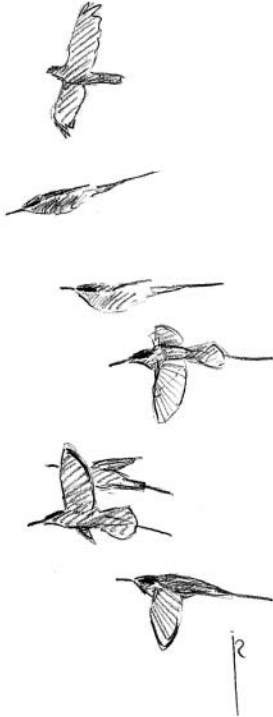


A COMPARISON OF SPRING MIGRATION PHENOLOGY OF BEE-EATERS AND ORIENTAL HONEY-BUZZARDS

PERNIS PTILORHYNCUS

AT TANJUNG TUAN, MALAYSIA, 2000-01

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----- REUVEN YOSEF¹ & K. L. BILDSTEIN²



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Counts of migrating Blue-tailed Bee-eaters *Merops philippinus* and Blue-throated Bee-eaters *M. viridis*, as well as five raptor species were made in March 2000 and March 2001 at Tanjung Tuan, a coastal migration watch-site in western Malaysia. Totals of 2226 bee-eaters (12.9 bee-eaters h⁻¹) and 11 441 raptors (66.5 raptors h⁻¹) were counted. The Blue-tailed Bee-eater comprised 60.8% of *Merops* individuals (1353 birds) that could be identified. The Blue-throated Bee-eater was much less common, comprising 10.0% of the flight (222 counted). Oriental Honey-buzzards *Pernis ptilorhyncus* comprised 93.1% (10 648 individuals) of the raptor flight. Bee-eater and Honey-buzzard migration peaked during 11:00-16:00h, and both generally preferred westerly winds to make landfall at Tanjung Tuan.

Key Words: *Merops philippinus* - *M. viridi* - *Pernis ptilorhyncus* -migration - Malaysia - East Asian Flyway

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INTRODUCTION

Since the 1950s, Oriental Honey-buzzards *Pernis ptilorhyncus* have been known to migrate north-east from Sumatra across the Straits of Malacca to the west coast of Malaysia each spring (Oakeley 1955; White 1961; Medway & Nisbet 1965; Medway & Wells 1976; Wells 1990). Recently it was discovered that significant numbers of Blue-tailed Bee-eaters *Merops philippinus* and Blue-throated Bee-eaters *M. viridis* also use the same route each year (Medway & Wells 1976; Fry *et al.* 1992; Wells 1999). However, information regarding routes, timing and destinations of diurnal

migrants on this East Asian Flyway in both spring and fall are not well known (see McClure 1974; McClure 1998; DeCandido *et al.* 2004). In Southeast Asia, migrating bee-eaters and Honey-buzzards travel in flocks, interspersing flapping-flight with soaring in thermals whenever possible. In this paper we analyze the diurnal rhythm of migrating bee-eaters and Honey-buzzards where both make landfall on the Asian mainland after an overwater crossing of at least 38 km.

Port Dickson (2°24'N, 101°51'E, sea-level) is a small town on the west coast of Malaysia situated on the Straits of Malacca, approximately 94 km southwest from Kuala Lumpur (Fig. 1-2). It is



Fig. 1. Location of Tanjung Tuan in relation to Sumatra

located at the southern end of a south to north range of mountains that presumably funnels spring migrants north along the western lowlands of the Malay Peninsula (Medway & Nisbet 1965; Wells 1999). The watchsite, known locally as Tanjung Tuan, is situated on the deck of a lighthouse, south of Port Dickson at km 16, approximately 3 km west of the coastal highway. The lighthouse, built by the Dutch in the 18th century, sits atop a rocky peninsula providing a 180-degree view to the west, south and north; it is surrounded by coastal evergreen rainforest in a small, forest reserve. On clear days it is possible to see Sumatra approximately 38 km across the Straits of Malacca to the southwest. This is the shortest overwater distance along the Straits from Tanjung Medang on the island of Pulau Rupert of northwestern Sumatra (Zalles & Bildstein 2000).

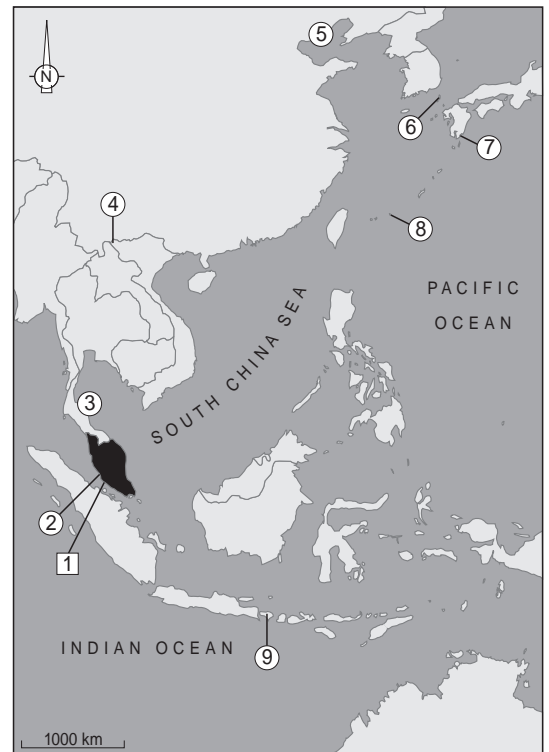


Fig. 2. Location of Tanjung Tuan, Malaysia (1) relative to other important raptor migration watch sites in East Asia: Selangor Plains, Malaysia (2); Chumphon, Thailand (3); SaPa, Vietnam (4); Beidaihe, China (5); Uchiyama-toge, Nagasaki, Japan (7); Miyako Islands (Ryukyus), Okinawa, Japan (8); and Bali Barat National Park, Indonesia (9). See DeCandido *et al.* (2004) for information about these watch sites.

METHODS

Migrants were counted during 8-22 March 2000 (104 observation h) and 2-12 March 2001 (68 h) by DA and RDC using 8.5x and 10x binoculars. Observations typically began at 09:00-10:00 h local time and usually ended by 17:00 h. DeCandido identified, counted, and recorded the numbers of bee-eaters and raptors seen, while Allen photographed the migration. Most bee-eaters (75.9%) and almost all raptors (> 99%) were identified to species level. Weather conditions typically were hazy-cloudy with little wind

in the morning till 10:00 h, then becoming clear but humid. On many days at approximately 10:45 h, a 3-12 km h⁻¹ sea breeze from the west/northwest would begin. On certain days the wind direction and speed changed significantly in subsequent hours. Wind direction was measured by recording the reading shown on the weather vane mounted atop the lighthouse and a hand-held compass.

We scanned mainly to the west across the Straits of Malacca in the direction of Sumatra from the patio of the lighthouse. Bee-eaters and raptors were considered migrants if they passed west-to-east across an imaginary north-south line and continued west and out of sight past the lighthouse and nearby hills. Occasionally, migrants did not pass the immediate area of the watchsite but continued on a northeastern course over the Straits of Malacca, presumably making landfall north of the lighthouse towards Port Dickson. We pooled the number counted of both *Merops*-species along with all bee-eaters we could not identify to species level.

RESULTS

In 2000-01, a total of 2226 bee-eaters of two species (12.9 birds h⁻¹) were counted during 26 observation days. These included 1353 Blue-tailed Bee-eaters (60.8%), 222 Blue-throated Bee-eaters (10.0%) and 651 unidentified individuals (29.2%). Also, a total of 11 442 raptors (66.5 birds h⁻¹), were counted in migration. Oriental Honey-buzzard was the most common raptor, making up 93% (10 648 total; 61.9 birds h⁻¹) of the flight in 2000-01. Black Bazas *Aviceda leuphotes* comprised 5.3% (608 total), and Chinese Goshawk *Accipiter soloensis* (62), Grey-faced Buzzard *Butastur indicus* (48) and Japanese Sparrowhawk *A. gularis* (12), accounted for 1.1% (4.6 birds h⁻¹); 64 raptors could not be identified. The majority of bee-eaters (84.0%) were seen from 11:00-16:00 h (Fig. 3). The highest hourly total occurred between 13:00-14:00 h on 21 March 2000 when 101 Blue-tailed Bee-eaters were counted. Once the first flock of bee-eaters

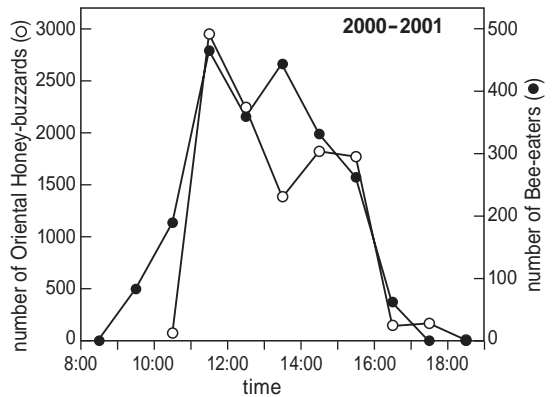


Fig. 3. Number of bee-eaters and Oriental Honey-buzzards counted in migration by hour of the day at Tanjung Tuan, Malaysia, in March 2000-2001

arrived at the Cape, scattered flocks would follow for 4-6 h each day on most days, especially after 10 March. Exceptionally, bee-eater migration would last for seven (17 March 2000) to eight (21 March 2000) consecutive hours on a given day. On peak flight days, the arrival of bee-eaters began in the 09:00-10:00 h (17, 20 and 21 March 2000). Flocks were not usually seen after 16:00 h, and no bee-eaters were recorded migrating after 17:00 h. High daily counts of bee-eaters occurred after 15 March 2000, frequently when winds with a westerly component were moderate to strong (> 15 km h⁻¹) as on 16 March 2000 (169 counted), 17 March 2000 (254) and 19 March 2000 (248). Overall, 30.1% of the bee-eater flight in 2000-01 was counted on these three days of moderate to strong winds. However, the highest day counts in both years occurred on days with light (< 10 km h⁻¹) winds: 11 March 2000 (139 counted) and 21 March 2001 (326).

Most (95.0%) migrating Oriental Honey-buzzards were seen from 11:00-16:00 h, with a decided peak between 11:00-12:00 h, and a second, smaller, peak between 14:00-15:00 h and small flocks up until 18:30 h only on days of high counts (2 and 12 March 2001). The highest hourly count in 2000-01 was 841 individuals from 11:00-12:00 h on 9 March 2001. The majority (96.7%) of Honey-buzzards made landfall at the Cape with light to moderate (< 15 km h⁻¹ and usually

< 10 km h⁻¹) winds. Generally, light winds with a westerly component produced the best Oriental Honey-buzzard flights. However, in 2001, of the four days with > 1000 Honey-buzzards counted, three had light winds from the NE to E, and the fourth had light northwestern winds.

DISCUSSION

Since the 1950s in Malaysia there has been known a significant migration of raptors that are returning each spring from Sumatra to the Asian mainland in the area of Tanjung Tuan. However, only a few published accounts provided information about the daily and seasonal raptor migration phenology at the site (Oakeley 1955; White 1961; Medway and Nisbet 1965; Wells 1990; 1999). Even fewer data exist for the number of individuals of the two *Merops* species that utilize this same route each spring (see Medway & Wells 1976; Wells 1999). In Southeast Asia, the handful of bee-eater migration reports present data from single days of observation (see David-Beaulieu 1944; David-Beaulieu 1949-50; Melville and Fletcher 1982; Tizard 1996; Evans 2001). The only long-term study of migrating bee-eaters comes from Hong Kong (Carey *et al.* 2001). Even there, data are based upon a small sample: a maximum 30-year aggregate of 30-40 individuals total, counted by week in spring.

At Tanjung Tuan, Oriental Honey-buzzards and bee-eaters showed a diurnal migration pattern typical of soaring birds (Kerlinger 1989), with a late morning peak, an indication of a noon lull and steeply declining passage in the late afternoon. Both species (groups) use thermal soaring and active flight during migration, and readily cross large bodies of open water. In the closely related European Honey-buzzard *Pernis apivorus* and European Bee-eater *Merops apiaster* flying speeds were very similar between both species groups (Bruderer & Boldt 2001), but Honey-buzzards showed a wide variation in gliding and flap-gliding speeds depending on environmental conditions (Bruderer *et al.* 1994). The – on average – earlier arrival of bee-eaters at Tanjung Tuan may

have been caused by employment of active flight to a greater degree, a lesser dependence on thermals than broad-winged raptors and/or taking advantage of favourable weather conditions in Sumatra (thermals) and Malaysia (onset of seabreeze from the W and NW at about 10:45 h) earlier than Honey-buzzards. Both bee-eaters and Honey-buzzards declined rapidly as migrants after 15:00 h, but why only Honey-buzzards were seen in migration after 17:00 h remains to be determined.

Bee-eaters were more likely than Oriental Honey-buzzards to make landfall at Tanjung Tuan when winds were moderate to strong (> 15 km h⁻¹) from the NW-W (DeCandido *et al.* 2004). Several high daily bee-eater counts occurred on moderate to strong wind days, when simultaneously no Oriental Honey-buzzards were counted in migration. All Honey-buzzard flights at the Cape were correlated with light winds (< 15 km h⁻¹, usually < 10 km h⁻¹). It seems likely that varying numbers of bee-eaters and Honey-buzzards are migrating in all wind speeds and wind directions along a fairly broad front as they approach Tanjung Tuan. Moderate to strong westerly winds concentrated the bee-eater flight at the Cape probably because it was the closest site to make landfall. What factor(s) influence Honey-buzzards to choose Tanjung Tuan to make landfall in large numbers on certain days but not others remain to be determined. Light winds, sometimes with a westerly component, produced the best Honey-buzzard flights, but on other days with the same conditions, few Honey-buzzards appeared. Also, large flights of Honey-buzzards occurred on days with NE-E winds. The influence of wind direction and speed upon migrants at Tanjung Tuan warrants additional investigation, as do the factors that initiate movements of particularly large numbers of bee-eaters and raptors. In any event, conditions in Sumatra probably play the most important role in determining the extent and timing of bee-eater and Honey-buzzard migration at the Cape on any given day.

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SAMENVATTING

De laatste jaren zijn in Zuidoost-Azië diverse bergke-tens en zee-engtes ontdekt waar thermiekegevoelige vogels zich tijdens de trek concentreren. Een van deze plekken ligt vlakbij Port Dickson in Maleisië aan de Straat van Malakka. Tijdens de voorjaarstrek bereiken roofvogels en bijeneters hier land na een oversteek van minimaal 38 km open water vanaf het eiland Pulau Rupert voor de kust van Sumatra, Indonesië. Tijdens tel-lingen in maart 2000 en 2001 werden 11 442 roofvo-gels in vijf soorten (vooral Aziatische Wespindief *Pernis ptilorhyncus*) en 2226 bijeneters in twee soorten geteld. Deze passeerden vooral tussen 10:00u en 16:00u lokale tijd, waarbij de bijeneters iets eerder begonnen en de wespindieven wat langer doorgingen (vooral op dagen met sterke trek). De bijeneters werden vaker gezien tijdens windsterktes van 15-30 km u⁻¹, de wespindieven bij <15 km u⁻¹. Alle passanten maakten gebruik van thermiek, maar wisselden dat af met vlie-gen indien noodzakelijk. Dat laatste werd wat vaker door bijeneters toegepast, mogelijk de verklaring waar-om ze al vóór 11:00u begonnen binnen te druppelen. (RGB)

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