FIELD STUDY

Ringing migrant sparrowhawks in southern Thailand

CHUKIAT NUALSRI, PHILIP D. ROUND, ANDREW J. PIERCE, KASET SUTASHA, DUANGRAT PHOTHIENG, KRIANGSAK SRIBUAROD, JONATHAN MURRAY & ROBERT DECANDIDO

The significance of the Thai-Malay Peninsula as a migratory flyway for raptors and other diurnal migrants has been recognised since at least the mid-1980s (Melville & Fletcher 1982, Lekagul *et al*. 1985, Bildstein & Zalles 1995). Recent studies (DeCandido *et al*. 2004a,b, DeCandido & Nualsri 2009) have focused on intensive monitoring of the numbers and species composition of raptors and other diurnal migrants during both spring and autumn migrations. From 2001 onwards, observations were made mainly in the coastal plain near Chumphon town, at Ban U-Tapao, and at nearby Khao Promsri as well as a further site, Khao Radar, about 100 km north of Chumphon town, immediately east of Highway 4, in Bang Saphan Noi district, Prachuap Khiri Khan province. Observations at the latter site have been conducted mainly by the Thai Raptor Group (Lorsunyaluck *et al*. 2008, DeCandido *et al*. 2011).

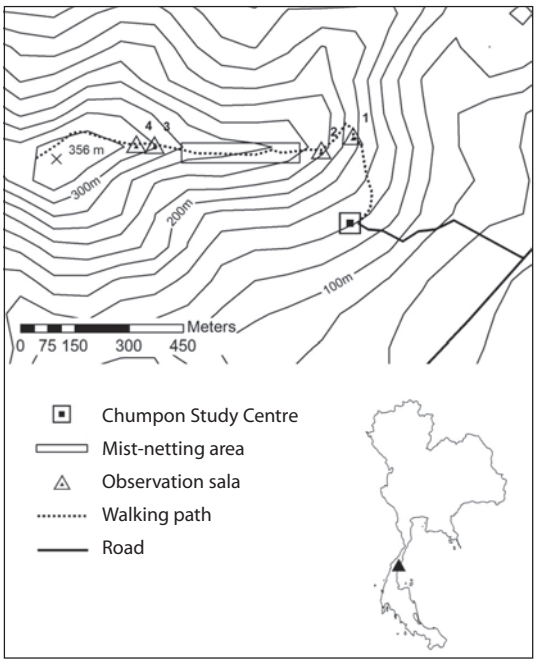
Since 2008 Khao Dinso, Pathiu district, Chumphon (10.633°N 99.283°E) has been recognised as the best site for monitoring the southward migration of raptors and other diurnal migrants (Nualsri & DeCandido 2010). Khao Dinso is a steep, 356 m hill situated about 1.5 km from the coast. It is deforested but covered with secondary, regenerating scrub woodland, and offers spectacular views of the surrounding lowlands (a mosaic of rubber and oil-palm plantations) and adjacent sea coast.

Most observations were conducted at 240–300 m on an east-west ridge (Figure 1). Raptor migration starts here in mid-August and continues until mid-November. In the earlier part of the season (until at least early October) more than 95% of the individuals on passage are Japanese Sparrowhawks *Accipiter gularis* and Chinese Sparrowhawks *A. soloensis* (RD & CN pers. obs.). During that period, migrating raptors tend to hug the coast, skimming low over the ridges and using them to reduce the effect of the prevailing south-west monsoon headwind.

By placing mist-nets (usually five 12 m nets) along the level part of the ridge-top, siting them where there were gaps in the tree cover, with the top of the net no more than 4 m above the ground and perpendicular to the birds' flight-line, we were able to catch small numbers of migrating sparrowhawks. Baiting proved unsuccessful: we tried small chicks and (for a brief period) Stripe-throated Bulbuls *Pycnonotus finlaysoni* suspended in cages at head-height, but neither appeared to attract sparrowhawks. All birds trapped were measured, weighed, examined for moult, photographed and ringed with numbered metal rings supplied by the Department of National Parks, Wildlife and Plants Conservation.

A total of 75 accipiters—48 Japanese Sparrowhawks (21 adult males, 13 adult females, 10 juvenile males and 4 juvenile females), 26 Chinese Sparrowhawks (10 adult males, 8 adult females and 8 juvenile males—all the juvenile Chinese Sparrowhawks were assumed to be males because their wing-lengths were identical to those of adult males) and one unsexed juvenile Shikra *Accipiter badius*—were trapped during the 2011 and 2012 autumn seasons. Of these, 72 were trapped in only 10 days (six days in 2011 and four in 2012) between 19 September and 6 October. Trapping after the last date was much less successful. Although

Figure 1. Location of Khao Dinso and details of ringing site.



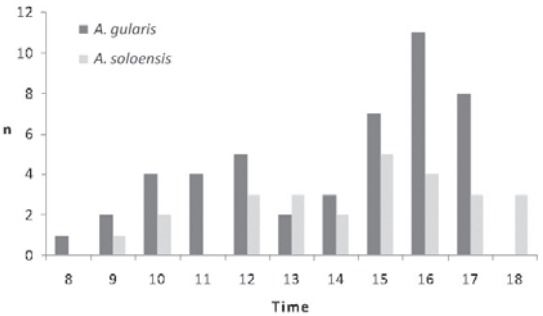


Figure 2. Numbers of Japanese *Accipiter gularis* and Chinese Sparrowhawks *A. soloensis* trapped in relation to time of day.

the overall number and diversity of raptors was greater at that time, the south-west monsoon declines in early October and by about 20 October is replaced by a north-east monsoon tail-wind; the birds then pass much higher, well beyond the reach of mist-nets. The numbers of sparrowhawks passing are much fewer then, and the passage of other species, especially Black Baza *Aviceda leuphotes* and Grey-faced Buzzard *Butastur indicus*, increases.

The numbers of hawks trapped increased as the day progressed, peaking during the second half of the afternoon (Figure 2). Although the reduced capture frequency in the middle part of the day and the early afternoon corresponded with fewer sightings over the coastal ridge, this did not apparently indicate a real decline in numbers but rather a shift in flight pattern. As updrafts became stronger in the hottest part of the day, birds tended to be higher and were both harder to catch and less visible, whilst the passage tended to be further to the west at that time (RD pers. obs., M. Siponen pers. comm.). Nevertheless, low clouds and sudden rainstorms brought birds lower, leading to capture at any time of day.

Adult and second calendar-year males accounted for 43.8% of Japanese Sparrowhawks and 38.5% of Chinese Sparrowhawks trapped. Juvenile male Japanese Sparrowhawks also outnumbered juvenile females, whilst no juvenile female Chinese Sparrowhawks were identified. Sexual size dimorphism was far more obvious in Japanese than Chinese Sparrowhawks and there was some overlap in wing-length between the largest adult males and smallest adult females of the latter species (Table 1). Since the mean and standard deviation of the wing length of our juvenile sample was identical to that of adult males, we may be reasonably confident that no juvenile females were overlooked.

Because we were not baiting to attract raptors, we may assume that the body mass and age composition of our trapped birds were probably representative of the migrating population. Baiting, widely used elsewhere for raptors, in combination with various other trapping methods, may have a tendency to bias catches according to age ratio or physical condition, since lighter or more emaciated birds may have a greater need to feed (Nass 1964, Weatherhead & Ankney 1984, Gorbay & Yom-Tov 1994). Roughly 20% of the Japanese Sparrowhawks handled had distended crops, indicating they had recently fed, and they were occasionally observed harrying and hunting small birds. We did not observe Chinese Sparrowhawks actively hunting, although their feeding habits, which, at least in breeding and wintering areas, involve short flights to capture frogs or insects from the ground or wetland margins (Ferguson-Lees & Christie 2001), may be less easily detected. Nevertheless, we have once, elsewhere on north-bound spring migration, observed a Chinese Sparrowhawk preying on birds. Although we speculated that Chinese Sparrowhawks might feed less on migration than Japanese Sparrowhawks, and rely more on fat reserves to fuel their migration, we could not detect significantly elevated levels of body fat among any of the sparrowhawks that we handled.

Chinese Sparrowhawk males were, on average, about 88% of the body mass of females, while Japanese Sparrowhawk males were much smaller, roughly two-thirds the body mass of females (Table 1). Although juveniles tended to be lighter than

Table 1. Wing length and weight of *Accipiter* species trapped at Khao Dinso during autumn migration in September and October 2011 and 2012.

Age/sex class	Wing (mm)	Range (n)	Weight	Range (n)
A. gularis ad f	194.5 ± 3.00	189–200 (12)	152.2 ± 12.97	115.6–167.8 (13)
A. gularis ad m	167.2 ± 4.06	161–178 (21)	100.9 ± 7.73	88.8–118.4 (21)
A. gularis juv f	190.3 ± 1.71	188–192 (4)	142.8 ± 6.60	135.6–151.3 (4)
A. gularis juv m	165.5 ± 3.75	163–170 (10)	95.3 ± 7.94	84.8–108.1 (10)
A. soloensis ad f	199.4 ± 5.24	190–204 (4)	137.5 ± 8.94	124.9–150.1 (8)
A. soloensis ad m	192.1 ± 4.33	183–199 (10)	121.0 ± 8.21	106.7–138.3 (10)
A. soloensis juv all	192.1 ± 4.33	183–199 (8)	118.0 ± 8.94	105.8–129.5 (8)

P. D. ROUND

Plate 1. Adult male Chinese Sparrowhawk *Accipiter soloensis* showing dark vinous iris. Note the bright orange-yellow cere and grey orbital ring which are common to all age/sex classes. 19 September 2012.

P. D. ROUND

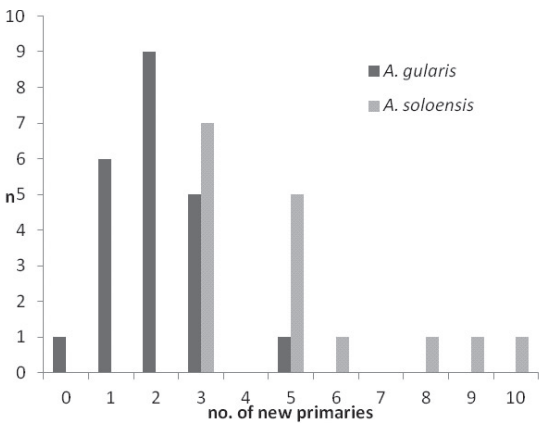
Plate 2. Apparent Second calendar-year male Chinese Sparrowhawk showing bi-coloured iris, 19 September 2012.

adults of the corresponding sex in both species, these differences were not statistically significant (*t*-test).

Almost all the non-juvenile sparrowhawks trapped displayed arrested moult, having replaced some inner primaries. In general, moult (Figure 3) had progressed further in Chinese Sparrowhawks (median number of new, moulted primaries = 5, range 3–10) compared with Japanese Sparrowhawks (median number of new primaries = 2, range 0–5). Herremans & Louette (2000) noted arrested moult in an October-taken Chinese Sparrowhawk specimen from Thailand.

Male Japanese Sparrowhawks and both sexes of Chinese Sparrowhawks that were one year old (second calendar-year birds) could be recognised because their retained (unmoulted) primaries were barred, brown juvenile feathers. There was considerable variation in the iris colour of males. Japanese Sparrowhawks in apparently definitive adult male plumage showed irides that ranged from orange-scarlet to uniform crimson-red, with a yellowish outer ring (Plates 7 & 8). The iris colour of adult male Chinese Sparrowhawks was dark vinous-crimson (Plate 1) but a second calendar-year male had a red iris with a yellow-flecked outer ring (Plate 2). Juveniles and females of both species had yellow irides.

Figure 3. Extent of replacement of primaries in adult and second calendar-year Japanese *Accipiter gularis* and Chinese Sparrowhawks *A. soloensis*.



In addition to raptors, Khao Dinso has significant potential for studying a range of other migrant species. The most abundant landbird migrants trapped were Eastern Crowned Warblers *Phylloscopus coronatus* and the long-distance migrant race of Asian Paradise-flycatcher *Terpsiphone paradisi incei*. Further ringing activities have the potential to reveal scarce or little-known species and add further to knowledge of the seasonality of migration. We have already trapped six Alström's Warblers *Seicercus soror,* a species hitherto known from the Thai-Malay Peninsula only by a single sight record (Wells 2007).

The site is principally productive for monitoring the southward raptor migration. It is unlikely that our capture success in early autumn can be repeated during spring migration since the northward migratory flight-line largely bypasses Khao Dinso, being shifted several km to the west. Northbound migrants are usually assisted by a south-west tail-wind and are higher and harder to capture. Nonetheless, it would be desirable to maintain some ringing and monitoring effort at Khao Dinso year round, especially for other landbird migrants.

Ringing and monitoring work will be continued in future seasons alongside the visual recording of raptor passage and other diurnal migrants. We will possibly attempt a greater range of capture techniques and, if funds allow, fit satellite transmitters to track the migration of sparrowhawks. A permanent study centre, intended as an observatory for study of all avian migrants

P. D. ROUND

Plate 3. Apparent second calendar-year female Chinese Sparrowhawk ventral view, 22 September 2012.

Plate 4. Apparent second calendar-year female Chinese Sparrowhawk dorsal view. Note retained old, unmoulted two outermost primaries and some secondaries. The left central tail feather is also old and unmoulted. 22 September 2012

P. D. ROUND

P. D. ROUND

Plate 5. Juvenile Chinese Sparrowhawk. Note the grey orbital ring and bright orange-yellow cere which are shared by all age/sex classes. 21 September 2012.

Plate 6. Juvenile Japanese Sparrowhawk *A. gularis*. Note the yellow orbital ring and greenish-yellow cere shown by all age/sex classes. 21 September 2012.

P. D. ROUND

P. D. ROUND

P. D. ROUND

Plates 7 & 8. Variation in iris colour in apparent adult male Japanese Sparrowhawks, 19 September 2012 (Plate 7), 25 September 2011 (Plate 8).

including raptors, was built on the lower slopes of Khao Dinso in October 2012 by the Pathiu district administration, with funding from Chumphon province. Since nature education and awareness promotion are major goals of the centre, interested members of the public, school groups, university undergraduates, etc. may also be invited to observe the ringing activities in future.

Acknowledgements

We thank Pinit Charoenpanit, former Chumphon province governor, Prasit Fugudom, Pathiu district chief officer and Jareak Kosin, headman and his assistant in village no. 8, Bangson subdistrict, for their kind support and assistance. This work was carried out with permission from the Department of National Parks, Wildlife and Plants Conservation who also supplied the bird rings. Wangworn Sankamethawee and Martti Siponen assisted with ringing. We thank Keith Bildstein for his helpful comments and suggestions on our data. We are grateful for contributions to funding in 2012 made through Baan Suksabye, continuing a tradition of giving by Nurak Israsena and Edmund W. Pease. Perawit Insuan prepared the map. Philip Round is supported by The Wetland Trust UK.

References

Bildstein, K. L. & Zalles, J. I. (1995) *Raptor migration watch-site manual*. Pennsylvania USA: Hawk Mountain Sanctuary.

DeCandido, R., Kasorndorkbua, C., Nualsri, C., Chinuparawat, C. & Allen, D. (2008) Raptor migration in Thailand. *BirdingASIA* 10: 16–22.

DeCandido, R. & Nualsri, C. (2009) Timing and abundance of Grey-faced Buzzards *Butastur indicus* and other raptors on northbound migration in southern Thailand. *Forktail* 25: 90–95.

DeCandido, R., Nualsri, C., Allen, D. & Bildstein, K. L. (2004a) Autumn 2003 raptor migration at Chumphon, Thailand: a globally significant raptor migration watch site. *Forktail* 20: 49–54.

DeCandido, R., Nualsri, C. & Allen, D. (2004b) Migration of Black Drongo *Dicrurus macrocercus* in southern Thailand in autumn 2003. *Forktail* 20: 143–144.

DeCandido, R., Sawasdee, C., Smith, D., Nualsri, C. & Allen, D. (2011) Observations on the 2009 southbound migration of three bee-eater species at Radar Hill, Thailand. *Forktail* 27: 106–108.

Ferguson-Lees, I. J. & Christie, D. A. (2001) *Raptors of the world*. London: Christopher Helm.

Gorney, E. & Yom-Tov, Y. (1994) Fat, hydration condition and moult of Steppe Buzzards *Buteo buteo vulpinus* on spring migration. *Ibis* 136: 185–192.

Herremans, M. & Louette, M. (2000) A partial post-juvenile molt and transitional plumage in the Shikra (*Accipiter badius*) and Grey Frog Hawk (*Accipiter soloensis*). *J. Raptor Res*. 34: 249–261.

Lekagul, B., Round, P. D. & Komolphalin, K. (1985) Birdwatching for Palearctic migrants in Thailand. *British Birds* 78: 2–39.

Lorsunyaluck, B., Tandavanitj, P. & Kasorndorkbua, C. (2008) Autumn migration of Chinese Sparrowhawk *Accipiter soloensis* and Japanese Sparrowhawk *Accipiter gularis* at Radar Hill, Prachuap Khiri Khan, Thailand. *J. Wildlife in Thailand* 15: 74–79.

Melville, D. S. & Fletcher, W. E. (1982) Diurnal observations of bird migration in central and western Thailand. *Nat. Hist. Bull. Siam Soc*. 30: 49–50.

Nass, R. D. (1964) Sex and age ratio bias of cannon-netted geese. *J. Wildl. Mgmt*. 28: 522–527.

Nualsri, C. & DeCandido, R. (2010) Khao Dinso: the premier site to observe migrating raptors in the Orient? *BirdingASIA* 14: 68–72.

Weatherhead, P. J. & Ankney, C. D. (1984) A critical assumption of band-recovery models may often be violated. *Wildl. Soc. Bull*. 12: 198–199.

Wells, D. R. (2007) *The birds of the Thai-Malay Peninsula*, *2*. London: A. & C. Black.

Chukiat NUALSRI
Nathung Administrative Organisation, 99 Mu3
Nathung Sub-District
Muang Chumphon 86000, Thailand
Email: bnternstar@gmail.com

Philip D. ROUND
Department of Biology, Faculty of Science
Mahidol University, Rama 6 Road
Bangkok 10400, Thailand
Email philip.rou@mahidol.ac.th

Andrew J. PIERCE
Conservation Ecology Program
School of Bioresources and Technology
King Mongkut's University of Technology Thonburi
Bangkhunthien, Bangkok 10150, Thailand
E-mail: andyp67@gmail.com

Kaset SUTASHA
Veterinary Teaching Hospital
Faculty of Veterinary Medicine
Kasetsart University, Bangkok 10900, Thailand
Email: kasetvet57@gmail.com

Duangrat PHOTHIENG
Director, Captive Propagation Division
Department of National Parks, Wildlife
and Plants Conservation
Bangkok 10900, Thailand
Email: pothieng@hotmail.com

Kriangsak SRIBUAROD
Khlong Saeng Wildlife Research Station
Department of National Parks, Wildlife
and Plants Conservation
P.O. Box 15, Khao Phang, Ban Tha Khun District
Surat Thani 84230, Thailand
Email: JOKSWRS@hotmail.com

Jonathan MURRAY
195 Soi 19 Pradipat Rd, Bangkok 110400, Thailand
Email: jmurray808@yahoo.com

Robert DeCANDIDO
1831 Fowler Avenue, The Bronx
New York 10462, USA
Email: rdcny@earthlink.net