

Nest-site selection by Isabelline Wheatears *Oenanthe isabellina* on the Tibet plateau

SHAOBIN LI & WEIJUN PENG

Introduction

The Isabelline Wheatear *Oenanthe isabellina* is a small insectivorous bird (Li & Lu 2012b) which, in common with most species in genus *Oenanthe*, is poorly known (Panov 2005, Kaboli *et al.* 2007). It has a wide distribution, breeding from central Asia to south-east Europe, and wintering in India and Africa; its altitudinal range lies between 1,000 m and over 4,000 m and it typically inhabits shrublands and grasslands, often nesting in rodent burrows (Cramp 1988, Zheng 2002, Collar 2005).

Although the species's breeding biology has been reported (Li & Lu 2012b), little information on nest-site selection is available. This note focuses on nest-site selection by Isabelline Wheatears at about 3,400 m, near the upper limit of their breeding range, to study how they avoid predation and cope with the harsh high-altitude conditions.

Material and methods

Work was carried out between April 2009 and July 2012 in Tianjun county, Qinghai province, north-east Tibetan plateau (37.283°N 99.100°E) at 3,400 m. The climate is cold and dry, with an annual mean temperature of -1.1°C and total precipitation of 345 mm. The habitat is dominated by alpine steppe meadow, with the commonest mammal in this area being the Black-lipped Pika *Ochotona curzoniae* (Li & Lu 2012a,b).

Isabelline Wheatear nests were located by following the adults' breeding activities using binoculars. When a nest was located, a series of nest parameters were recorded: geographical coordinates (by GPS), burrow origin (excavated by pika or other primary cavity-nesters), burrow status (abandoned or not by the excavators), the direction of burrow entrance (by compass), the long radius (R_1) and short radius (R_2) of the burrow entrance (using calipers). The number of pika burrows within 36 m² of the nest burrow was counted. The same procedures were followed at a set of randomly selected burrows not being used by breeding wheatears, so that the characteristics of burrows selected by Isabelline Wheatears could be identified. For some nests, we dug vertical holes at the side of the burrow tunnel turnings to obtain nest dimensions after the young fledged (for details of the procedures see Li & Lu 2012b). The distance from the burrow entrance to the nest (entrance–nest distance) was measured during these operations.

A total of 43 nests were located. Burrow entrance size (entrance hole size) was calculated by $\pi \times R_1 \times R_2$. The direction of burrow entrances were designated as north, north-west, west, south-west etc. Independent or paired-samples *t* tests were used to compare the means of two variables and chi-square tests were applied to determine whether the cardinal directions of selected burrows differed from a random distribution. The four years of data were pooled together because of small sample size each year. All the analyses were performed in SPSS V.16.0. Tests were two-tailed and values are given as means \pm se.

Results

The majority of the nests (41) were located in burrows excavated by pikas, but two were in Hume's Groundpecker *Pseudopodoces humilis* burrows in vertical banks. All 43 wheatear nests were built in abandoned burrows. Entrance hole size averaged 28.5 ± 1.2 cm² (17.7–41.2), and no difference between the two burrow types was detected (pika burrow vs groundpecker burrow = 28.6 vs 25.9 , $t_{41} = 0.49$, $p = 0.63$). Compared with the randomly selected pika burrows ($n = 200$), the ones selected by the wheatears had a smaller entrance

hole size (38.6 vs 28.5 , $t_{241} = 8.27$, $p < 0.001$). The directions of burrow entrances did not deviate from a random distribution ($\chi_3^2 = 3.49$, $p = 0.32$; $\chi_7^2 = 7.15$, $p = 0.41$). Within 36 m² of a wheatear burrow, there were 2.2 ± 0.2 ($n = 43$) pika burrows, which is significantly fewer than around the randomly-selected burrows (6.4 ± 0.3 , $n = 50$; $t_{91} = 10.2$, $p < 0.001$).

Of the 29 nests dug out, two were in Hume's Groundpecker burrows and the nest was constructed directly on the abandoned groundpecker nest in the burrow chamber. Of the 27 nests in pika burrows, 15 (56%) were placed in the second section (between the first and second tunnel turning), nine (33%) in the third section (between the second and third turns) and the remaining three (11%) in the fourth section (beyond the third turning); 25 of the pika burrows dug out had only one opening. Nests were either in tunnels ($n = 18$) or in burrow chambers built on the abandoned pika nest ($n = 11$). The wheatear nest was a cup-shaped structure, consisting of grass stems lined with animal fur, feathers and artificial fibres. The external diameter of 12 nests was 14.6 ± 0.5 cm, the internal diameter 7.7 ± 0.4 cm, the cup depth 4.9 ± 0.2 cm, and the dry nest mass averaged 98.7 ± 15.9 g. The entrance–nest distance in pika burrows averaged 125.1 cm ($n = 27$), whereas the length of the two groundpecker burrows were 221 and 182 cm.

Discussion

The aims of nest-site selection are to avoid predators and improve breeding success (Lack 1968, Roff 2002). Black-lipped Pikas are abundant on the Tibet plateau alpine steppe (Wang & Zhang 1996) and studies have found that this species may attack birds that nest in their burrows and also block burrow tunnels during its excavating activities (Du 2009, Lu *et al.* 2009, Zeng & Lu 2009). The Isabelline Wheatears selected abandoned pika burrows in areas with a low density of rodent burrows. This strategy may reduce disturbance by pikas and also predation by the Mountain Weasel *Mustela altaica*—a major predator of burrow-nesting birds (Du 2009, Lu *et al.* 2009, Zeng & Lu 2009, Li & Lu 2012a,b) and of pikas which are a large part of its diet, such that density and distribution of weasels is closely linked to that of pikas (Wei *et al.* 1994).

Relative to sympatric open-nesting passerines, the burrow-nesting Isabelline Wheatears benefit from better concealment from predators and a much better microclimate—higher temperature and humidity—for reproduction. These factors all contribute to improved breeding success of burrow-nesting birds (Martin & Li 1992, Martin 1995, Li & Lu 2012b). With strong winds and low temperatures prevailing throughout the year, Isabelline Wheatears frequently chose a burrow with a small entrance hole and made their nest beyond the first tunnel turning—a choice which reduces the effect of the cold wind and improves the micro-climate in the nest.

Acknowledgements

We thank Bo Du, Shiyi Tang and Xia Zong for help in the field. We also appreciate the references provided by Canwei Xia.

References

- Collar, N. J. (2005) Family Turdidae (thrushes). Pp.514–807 in J. del Hoyo, A. Elliott & D. A. Christie, eds. *Handbook of the birds of the world*, 10. Barcelona: Lynx Edicions.
- Cramp, S. (1988) *The birds of the Western Palearctic*, 5. Oxford: Oxford University Press.

- Du, B. (2009) Cuckold or cooperate? A reproductive game of Tibetan Ground Tits *Pseudopodoces humilis*. Post-doctoral dissertation. Wuhan University.
- Kaboli, M., Aliabadian, M., Roselaar, K. S. & Prodon, R. (2007) Ecomorphology of the wheatears (Genus *Oenanthe*). *Ibis* 149: 792–805.
- Lack, D. (1968) *Ecological adaptations for breeding in birds*. London: Methuen.
- Li, S. & Lu, X. (2012a) Breeding biology of Rock Sparrows *Petronia petronia* in the Tibetan plateau, with special reference to life history variation across altitudes. *Acta Ornithol.* 47: 19–25.
- Li, S. & Lu, X. (2012b) Reproductive ecology of Isabelline Wheatears at the extreme of their altitude distribution. *Ardeola* 59: 301–307.
- Lu, X., Ke, D. H., Zeng, X. H. & Yu, T. L. (2009) Reproductive ecology of two sympatric Tibetan snowfinch species at the edge of their altitudinal range: response to more stressful environments. *J. Arid Environ.* 73: 1103–1108.
- Martin, T. E. & Li, P. (1992) Life history traits of open- versus cavity-nesting birds. *Ecology* 73: 579–592.
- Martin, T. E. (1995) Avian life history evolution in relation to nest sites, nest predation and food. *Ecol. Monogr.* 65:101–127.
- Panov, E. N. (2005) *Wheatears of the Palaearctic: ecology, behaviour and evolution of the genus Oenanthe*. Moscow: Pensoft.
- Roff, D. A. (2002) *Life history evolution*. Sunderland MA: Sinauer Associates.
- Wang, Z. W. & Zhang, Z.B. (1996) *Theory and practice of rodent pest management*. Beijing: Science Press.
- Wei, W. H., Zhou, W. Y., Fan, N. C. & Biggins, D. E. (1994) Habitat selection, feeding and caring for the young of alpine weasel. *Acta Theriol. Sin.* 14 (3): 184–188.
- Zeng, X. H. & Lu, X. (2009) Interspecific dominance and asymmetric competition with respect to nesting habitats between two snowfinch species in a high-altitude extreme environment. *Ecol. Res.* 24: 607–616.
- Zheng, G. M. (2002) *A checklist on the classification and distribution of the birds of the world*. Second edition. Beijing: Science Press.

Shaobin LI, College of Life Science, Yangtze University, Jingzhou, 434025 Email: shaobinlee@yahoo.com (corresponding author)

Weijun PENG, College of Life Science, Wuhan University, Wuhan, 430072

Similarity of the calls of juvenile Pied Cuckoo *Clamator jacobinus* and its Sri Lankan host species, Yellow-billed Babbler *Turdoides affinis*

GABRIEL A. JAMIE & GEHAN de SILVA WIJEYERATNE

On 7 May 2005 GSW was at Dunuvila Cottage, near Wasgomuwa National Park, Sri Lanka (7.583°N 80.917°E) with Chandrika Maelge and Sunela Jayawardene. At about 10h45 he heard what sounded like the typical whinnying chatter of a Yellow-billed Babbler *Turdoides affinis*. GSW did not investigate further immediately, as the Yellow-billed Babbler is widespread in Sri Lanka, but as the bird continued to call, he noticed that the pitch of the vocalisation changed slightly and decided that it merited further attention, only to find not a Yellow-billed Babbler but a Pied Cuckoo *Clamator jacobinus*. The bird was identified as a juvenile due to its duller colours—more brown than black—although the overall plumage pattern was similar to that of an adult. SJ and CM, both wildlife enthusiasts familiar with the calls of Yellow-billed Babbler, agreed that the cuckoo's call was almost indistinguishable from that of the babbler. At this time it appeared to be alone, with no sign of Yellow-billed Babblers in the vicinity.

A few hours later, in the same area, GSW observed what he assumed to be the same Pied Cuckoo moving through the trees with a flock of Yellow-billed Babblers, about 4.5 m above the ground. Babbler-like calls were heard again, but it was not clear whether any of them came from the cuckoo. No direct begging by the cuckoo was observed during this period. Owing to the lack of sound recordings and experimentation, this cannot be presented as a definite example of vocal mimicry (or even similarity) between an avian host and its parasite. However, the vocalisations of fledgling Pied Cuckoos are little known, even by experienced birdwatchers and ornithologists, and hence details of this encounter have been documented.

The Pied Cuckoo is widely distributed, from sub-Saharan Africa and Iran to Sri Lanka and Myanmar. Yellow-billed Babbler is the only host known in Sri Lanka, but elsewhere in its range a variety of other hosts are parasitised including other *Turdoides* babblers, bulbuls and shrikes (Erritzøe *et al.* 2012). There is a precedent for vocal similarity between Pied Cuckoo and its hosts—Liversidge (1969) claimed that the begging calls of Pied Cuckoos parasitising Common Fiscal *Lanius collaris* are 'similar to that of host chicks'. Similarity has also been noted between the begging calls of nestling

and fledgling Pied Cuckoos and Southern Pied Babbler *T. bicolor* hosts in South Africa (A. Ridley pers. comm.). It should be noted that both these examples differ from the Sri Lankan observation in that the vocal similarity in this account was between a young cuckoo and adults of the host species rather than between young birds of both species.

It is possible that Pied Cuckoo nestlings imitate the different begging calls of their hosts in different parts of their range the better to solicit food from the host parents or to avoid being rejected by them. Such vocal mimicry has already been found in Horsfield's Bronze Cuckoo *Chrysococcyx basalis* of Australia. These birds lay their eggs in the nests of more than one other species. The nestling Horsfield's Bronze Cuckoo alters its begging call to match that of the host chicks (Langmore *et al.* 2008). Adult males of most species of the brood-parasitic indigobirds and whydahs *Vidua* spp. of Africa incorporate elements of their hosts' (both adult and nestling) vocalisations into their own repertoires (Payne *et al.* 1998, 2000), and in some species at least the begging call of *Vidua* nestlings resembles that of their host (Payne & Payne 2002). However, detailed experiments and sound recordings are required to demonstrate if Pied Cuckoos do indeed copy the vocalisations of host species (both young and/or adults), and to interpret the significance of this behaviour.

Birdwatchers and ornithologists are urged to pay attention to the vocalisations of both adult and immature avian brood parasites and their hosts, and to make sound recordings and field notes when possible. GAJ (address below) would be interested to hear of any further examples of such similarity.

Acknowledgements

Many thanks go to Michael Mills, Suhel Quader and Amanda Ridley for providing information from their own experiences with Pied Cuckoos, and to Claire Spottiswoode for reading and commenting on the typescript.

References

- Erritzøe, J., Mann, C. F., Brammer, F. P. & Fuller, R. A. (2012) *Cuckoos of the world*. London: Christopher Helm.