Malayan Nature Journal 2009, 61(2), 209 - 212

Short note

Home range of *Chalcophaps indica* Linnaeus 1758 (Aves: Columbidae) in a semi-forested landscape

YANGCHEN LIN[1]

The movements of one male and one female *Chalcophaps indica* Linnaeus 1758 (Aves: Columbidae) were radio-tracked over a duration of one to two weeks in a semi-forested landscape in Singapore. The home ranges of the male and female were estimated by kernel analysis to be 24.1ha and 23.1ha respectively. Striking coincidences of the centres of activity of the male and female appear to be related to resource availability rather than mating.

Keywords: Chalcophaps indica, *Emerald Dove*, *home range, radio telemetry, ranging behaviour, Singapore.*

Chalcophaps indica Linnaeus 1758 (Aves: Columbidae) occurs in a wide variety of habitats and has a varied diet including seeds, fruits and invertebrates (Del Hoyo et al. 2007). Recapture studies indicate that *Chalcophaps indica* usually makes local movements depending on availability of fallen fruit and competition from conspecifics but occasionally flies long distances of up to 800 km (Wells 1999). Spatial and temporal details of these movements, however, are unknown. As far as the author is aware, this study is the first to quantify the diurnal home range of *C. indica*.

One male and one female *Chalcophaps indica* were captured using mist nets in June and July 2008 in Bukit Batok Nature Park (1.350°N, 103.764°E), a hilly area with a mixture of secondary forest and parkland in Singapore. G3-1V radio transmitters (AVM Instrument Company, California, USA) weighing less than 3% of the bird were attached to the birds using figure-8 harnesses with wing loops joined at the breast. The birds were immediately released at the locations of capture and telemetry commenced one day after release. The male bird was tracked over seven days with 43 positional fixes, and the female tracked over 14 days with 58 fixes. Approximately equal weight was given to all hours of the day from 07:00 to 19:00 hours. The intervals between fixes were at least one hour to minimize autocorrelation. Geographical coordinates were logged using the Global Positioning System.

1 National Biodiversity Centre, National Parks Board, 1 Cluny Road, Singapore 259569
Email: linyangchen@gmail.com Telephone: +65 91250868
Manuscript received: 15 January 2009
Manuscript accepted: 24 February 2009.

Home ranges were taken as 95% volume contours (Worton 1989) derived from adaptive kernel analyses in Home Range Tools for ArcGIS (Rodgers et al. 2007). The home ranges of the male and female were 24.1 ha and 23.1 ha, respectively. Due to the limited sample size (two animals), the home ranges should not be generalized for *Chalcophaps indica*. Greater sampling durations may also reveal larger range sizes. However, the present results permit a preliminary estimation of diurnal range and habitat use.

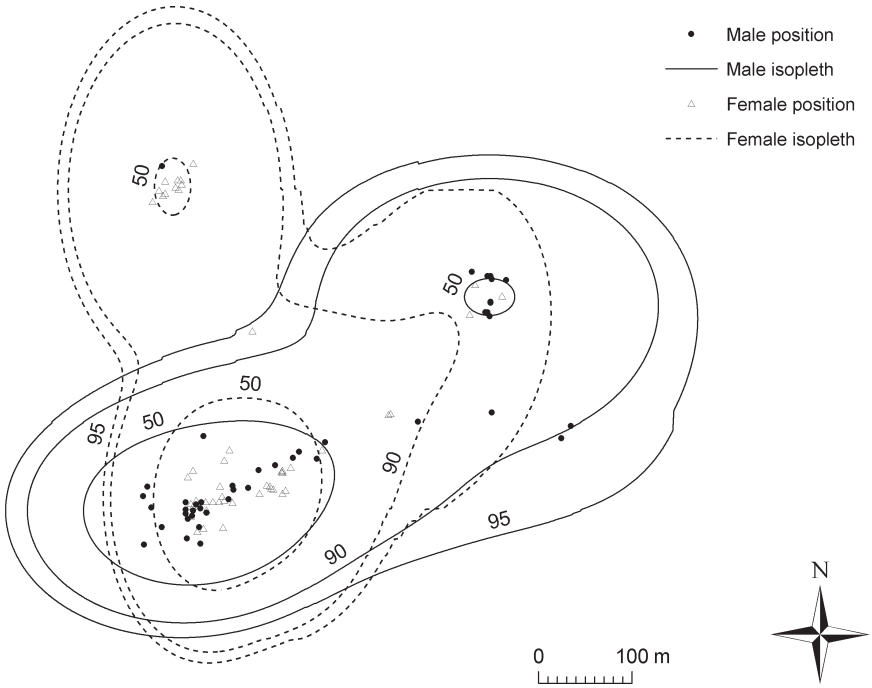

Figure 1. Observed positions and adaptive kernel density estimations of the home ranges of male and female *Chalcophaps indica*. Isopleths in percentage probabilities of occurrence.

Utilization distribution plots reveal two main centres of activity for each bird, only one centre of which is common between the male and female (Fig. 1). However, the positional fixes of the two birds (Fig. 1) indicate that the areas used in common are even more closely coupled between birds than is suggested by the statistical utilization distributions. These areas could be sources of nutrition like fruiting trees or mineral seeps (Wells 1999), or resting and preening areas. Sightings of the tagged birds were of either foraging or preening. Nocturnal flights by *Chalcophaps indica* have been recorded frequently in the Malay peninsular (Medway and Wells 1976); night telemetry would produce additional insights into the species dispersion characteristics.

Tracking took place within the breeding period which extends from April to September (Wells 1999). Although the centres of activity of the male and female largely coincide, the male and female were almost never at the same centre of activity at the same time when the telemetry receiver was periodically tuned to the first bird while tracking the second bird. The birds remained separate at their inferred roost sites. Furthermore, there was no repeated visit to any particular location (which would indicate the presence of a nest) during the course of the day. These observations suggest no mating and possibly mutual avoidance of close contact (i.e. being in the same feeding area) where direct intraspecific competition may occur. No breeding has been confirmed for *Chalcophaps indica* outside true forest (Wells 1999) except for one record in a landscape consisting primarily of mangrove fragments and former aquaculture ponds (Wang and Hails 2007). The coincidence of the centres of activity was probably due instead to attraction to food sources.

Although most ingested seeds are destroyed by the gut of *Chalcophaps indica*, a small proportion of *Ficus* seeds remains viable (Lambert 1989). Considering the long gut passage times of pigeons compared to other frugivorous birds, even pigeons which destroy most seeds may be significant in long-distance dispersal (Corlett 1998). Lambert (1987) reported *Chalcophaps indica* gut passage times of viable seeds of *Ficus sundaica* and *F. virens* of about 4 hrs and 12 hrs respectively. Based on the empirical telemetry data (male and female pooled) and an average gut passage time of 8 hrs, the mean seed dispersal distance would be approximately 160 m (n = 17, s = 119).

ACKNOWLEDGEMENTS

I am grateful to Geoffrey Davison, James Gan, Ramakrishnan Kolandavelu, Sharon Chan, Sunia Teo, Li-Feng Lim, Jonathan Goh, Norzehan Ahmad, Kim Yan Ng, Barbara C. Kermeen, Navjot S. Sodhi, Pei Xin Ng, Jun Hao Tang, Arthur R. Rodgers and Richard T. Corlett for their valuable advice and assistance.

REFERENCES

Corlett, R. T. 1998. Frugivory and seed dispersal by vertebrates in the Oriental (Indomalayan) region. *Biological Reviews* 73: 413-448.

del Hoyo, J., Elliot, A. and Christie, D. 2007. *Handbook of the Birds of the World Volume 4: Sandgrouse to Cuckoos* Barcelona: Lynx Edicions, p. 151.

Lambert, F. R. 1987. *Fig-eating and Seed Dispersal by Birds in a Malaysian Lowland Rain Forest.* PhD dissertation, University of Aberdeen, UK.

Lambert, F. R. 1989. Pigeons as seed predators and dispersers of figs in a Malaysian lowland forest. *Ibis* 131: 521-527.

Medway, L. and Wells, D. R. 1976. *The Birds of the Malay Peninsula, Volume V: Conclusion, and survey of every species.* London: H. F. and G. Witherby, pp. 174-175.

Rodgers, A. R., Carr, A. P., Beyer, H. L., Smith, L. and Kie, J. G. 2007. *HRT: Home Range Tools for ArcGIS Version 1.1* Thunder Bay, Ontario, Canada: Ontario Ministry of Natural Resources, Centre for Northern Forest Ecosystem Research.

Wang, L. K. and Hails, C. J. 2007. An annotated checklist of the birds of Singapore. *Raffles Bulletin of Zoology* Supplement no. 15.

Wells, D. R. 1999. *The Birds of the Thai-Malay Peninsula Volume 1: Non-passerines* London: Academic Press pp. 338-340.
Worton, B. J. 1989. Kernel methods for estimating the utilization distribution in home-range studies. *Ecology* 70: 164-168.