

Notes on the breeding of the Indian Spotted Eagle *Aquila hastata*

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(With two photographs online at: www.indianbirds.in)

Introduction

The Indian Spotted Eagle *Aquila hastata* is a rare, endemic (Ali & Ripley 1987), and 'Vulnerable' (BirdLife International 2004) species restricted to the Indian sub-continent. It is distributed sparingly in north India over the Gangetic plains, in eastern India up to Manipur and in central India in Madhya Pradesh and southern Orissa (Ali & Ripley 1987, Prakash 1996). In south India, its distribution is limited to Kotagiri and Mudumalai, Nilgiri district, Tamilnadu (Ali & Ripley 1987, BirdLife International 2004), and Tumkur, Karnataka (Davidson 1908).

These sedentary eagles are difficult to identify in the field and confusion with congeners persists even today (Ali & Ripley 1987), leading to frequent wrong identification. The Indian Spotted Eagle, which until recently, was considered a subspecies of *Aquila pomarina*, has now been elevated to a full species (Parry et al. 2002, Rasmussen & Anderton 2005). This study records the breeding of this species in south India after nearly a century (Davidson 1908).

Published nesting records are few (Prakash 1996, Davidson 1908, Parry et al. 2002, Islam & Rahmani 2005). Parry et al. (2002: p. 672) list the following un-published records from the archives of The Natural History Museum: Sylhet, Mysore¹ (J. Davidson, 4.iii.1848); Delhi (C.T. Bingham, 14.v.1876); Sylhet (*sic*, = Sylhet), E. Pakistan (= Bangladesh) (H.N. Coltart, 31.iii.1900); Agrore Valley (Hazara district, Pakistan) (W.H. Unwin, 6.v.1870); Madhubaur (*sic*, = Madhuban), Tirhut (Bihar) (Unknown, 20.vi.1899); Botanical Gardens, Calcutta (= Kolkata) (J.C. Parker, 9.v.1877); Fureedpore (= Faridpur), E. Bengal (= Bangladesh) (J.R. Cripps, 16.v.1878); Saharunpore (= Saharunpur, U.P.; W.E. Brooks, 30.iv.1872); Champaran, Behar (= Bihar) (F. Field, 2.v.1892). They also give two published records: Darbhanga, Bihar (C.M. Inglis, 16.v.?), Saharunpore (A. Anderson, ?.vi.1873; 7 separate records) and, one contemporary un-published record from Keoladeo National Park, Bharatpur (V.

Prakash, on eight occasions from 2.v.1985 to 7.v.1999). Presently, only two regular breeding sites, Bharatpur and Mysore, have been identified, where observations are in progress. Difficulty in identifying the eagle took much time to realize that the bird is in our backyard. The middle-aged farm owners, on whose farm we conducted our study, recall the breeding history of the eagles from way back to their childhood.

The presence of the resident Tawny Eagle *Aquila rapax* (Ali & Ripley 1987) and the migratory Greater Spotted Eagle *A. clanga* (Shivanand & Shivprakash 2004) is well recorded in Kaveri River basin, in the Mysore, Mandya and Chamarajanagar districts of Karnataka, where this breeding study is conducted.

Physical characteristics

The female's yellowish gape and 'lips' gradually turn greyish-white during breeding, and she acquires, and retains, a thin white supercilium all through that time.

Pair formation, courtship display and mating

Pair formation, nest building and mating activity takes place during the third and fourth weeks of February till second week of March. Pair formation takes place just before nest building. It is quite probable that monogamous bondage is strong and the same pair breeds every year. However, to ascertain this would require a much more detailed study. During courtship displays, the male takes off from the nest tree, gradually attaining height after a few circles in the air. Sometimes he flies in a horizontal 'loop of eight'. The female follows him, but at lower elevation. This might continue for up to forty minutes at a time. Towards the end of this display flight, both birds end up as close as a foot or two, to each other, and end the display by landing side-by-side on a branch. This ritual was observed thrice, within seven days, during one breeding season.

The process of mating is simple and quick.

The male lands directly on the female, which gives forth a muted coughing call. Mating took place in the early morning hours, but not after 09:00 hrs. We observed the pair mating once a day, in the morning hours, for three consecutive days, a week before incubation began. A total of seven copulations were observed in one season. Mating always occurred on a branch of the nest tree or on that of a neighbouring tree. The male dismounts onto the branch, takes a few steps, and either flies off to collect nesting material or goes to the nest and begins re-arranging twigs on the nest.

The nest

Both birds share nest-building activity. The nest is always constructed on the western side, but as close to the centre as possible, of a Coconut tree *Cocos nucifera*. The highest tree in the grove is chosen for nesting. Thorny twigs of *Prosopis juliflora* and *Acacia nilotica* are used as nesting material. A nest placed at a height of 9-12 m ensures safety and provides a clear all round view for approaching danger. At times, up to seven sorties are made by the male in one and half hours, to collect nesting material. Nest construction takes up to two weeks. Thorny nests are lined with an inner cushion of green sprays from *Cocos nucifera*, *Azadirachta indica*, *Ficus religiosa* and *cassia auriculata*. For some reason, *Azadirachta indica* is the most popular lining material before and after the hatching, till the chick is seven weeks old. Oval nest size is 40-60 cm x 30-40 cm with a depression of 15 cm (these dimensions approximations, based on measurements of two nests that had fallen), which is almost similar in size to the blown-down nest measured by Davidson on 13.iii.1877 (Barnes 1888).

Incubation

A single egg is laid every year. Incubation occurs through peak of dry season and finishes just before the monsoon. Normally, incubation begins in the third week of March and ends in the second week of May. Young

¹ This is an error in Parry et al (2002). Sylhet is in Bangladesh, not Mysore (Karnataka, India). Davidson's record is from Tumkur district in Karnataka.

fly generally by the end of July. Pre-monsoon showers start by the end of March and continue till the beginning of the monsoon, in the second week of June. The emergent vegetation at this time corresponds roughly with an abundance of prey. Other *Aquila* sp., that breeds nearby is Tawny Eagle *A. rapax*. The Indian Spotted Eagle's nest is located in the middle of three Tawny Eagle nests; spread over an area of almost 22 km². The Tawny Eagles breed between November and February. So competition for food, with the Indian Spotted Eagles doesn't arise. The Indian Spotted Eagle incubates for 45-48 days. Though its congener, *A. pomarina*, incubates for 42-44 days (Ali & Ripley 1987), Prakash (1996), contrary to his findings, feels the incubation period for *A. hastata* should be more than 30 days, which seems to be the case in our study.

The female incubates almost without any break for the first three weeks. Then onwards, she takes short, 10-35 minute breaks daily, either in the morning or in the evening. The male takes charge of incubation whenever the female leaves, either to consume prey he has brought her, or to defecate, or drink water. Sometimes, when she leaves the nest for less than ten minutes, the eggs are simply not incubated. The eagles incubated on hot days while hyperventilating with partially open beaks.

The nest is kept clean and tidy by the adults, especially by their infusion of fresh plant matter. The female generally carries morsels brought by her partner to a nearby tree and consumes it there. Young defecate over the rim of the nest. However, chicks are fed within the nest. Beak cleaning is an elaborate exercise for the adults. A hard thin stalk supports the leaflet of a coconut frond. Gripping this thin stalk with their beak, they gently slide it along the stalk, thereby cleaning the beak. They also brush the sides of their beaks on the rib of frond, to get rid of sticky food material.

Brooding is less intensive after the chick is 3-6 weeks old. Thereafter the female stays away from the nest, but within a protective distance from the chick.

Feeding

The male supplies the incubating female with toads *Bufo* spp., garden lizard *Calotes versicolor*, Indian field mouse *Mus booduga*, common Indian bronzeback *Dendrelaphis tristis*, Baya Weaver *Ploceus philippinus*, Streaked Weaver *P. manyar*, Baillon's Crake *Porzana pusilla*, Jungle

Myna *Acridotheres fuscus* and Indian Myna *A. tristis*. Toads from roads, crushed on rainy nights by vehicular traffic, are normally brought for her in the morning.

He brings the food, alights on the frond, walks up to the nest and drops it inside. On sensing a threat, he alights on a nearby tree, waits and then cautiously approaches the nest. The female carries this food to a nearby tree and consumes it over a period not exceeding two hours. Sometimes, after a 3-4 hour stint of incubation, the hungry female takes the morsel directly from the male's beak and leaves immediately for feeding. On some occasions, smaller items are consumed immediately on the nest itself.

The eaglet is fed with the same food that the adults consume; garden lizards and Indian field mouse forming its main diet. However, it is given tiny selected morsels, a piece at a time. The female, holding the prey in her claws, tears off morsels with her beak and feeds the young one. Gradually the eaglet adopts a begging posture by lowering its body and raising its beak. Some unidentified parts of the prey remain after it is fed. These are carried away from nest by the adults and disposed off in the middle of thick bushes.

Activity of eaglet

The eaglet watches its surroundings with curiosity, like all young raptors. From eight weeks onwards, it walks about on the nest and exercises its wings by waving them up and down. It stands for longer periods, as it gets stronger. Gradually, after gaining more confidence, it moves onto palm fronds, balancing with open wings. There it flaps its wings and hops up and down. Initially, while hopping, it hardly rises from the frond, but as it becomes stronger, it flaps continuously and leaps higher and higher. It faces gusty winds and flaps. It walks into the wind, getting accustomed to the strength of the breeze. It begins glides from higher frond to a lower one within the canopy. Sometimes it glides to a neighbouring tree and then flies back to its nest. These preparatory glides become longer as the eaglet grows. Flying practice continues till the end of July.

During flying practice, it often lands on the ground at least twice a day. There it tries to pull at shrubs' roots by holding an exposed stem. This was observed generally after rainy days. Could this strange exercise be practice for tearing carcasses in the future?

The eaglet imitates adults' hunting habit of flying straight to an imaginary prey, lying on the ground, from a high perch. After a successful hunt, an adult utters a call, while holding its prey in its clutches, and the eaglet arrives to share the food under what

seems like careful parental guidance and instruction. By 22nd - 24th week, after hatching, the eaglet makes attempt to catch prey on its own, calling in flight, as it goes hunting so that adults follow, landing only after the juvenile's attempt is complete. On one occasion, we observed an adult give supportive cover when a gecko was fleeing from the inexperienced juvenile. The juvenile roosts on any tree other than its nesting tree.

Precautionary measures

The male always remained close to the nest when the female was incubating, either flying about or perched on a nearby tree. Every avian intruder in the vicinity of the nest was chased away. Activities like the beating of drums or bursting of crackers to scare birds from depredating nearby paddy fields; the trimming of a tree just below the nesting tree; urchins throwing stones at coconuts on a nearby tree (c. 15 m); nuisance created by bonnet macaque *Macaca radiata* in the orchard; tilling the field with a tractor right below the nesting tree - didn't deter incubation. The adults wouldn't allow anyone to pluck coconuts from the nesting tree. One adventurer, who tried to do so, was badly bruised.

Once the egg had hatched, the female usually positioned herself away from the nest, but within 50 m of it, forming the first round of a protective shield, while the male, further away, either flying or perched, forming the second. Whenever Crows (*Corvus* spp.), Black Kite *Milvus migrans*, Brahminy Kite *Haliastur indus*, or Shikra *Accipiter badius* passed close to the nest, the eaglet made a low-pitched, 'kitch...kitch' call, of 4-5 notes, standing in an alert position. Either one of the adults would support the eaglet by threatening the intruder with high-pitched calls and aggressive posture. If the threat persisted, the female took off and chased the intruder away. The eaglet however moved into the nest's depression whenever the female gave a particular alarm-call on sensing danger.

Mobbing

Nesting eagles are mobbed vigorously by crows; once a congregation of over sixty crows was noticed. 4-6 crows mob the flying eaglet most of the time. Sometimes crows approached close to the eaglet, which took a few steps towards them and drove them away with aggressive postures. At such times, the repeated calls of the eaglet don't attract adults even though they

are in the vicinity. Adults drop food into the nest only after the murder of crows has moved away and in some cases they waited more than half an hour, holding prey in their beak, till the crows had moved away.

Once, at 17:35 hrs, the eaglet, which had learnt flying just three days ago, arrived at the nest from a near by perch, to find three bonnet macaques actively moving in the canopy of the nest tree. The young one fumbled on seeing them, but regained its balance quickly, turned and went back to its earlier perch. None of the adults assisted the eaglet in regaining the nesting tree from the macaques. That was a cloudy day and by 18:30 hrs it was dark. The eaglet couldn't occupy the nest and spent entire night on another tree.

Discussion

In the five years' breeding observations, nests have fallen off, causing chicks' mortality, in the second and third years. The dead chick from the third year, a day or two old was collected and sent to Bombay Natural History Society for preservation. The fourth-year nest also fell down. However, the adults raised a second brood. The fourth-year breeding continued almost up to the end of September, coinciding with an extended monsoon.

In all the breeding years, we feel that the nests were not strong or suitable for breeding activity. Yet, the pair raised three broods out of five. The nest should ensure the safety and protection of eggs and the newborn young (Brown 1976). But it doesn't seem so in this case, perhaps due to faulty tree selection. Despite misgivings, we consciously did not interfere in the natural breeding process of the birds either to save the chicks or strengthen the nest. Although a good number of *Ficus* sp., tamarind,

Syzigium sp., trees, with wide-spread canopy are present in the vicinity, the eagles did not utilize them. The coconut tree might have provided a safer place for the nest, as it was taller and afforded a better view of the surroundings and therefore any impending danger. Large scale coconut plantations in this region were started five decades ago (Kamath 1988). Davidson's observation (Barnes 1888) of a blown-down nest that was in a fork but not on branches of a tree, indicates that the bird's breeding habit has changed considerably over the last century. Davidson found the eagle common in central Mysore during 1877 (Barnes 1888). Further study is required to ascertain the cause of decline.

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Birding in the Saryu-Ramganga river valleys (1,500-4,133 m), Kumaon Himalayas

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(With three colour photographs on back cover)

Birds were surveyed on a trek from 27.ix.2004-7.x.2004, in Bageshwar and Almora districts of Kumaon, Uttarakhand, India. The trek started from Song / Supi village (1,500 m; 30°02'N 79°00'E) located along the Saryu River (see map), passing through Bhadratunga village (1,600 m), Madhari Pass (3,040 m), lower Raj Kharak (2,520 m), Gogina village, Ramaganaga River bridge (1,870 m),

Namik village (2,200 m), Sur-Sungri Pass (3,240 m), lower Thaltok (2,950 m), upper Thaltok (3,200 m), Sudam Khan Pass (4,133 m), back to upper and lower Thaltok and Sur Sungri Pass and then a descent to Jakala valley [2,200 m below Rur Khan Pass (3,500 m) which lies above Munsiyari on the other side], and finally ending at Birthi village (1,750 m) – about 100 km in seven days. I

passed through some spectacular scenery: forests, wild flowers and mountain peaks (Nanda Devi, Nanda Ghunti, Trishul, Badrinath, Kedarnath, Gangotri, Shivaling, Bandarpunch, Kamat, Panch Chuli, etc). There was unprecedented rain and snow-fall on the higher reaches.