheasants (Sathyakumar and Sivakumar, 2007). Of these, seven species are endemic to India, and the global status of 12 species is categorised as 'threatened'. This is largely due to habitat loss, habitat degradation and poaching. Sathyakumar and Sivakumar (2007) opined that the highest diversity of Galliformes is seen in the Himalayan Biogeographic Zones. There are seven endemic and eight restricted-range species of Galliformes within India (Sathyakumar *et al.*, 2007). The expansion of human habitation, the destruction of habitats by agriculture (slash-and-burn shifting cultivation, known as *jhum*), logging and hunting have resulted in a sharp decline in Galliformes abundance as well as causing habitat fragmentation. Although many Galliformes occur within Protected Areas (PA), the enforcement of

wildlife law is inadequate at many places (Choudhury *et al.*, 2007). Within the north-eastern states, Dohling and Sathyakumar (2011) and Sathyakumar *et al.*, works on Galliformes were notable. Despite the state bird being a Galliformes (Mrs. Humes Pheasant), few works was done on Galliformes of Mizoram (Ghose, 1999, 2000; Ghose and Thanga, 1998; Ghose *et al.*, 2003; Choudhury 2005, 2006, 2009; Lalthanzara *et al.*, 2011; Lalthanzara *et al.*, 2011(b); Sailo *et al.*, 2013) and are mainly focused on Pheasants. So, the present survey is taken up with the aim to work out the status of Galliformes of Mizoram.

MATERIALS AND METHODS

Study Area

Mizoram (21,087 sq. km, 21°58'N to 24° 35'N latitude and 92°15 to 93°29'E longitude) is a hilly state, located in northeast India. It is sandwiched by international borders, Bangladesh from the west (318 km) and Myanmar from the east and south (404 km). It has a state boundary in the north with Manipur, Assam and Tripura. It lies in the Indo-Myanmar Biodiversity Hotspot Area; therefore, Mizoram is rich in wild flora and fauna, both in variety and abundance. There are six important bird areas in Mizoram which fall under IBA criteria A1- A3. The dense natural forest covers 3158.57 sq. km. which is 14.98% of the total area and this is divided into tropical wet evergreen, tropical semi-evergreen and montane subtropical pine forests. The medium dense forest accounts for 2628.08 sq. km (12.46%), less dense forest 3738.57 sq. km (17.73%) and bamboo forest accounts for 67-83.7 sq. Km (31.81%) (MIRSAC, 2009)

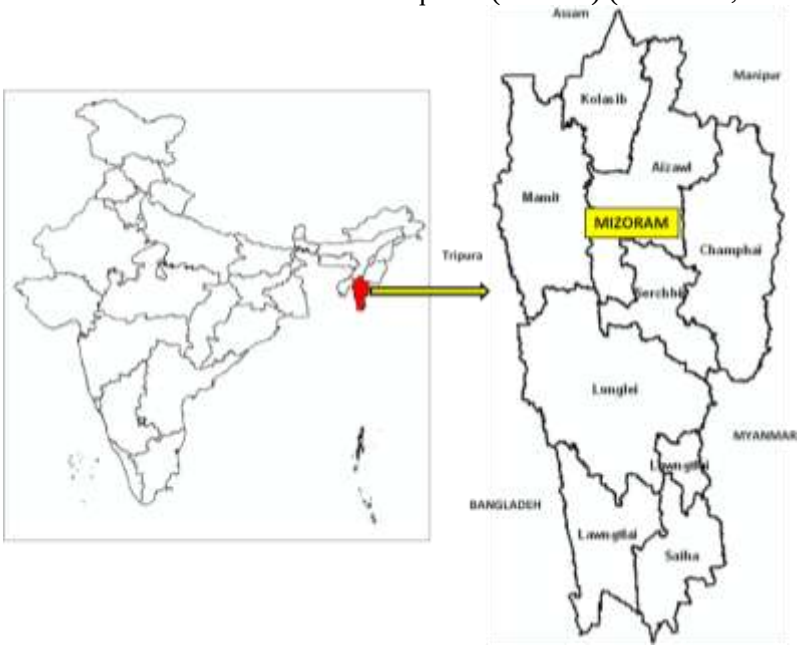

Figure 1: Map of Mizoram, study area

Field Methods

Secondary information on the spatial distribution of Galliformes was collected from all over the state, covering 245 villages by interview with local people, particularly hunters, identification from trophies, departmental records and historical data. Colour pictures of Galliformes were shown to local people for identification. Personal experience with the birds is also very helpful in birds' identification. Preliminary field investigation was carried out in selected protected areas, *viz*. Murlen National Park, and Lengteng Wildlife Sanctuary (Champhai district) and Phawngpui National Park (Lawngtlai district) during September 2012 – December 2013. Nine other protected areas were selected for close examination of the galliformes presence or absence. Call count technique was applied to determine the presence/absence of

Blyth's Tragopan (Gaston, 1980), Line transects (Burnham *et al.,* 1980) and opportunistic encounter are also taken into consideration. Survey was conducted using existing test path or footpath to determine the presence/absence and distribution of the Galliformes in the field investigation areas. Evidences were also obtained from the Environment and Forest Department, Govt. of Mizoram. The abundance record is maintained from the survey.

RESULTS AND DISCUSSION

The present survey record 10 species of Galliformes from Mizoram. Out of these, 6 species were Pheasants and other 4 species are Partridge (Table 1). Bird checklist of Mizoram has recorded 16 species of Galliformes from Mizoram (Lepage, 2013) while the present survey has recorded only 10 species. This may be regarded as a good indicator that the species diversity of Galliformes in this hilly state is alarmingly declining from recent past. The rapid decline can be attributed to habitat destruction by *jhum* and forest fire in the dry season, habitat fragmentation due to human encroachment, poaching and trapping for local consumption.

The only record of *Pavo muticus* (Green peafowl), which is an endangered species (IUCN 2012), in Mizoram is in 2008 at Tarpho village (23˚00'14.05''N 93˚00' 14.74''E; 1295m) paddy field, Lunglei district in the south east of Mizoram, near the Myanmar border line. In the year 2008, one farmer shot a female *P. muticus* from his rice field (Tarpho village) bordering Khawhri village area. The historical record indicated that the bird has been detected around Pawlrang village some 10 years back. The present study did not find new information in the wild. However, fortunately two female Green Peafowl can be seen in the Aizawl Zoological Park, maintained by Environment and Forest Department, Government of Mizoram. Of the three subspecies of Green Peafowl, *Pavo muticus spicifer* inhabit NE India and south east Bangladesh to North West Myanmar.

The present survey records *Syrmaticus humiae*, a near- threatened (NT) species (IUCN 2012) and the state bird of Mizoram from 13 sites *viz.* Kawlbem, Farkawn, E. Khankawn, Vapar, Khawbung, Dungtlang, Samthang and Lianpui (from Champhai District); Lungzarhtum, Ngengpui and Sangau (from Lawngtlai district); Khawbel village (from Serchhip district); and Tongkolong village (from Saiha district). Although some records needs to be confirmed by further field investigation as the altitude where the local people recorded the bird is below the previous recorded ranges of S. Sathyakumar and R. Kalsi (2007). Apart from Phawngpui National Park and Murlen National Park, Choudhury (2005) recorded Mrs Humes Pheasant from 7 sites, and from 12 additional sites based on information from the local people. Choudhury also believes that Mrs Hume's Pheasant is still widely distributed in the higher altitude region of Mizoram especially in Champhai and Saiha district and also suggest the possible presence of Mrs Hume's Pheasant in Serchhip and Lunglei district. Choudhury's finding is in line with the present findings as the survey recorded Mrs Hume's Pheasant from Champhai district, Saiha district, Serchhip district and Lawngtlai district which are in the eastern side of Mizoram. Although Hume's Pheasant can rely on broken or fragmented forest (McGowan and Garson, 1995), habitat loss is considered a main threat to Hume's Pheasant in the state.

Tragopan blythii was recorded from 4 villages (Lawngtlai district- Lungzarhtum, Vawmbuk and Sangau; Champhai district- Selam). Blyth's Tragopan a vulnerable species (IUCN 2012) is reported from Phawngpui National Park (Ghose 1999, Ghose *et al.,* 2003; and Choudhury, 2006) and from Lengteng wildlife sanctuary (Lalthanzara *et al.,* 2011). Of the two subspecies of Tragopan, *Tragopan blythii blythii* is known to reside in Himalayas of north east India to south west of China and adjacent Myanmar. This result is in line with Singh (2013) who mentioned that the habitat area of Tragopan ranges from 1500 to 3000 meters depending on the season. Phawngpui peak and Lengteng peak are the highest and second highest peaks in the state with 2157m and 2141m respectively, steep and well-wooded terrain thus both are within Tragopan habitat range. The present Tragopan record from Lungzarhtum and Vawmbuk villages had a boundary with PNP where it was previously recorded (Ghose, 1999 and Choudhury, 2006). Similarly Selam village, Champhai district also borders with LWS and therefore not considered to be as significant as Lalthanzara *et al.,* (2011) had recorded Blyth's Tragopan from LWS.

Arborophila atrogularis, a NT species (IUCN 2012) is found to be common all through Mizoram as most of the interviewed people can tell its presence in their village areas. During the survey, it was also encountered inside LWS. Though the range given by earlier workers (Sathyakumar *et al.,* 2007 and Grimmett *et al.*, 2013) does not include Mizoram as the range for Hill Partridge (*Arborophila torqueola*) it is found to be common in the broadleaved forest in the eastern part of Mizoram. They were recorded at an altitude of 1509m-2135m above mean sealevel at LWS whereas Sathyakumar *et al.*, recorded the species at an elevation of 2050m-3750m. Hill Partridge was previously recorded by Sawmliana in Mizoram (Sawmliana 2009, 2013).

Mountain Bamboo Partridge (*Bambusicola fytchii*) is common in the eastern part of the state and are resident. They can be easily seen on the road while travelling by vehicle in the early morning and late afternoon, they usually fly or disappear on the roadside bush. They are seen usually in couple or in a flock of more than four individuals. Rufous throated partridge (*Arborophila rufogularis*) is resident and were common in the broadleaved forest throughout Mizoram. The other species of galliformes such as *L. l. lathami, G. gallus* and *P. bicalcaratum* are found to be common throughout the state. However, *Gallus gallus* is restricted to lower altitude region with bamboo forest. In India, the species is present in 205 districts in 21 range states in India (Fernandes et al., 2007) which shows that *Gallus gallus* is still widely distributed in the country. *P. bicalcaratum* is mainly confined to thick virgin forest all over the state. *L. l. lathami* is sighted up to 1862m above mean sea level in LWS. But, Sathyakumar *et al.*, recorded KP at an elevation of 1850m-2100m in the Khangchendjonga Biosphere Reserve. This shows that it can thrive well in varying altitude.

Threats and Conservation measures to Galliformes of Mizoram

Threats

Habitat loss

Habitat destruction has threatened the survival of the Galliformes all over their range in these states. Unplanned forest clearance has resulted in habitat fragmentation in places resulting in isolated populations, which have an uncertain future. Forests are destroyed primarily for logging, expansion of agriculture, slash-and-burn shifting cultivation by hill tribes, unplanned clearance for human settlement, encroachment by developmental activities, road and railway construction, large-scale and unplanned bamboo harvesting for paper production are the main factors for habitat loss in Mizoram.

Poaching

Galliformes are hunted predominantly to provide meat, mostly for local consumption. Even in some protected areas Galliformes are poached. Snaring is commonly used, as the hunter need not pursue the birds, but only set the snares in suitable habitats. Poaching is still a main threat in more remote areas of the state.

Human Disturbances

Human enters forest for a variety of reasons ranging from collection of timber and other natural forest products and their presence is regarded as a factor causing disturbance to Galliformes at critical times. The collection of mushrooms inside the Protected Areas can be threat to Galliformes. The people are also accompanied by dogs which also become potential source of disturbance. Similarly, bamboo shoot collectors, palm shoot collectors and cane shoot collectors can also be potential sources of disturbance. These are commonly practice in all parts of the states as many people depend on forest products for their livelihoods.

Forest Fire

Forest fire due to carelessness of hunters and uncontrolled *jhum* burning during the dry season (January-April) coinciding with the breeding season of Galliformes may destroy the habitat and nest of these birds.

Conservation Measures

Legal protection

The majority of galliformes are protected under Schedule I of the Indian Wildlife (Protection) Act 1972 of India, which prohibits their killing or capture. Strict enforcement of WPA is necessary all over Mizoram and especially in and around the protected areas.

Habitat protection

As depicted earlier, habitat destruction is the major threats to galliformes in Mizoram, protection of habitat is highly needed in Mizoram. Nine PAs have been created to protect the galliformes in the states. The degree of protection provided by the protected areas highly vary from species to species. For example, for the Blyths Tragopan (Phawngpui NP and Lengteng WLS) and Mrs Humes Pheasant (Phawngpui NP, Lengteng WLS and YMA Reserve at Kawlbem village). In most of the PA's in Mizoram, the enforcement of protection measures is inadequate.

Recommendations

Status survey, population estimate and monitoring

Field investigation to collect comprehensive information on population status, distribution, habitat requirements and up-to-date threats of Galliformes in the state is urgently needed. These estimates need to be produced and assessed at regular intervals to determine the population of Galliformes.

Creation of more Community Reserves

If creations of more PA's are difficult, the community/Village should create more 'Community Reserve' in their own jurisdiction to protect wildlife. For example, the community reserves near Mamit town (the 'Zo-Ngaw') and the 'YMA Reserve' at Kawlbem village is found to be highly helpful in conservation.

Control of Poaching

The enforcement of Wildlife Laws to stop the hunting of Galliformes needs to be increased. Anti-poaching staff needs to be well trained, better equipped and motivated. The local people, particularly hunters to be make aware on the role of galliformes in the ecosystem and thereby importance of their conservation.

Control of habitat destruction

Complete eradication of '*jhum*' is not possible because it is a way of life and deeply embedded in the culture of the tribals. Therefore, other sustainable economic alternatives should be taken to control it, especially near the Galliformes habitats and the PA's as a whole. No new encroachments should be allowed to take place at least in the Reserve Forests. Fresh encroachments, especially those inside the important Galliformes habitats should be prevented. Logging in the remaining natural forests should be prevented, or at the least severely controlled.

Management of Forest Fire

If 'jhum' is to be burned, it should be done at least latest by first week of February and care should be taken not to make stray fire which can lead to forest fire. Adequate fire-line should be made by each farmer before burning the jhum.

Habitat improvement: Afforestation of wildlife amenable species using gap plantation in degraded areas and block plantation in forest blanks

Water improvement: Creation of waterholes, revitalization of existing lakes, streams, rivers and ponds.

People's Participation in Conservation: Conservation cannot succeed without local people's support and participation. This is especially true in the tribal areas where traditional dependence on forests has been high. People's support will only be forthcoming if people see forests as source of sustainable income to them.

Effective management of the existing PAs

In every Protected Areas effective law enforcement and wildlife protection measures through well equipped, well paid, trained and motivated manpower should be enhanced. Communication system (including communications within the PA) should be improved in all the important reserves.

Other measures

The following measures should be taken up:

a) Awareness on conservation among locals, including the tribals of remote areas with active involvement of local NGOs.

b) Reduce dependency of villagers bordering Protected Areas on forest.

c) Further research on Galliformes ecology, behaviour, seasonal and altitudinal movements in different habitats should be taken up.

Mizoram having a record of 10 species of Galliformes including 4 globally threatened species can be regarded as important place for Galliformes. Although the present scenarios for the 6 least concerned species are found to be stable, but if the prevailing threats are allowed to continue, their status can degrade in the near future. The status of the 4 threatened species needs to be assessed and available measures should be taken up to maintain the continuity of their survival in this tropical hilly state.

Table 1: Galliformes of Mizoram and their present conservation status

Sl. No.	Common Name	Latin Name	Population Status	Habitat	Altitude (m)	IUCN	IWPA
1	Green Peafowl	*Pavo muticus* (Linnaeus, 1766)	Very Rare or Absent	Dense forest near streams or clearings	1295m	EN	I
2	Blyth's Tragopan	*Tragopan blythii* (Jerdon, 1870)	Very Rare	Evergreen broadleaved forest + dense shrub, steep slopes	1234m-1588m	VU	I
3	Mrs. Hume's Pheasant	*Syrmaticus humiae* (Hume, 1881)	Rare	Montane forests	145m-1523m	NT	I
4	White-cheeked Hill-Partridge	*Arborophila atrogularis* (Blyth, 1849)	Common	Humid forests	<1,500 m	NT	IV
5	Mountain Bamboo-Partridge	*Bambusicola fytchii* (Anderson, 1871)	Common	Dense tall grass in foothills and fallow lands	<2,000 m	LC	I
6	Red Junglefowl	*Gallus gallus* (Linnaeus, 1758)	Common	Almost every type of forest	<2,000 m	LC	IV
7	Kaleej Pheasant	*Lophura leucomelanos* (Latham, 1790)	Common	All types of forests+dense undergrowth	245-1862 m	LC	IV
8	Grey Peacock Pheasant	*Polyplectron bicalcaratum* (Linnaeus, 1758)	Fairly Common	Dense undergrowth evergreen forests	1684m-1836m	LC	I
9	Common Hill-Partridge	*Arborophila torqueola* (Valenciennes, 1826)	Common	Undergrowth of broad-leaved evergreen forest	1509 m-2135m	LC	IV
10	Rufous Throated Hill-Partridge	*Arborophila refogularis* (Blyth, 1849)	Common	Undergrowth of broad-leaved evergreen forest	1509m-2140 m	LC	IV

Very rare or absent- 1 seen in 2008
Very rare- reported from 4 sites
Rare- reported from 10 sites
Fairly common- restricted to thick virgin forest
Common – reported from almost all survey sites

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