

## Project Update: May 2018

### 1. Introduction

The Indian spotted eagle (*Aquila hastata* Lesson 1831) is only recently separated from the European lesser spotted eagle (*A. pomarina*) (Parry et al 2002). It is partly as a result of its new distinction as a species, one of the least known of all raptors. Due to its small population and declining trends this eagle is now listed as a Vulnerable (Birdlife International 2016) and has been given similar status in a national red data book of Nepal (Inskipp et al 2016). Indian spotted eagle (ISEA) is restricted to Indian-Subcontinent, distributed in Bangladesh, Cambodia, Myanmar, India, Pakistan and Nepal between altitudes of 0 – 1000 m (Birdlife International 2016). It occurs at very low densities throughout its range (Handschuh et al 2011). An estimated population of Indian spotted eagle in Nepal is about 30-70 individuals (Inskipp et al 2016). Due of low densities and the secretive nature of raptors, studying the breeding diurnal raptors are difficult to study (Bildstein 2017). However once if the nests are detected then it would be much easier to extract the information regarding on their breeding biology. Study of the breeding biology of raptors helps to determine their relationship with the different environmental variables. Such works are significantly important to access their status and identifies the restraining factors that results the breeding failure.

Here in this progress report we provide the update of the project work funded by “The Rufford Foundation” regarding on the title “Eagle of the Farmlands: biology, threats and their conservation actions of Indian spotted eagle (*Clanga hastata* Lesson 1831) in Lowlands of Nepal”. The first attempt ever made to study the breeding biology of the Indian spotted eagle in Nepal. Till now we have managed to gather data of nest preparation stage and incubation stage while chick rearing and fledgling data is yet to be taken.

### 2. Materials and Methods

#### 2.1 Study Area

In 2016 and 2017 we were able to discover five nests in Lumbini, Dhanusa and Koshi Tappu of Nepal. The nests were all found to be active. This is the first highest number of nests of this rare eagle ever discovered in Nepal. The three nests were discovered in Lumbini while single nest was discovered in Dhanusa and Koshi.

#### 2.2 Monitoring the nests and breeding pairs

Monitoring of the breeding pairs and its nest of the Indian spotted eagle was done during the nest preparations and incubation stage. Observation of breeding phenomenon was done from blind placed, 40 – 60 m away from the nest using a camouflaged hide (Fig: 1, Fig: 2). Observation started from 15<sup>th</sup> to 25<sup>th</sup> March, 2018 for nest preparation while incubation stage was observed from 28<sup>th</sup> April - 5<sup>th</sup> May 2018 for two nests in Lumbini at the same time. The third nest in Lumbini and nest of Dhanusa were monitored at the same time on 6<sup>th</sup> May -13<sup>th</sup> May while the nest of Koshi was monitored in 14<sup>th</sup> – 22<sup>nd</sup> May 2018. Nest monitoring was initiated from 07:00-18:00 hrs. We named the code as “A”, “B” and “C” to the nests located as Lumbini, “D” for the nest of “Dhanusha” and “E” for the nest of Koshi. Nest site characteristics were recorded down.

### **2.2.1 Monitoring nest preparation stage**

We recorded different activities of the breeding pair during the nest preparation. We noted down the frequency of the nesting materials brought by male and female, participation of nest maintenance activities, types of materials brought up by eagles (twigs, insecticides plant and greenery branches) and attempt of copulations. The nest site characteristics were recorded too. When we were in a study area for a to monitor nest preparation activities, we only found the nest preparation activities of three breeding pairs of nest "B", "C" and "D". We didn't see any nesting preparation activities of nesting pairs of "A" and "E" respectively.

### **2.2.2 Monitoring incubation stage**

The duration of incubation by each individual, prey provision to incubators by non-incubators, attendance of the non-incubators, the activities of the chasing the intruders and prey items brought by incubators were noted down.

### **2.2.3 Nest predators and determination of safe buffer zone**

We searched the evidence of the probable nest predators that might reside near to the nesting site of the eagles through direct observation. We noted down the types of disturbances, level of disturbances, maximum distance with alert reaction, minimum distance without alert reaction and time of disturbances

## **3. Results**

### **3.1 Nest Site Characteristics**

Out of five nests, four nests were found to be made in the *Dalbergia sissau* tree while one was found in the Sal tree. The height of the nesting trees were found to be  $29 \pm 4.1183$  m while the nests were found at the average height of  $20.6 \pm 4.56$  m from the ground. Out of five nests, nests "B", "C" and "D" were sighted at the thin forest of *Dalbergia sissau* on the other hand nests "A" and "B" were found at an open space with a couple of trees nearby. Water hole was present at the average distance of 78.54 m.

### **3.2 Nest building behaviour**

During the nest preparation stage male eagles were found to have higher contribution on bringing the nesting materials i.e. 69.86% in nest "B", 68.11% in "nest C" and 70.31% in "nest D" compared to female 30.14% in "nest B", 31.89% in "nest C" and 29.69% in "nest D". However females contributed higher percentage on construction, maintenance and repair of the nest i.e. 63.89%, 65.22% and 68.75% respectively. During the whole observation period the eagles were recorded carrying out the dead twigs to construct the nest while small green branches of *Dalbergia sissau* to put on the outer rim of the nest.

Observation showed that Eucalyptus green leaves were placed in the cavity of the nest during the study period. We didn't observe any nest building activities of nesting pairs of "A" and "E".

### 3.3 Incubation stage monitoring

We found five active nests during the incubation monitoring stage at the previously recorded areas i.e. 2017. This inferred that the nest "A" of Lumbini and "E" of Koshi were made lately. The time spend to incubate the egg by the females were found to be higher than the males in all the monitored nests. Statistically significant differences between the time spend by male and female to incubate the egg was found (Wilcox=25, P =0.0079). The female were found to spend larger their time on incubation compared to male. The percentage of non-incubating male attendance near the nest was found to be  $69.95 \pm 9.29$  % while non-incubating female was found to be  $30.05 \pm 9.29$  % when all the total attendance data of both non-incubating males and females were pooled up. The nest "C" has failed to hatch the egg. At the first and second day of nest monitoring the female eagle was recorded incubating the egg (Fig: 6) but when it was a 3<sup>rd</sup> day of nest monitoring of nest "C", neither male nor female were seen incubating the egg. Monitoring the nest further for few days led us know they often used to fly early at morning and returned to the nest at around 5 pm. This made us suspect that the egg might has failed to hatch eaglet. On the 7<sup>th</sup> day of nest observation, we saw rufous treepie and common myna perching in the nest of the eagle. We went just down to the nesting tree and found the shell of the eagle's egg with a higher percentage of albumen in the broken egg. Pooling all the data of five nests, 15 times the eagles were recorded repairing the nest. During the whole observation 35 times the eagles were seen chasing the crows, white-eyed buzzard and black kite when they approached near the nest. Twenty five times the incubators were found making a "chuck" sound in a high pitch when the intruders were nearer to the nest. Male eagles were found to bring the prey items in the nest however we didn't get any evidence about the male feeding the incubating female. The male simply used to put prey items in the nest. During the whole observation, the male eagles brought three various prey items (four birds, three rodents and one frog).

### 3.4 Nest predators and identification of safe buffer zone

We didn't encounter any probable nest predators in the nesting area. The maximum distance with alert reaction of the nests were found 38.64, 77.5, 61.85, 74 and 23 m for nest "A", "B", "C", "D" and "E" respectively. The minimum distance without alert reactions were found to be 105, 110, 96.25, 119 and 60.79 m for nest "A", "B", "C", "D" and "E". Grazing of livestock near the nesting area was found to be one of the major disturbances. The incubators often used to lower down the head when the herders reached at distance calculated as "the maximum distance with alert reaction".

## 4 Conclusions

The nests were mostly made in the lesser dense forest of *Dalbergia sissau* located near the source of the water hole. Male Indian spotted eagle made a higher contribution on bringing the nesting materials to build the nest while female were found to put greater effort on arranging the twigs, greenery branches and herbicides leaves in the nest. Female were found to spend their longer time period incubating the eggs compared to male. Males were highly engaged in chasing the intruders compared to female. The non-incubating male showed higher attendance near the nest compared to non-incubating female. Due of sharing the same breeding territory the eagles were often disturbed by crows, White-eyed buzzard and black kite. Usually the incubating eagles

were found creating a “chuck Ccuck” call with a high pitch when they get highly disturbed. The prey items were mainly brought up by male comprising of bird, rodents and mammals.

## References

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Left: Researcher monitoring the nest of Indian Spotted Eagle from a camouflaged hide. Right: Researcher Dheeraj Chaudhary inside the camouflaged hide to monitor the nest.



Left: Incubating female Indian Spotted Eagle of Nest "A". Right: Broken Indian Spotted Eagle egg found under the nesting tree of nest "C".



Herder grazing their livestock very close to the nesting tree of Indian Spotted Eagle



Female Indian Spotted Eagle of nest "C" incubating at leftmost top corner, Common Myna and Rufous Treepie recorded sitting at the nest after the failure of hatching egg.



Prey item brought by male Indian Spotted Eagle