

CITIZEN SCIENCE AND THE MONITORING OF HORNBILLS IN SINGAPORE

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ABSTRACT. – Bird photographers in Singapore are accumulating excellent images of birds and their natural behaviour. The formation of a specialist group, the Bird Ecology Study Group (BESG) in 2005 saw close collaboration between photographers and this new bird group. These photographers are revitalising citizen science. Their observations and images are regularly posted in the BESG's weblog <http://www.besgroup.org/>. All contributors are fully acknowledged, thus encouraging others to participate. These citizen scientists have monitored activities of hornbills in the field, including courtship and nesting of two pairs of Oriental Pied Hornbills. Citizen scientists were also involved in collecting information of the aberrant behaviour of a pair of Great and Rhinoceros Hornbills, both female escapees. Weblog posts were made of these observations and subsequently published in scientific journals, with the citizen scientists as co-authors. We have shown that citizen scientists, be they photographers or birdwatchers, can be encouraged to make publishable field observations, and bring back crisp images of birds or their behaviour.

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KEY WORDS. – Citizen science, hornbills, Singapore.

INTRODUCTION

Citizen science refers to the recruitment of the public to assist in the collection of scientific field data that scientists make use of to compile reports (Cohn, 2008). In Singapore, these citizen scientists have always been at the forefront of data collection as far as birds are concerned (Wee & Subaraj, 2009). These birdwatchers were mainly British colonial personnel during the pre-independent days (Wang & Hails, 2007). Locals came into the picture when a formal Bird Group was started within the then Malayan Nature Society (Singapore Branch), now Nature Society (Singapore) or NSS around 1984 (Wee & Tsang, 2008). Led by leaders with exposure to a long tradition of birdwatching in their home county Britain, the group initially attracted limited local participation (Wee, 2006a). Recreation-based activities like guided nature walks, bird race, surveys and bird counts helped attract locals to the group. Birdwatchers then were also encouraged to make field observations of migrant arrivals, nesting and other bird behaviour, in an effort to inject some science into this recreational activity.

An in-house monthly newsletter, the Singapore Avifauna, was started to allow members to record their observations. The newsletter proved popular, containing a mix of simple sightings, behavioural notes and trip reports. In early 1990s, locals took over the leadership of the group (Wee,

2006a). Deprived of experienced leaders and the exit of many expatriate birdwatchers, locals took the easy way out and simply watched birds. Many became experts at field identification of birds, a skill useful in documenting bird populations of habitats. Unfortunately, they lost their abilities to make field observations and so we lost the opportunity to collect and document bird behaviour for nearly a decade.

Earlier sightings of hornbills. – Way back in the early 19th century, Singapore had its native hornbill species. Gibson-Hill (1949) listed Oriental Pied Hornbill (*Anthracoceros albirostris*), Rhinoceros Hornbill (*Buceros rhinoceros*) and Helmeted Hornbill (*Buceros vigil*) in his checklist, although by then all three were locally extinct. Wang & Hails (2007) rejected Helmeted Hornbill as ever having been found in Singapore due to doubtful provenance.

In the 1920s the Oriental Pied Hornbill was believed to be still present (Robinson, 1927). Subsequently they were not seen until the 1960s, when irregular sightings were made at various locations on the mainland. These were thought to be escapes from the wildlife trade; besides, the zoo had been known to release free-flyers into its area (Wang & Hails, 2007). Both subspecies, *Anthracoceros albirostris convexus* and *A. a. albirostris*, were seen and known to be breeding. The former occurs in the north while the latter the south of the Malay Peninsula.

In the early 1990s, a breeding pair of Oriental Pied Hornbills, subspecies *convexus*, was sighted on the offshore island of Pulau Ubin (Lim, 1994a; Wee & Subaraj, 2006). Thought to have flown from the nearby Malaysian state of Johor, the pair eventually multiplied to form a small population on this island. Although regular sightings were made (Lim, 1994b), details of breeding were not recorded. If there were attempts at documenting their breeding on the mainland, apparently the results have not been published (L.K. Wang, pers. comm.).

Bird photographers as citizen scientists. – Hornbill monitoring took a serious turn in the early 2000s when digital photographers burst onto the scene (Chan et al., 2007; Tsang et al., 2009; Wee & Subaraj, 2009). The subsequent formation of the Bird Ecology Study Group (BESG) within the Nature Society (Singapore) in 2005, complementing the Bird Group, added to the impact of the photographers (Wee, 2006a,b). The BESG's close working relationship with bird photographers added to the impact. The latter provided images and the former helped in their interpretation. The results were posted in the group's weblog <http://www.besgroup.org/>.

Initially, photographers sent in sightings of these birds from various urban locations as they never fail to excite attention, considering their size and unique characters. Postings in the freely accessible weblog encouraged further contributions from the public. Soon, images sent in included behavioural aspects like food preferences, comfort behaviour and gradually, courtship and breeding.

The Oriental Pied Hornbills were by then actively breeding on the mainland as well as on the offshore island of Pulau Ubin. In early 2005, photographers located a Great Hornbill and a Rhinoceros Hornbill, both female, pairing up and playing out elements of courtship in a plot of degraded secondary growth around the Eng Neo area of mainland Singapore. Daily, groups of them kept vigil on the pair, meticulously documenting their activities. The Great Hornbill, exhibiting some behaviour patterns more usual in the role of a male, was trying hard to persuade the rhinoceros hornbill to enter a cavity in the trunk of an old albizia tree (*Paraserianthes falcataria*). The accounts, illustrated with images were posted in the weblog, to be eventually written up formally and published (Chan et al., 2008; Wee & Subaraj, 2006). This was BESG's first major collaboration with citizen scientists in the publication of scientific papers.

Another opportunity arose when two pairs of Oriental Pied Hornbills started prospecting separate cavities in old trees in the Changi area. These birds probably moved from nearby Pulau Ubin to the mainland to seek out nesting opportunities. Here, a battery of photographers was organised to take turns observing the two nesting attempts. The observations, together with images that included courtship feeding, gathering of mud to seal the female inside the nest cavity and regular food brought by the males to the nests, were again initially posted in the weblog. Unfortunately, both nesting attempts failed to fledge chicks, possibly due to the inexperience of these

birds. From these accounts we again managed to publish a scientific paper that included the observers as co-authors (Wee et al., 2008).

DISCUSSION

Citizen scientists played, and continue to play, important roles in the collection of detailed field data on hornbills in particular and birds in general. They are currently being credited beyond simple acknowledgments for their roles in data collection. The few scientific papers published during the last few years credited citizen scientists as authors and co-authors.

The absence of earlier contributions on behavioural studies of the Oriental Pied Hornbills is puzzling. It cannot be said that there were no talent or interests, other than listing birds in reports and ticking species in checklists. Two important earlier papers by Ho & Supari (1997, 2000) on the plain-pouched hornbill (*Aceros subruficollis*) attest to the presence of talent, although these observations were made in nearby Malaysia. Yet, in Singapore itself, there was not much documentation of breeding by the Oriental Pied Hornbills until bird photographers came onto the scene.

The entry of bird photographers on to the birdwatching scene is a blessing. For one, it has injected renewed interest in birdwatching that in turn has nudged traditional birdwatchers out of their complacency. Also, the sudden spate of publications outside of hornbills, due mainly to citizen scientists in the guise of bird photographers (Tsang et al., 2009), will ensure that things can only become better for ornithology in Singapore.

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