Records of Xinjiang Ground-jay *Podoces biddulphi* in Taklimakan Desert, Xinjiang, China

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The Xinjiang Ground-jay *Podoces biddulphi* is restricted to sandy desert, scrub and desert poplar in the Talikmakan Desert in Xinjiang, China (with a recent claim of one seen from a moving train well to the east in Golmud, Qinghai Province by Turton and Speight 1986). The species is classified as Near Threatened (BirdLife International 2001) because it is believed to have a small population that may be declining because of degradation of desert habitats through the intensive grazing of goats and camels, extraction of fuelwood, and the conversion of large areas to irrigated land (BirdLife International 2001). Xinjiang Ground-jay was described as common in 1929–1930 (Ludlow and Kinnear 1933), but was found to be scarce and difficult to locate in the same areas in 1988 (Grimmett 1991, Grimmett and Taylor 1992). However, we recently found it to be widespread and locally common in the interior of the Taklimakan Desert (Ma Ming 1998).

Here we describe the results of quantitative surveys for the species in the Taklimakan Desert between 1988 and 2003.

STUDY AREA

The Taklimakan Desert (37–42°N 77–90°E) is located in Tarim Pendi (basin), Xinjiang Uygur Autonomous. Region. This desert stretches 800 km from east to west and 500 km from north to south with an area of 337,600 km^2; the altitude ranges between 900 and 1,200 m. Temperatures average 10–12°C, and are lowest in January (-30°C) and highest in July (>48°C). The annual precipitation is 20–50 mm. Plant species such as *Phragmites australis*, *Tamarix taklamakanensis*, *Apocynum* spp., *Scorzonera divaricata*, *Cynanchum kaschgaricum*, *Salsola* spp. and *Halogeton* spp. characterise the low areas between sand dunes where groundwater is accessible. Sand dunes in the Taklimakan Desert attain heights of tens of metres, with the highest exceeding 150 m. Prior to the construction of the Tarim Highway in June 1994, the interior of the Taklimakan Desert was highly inaccessible except by aircraft.

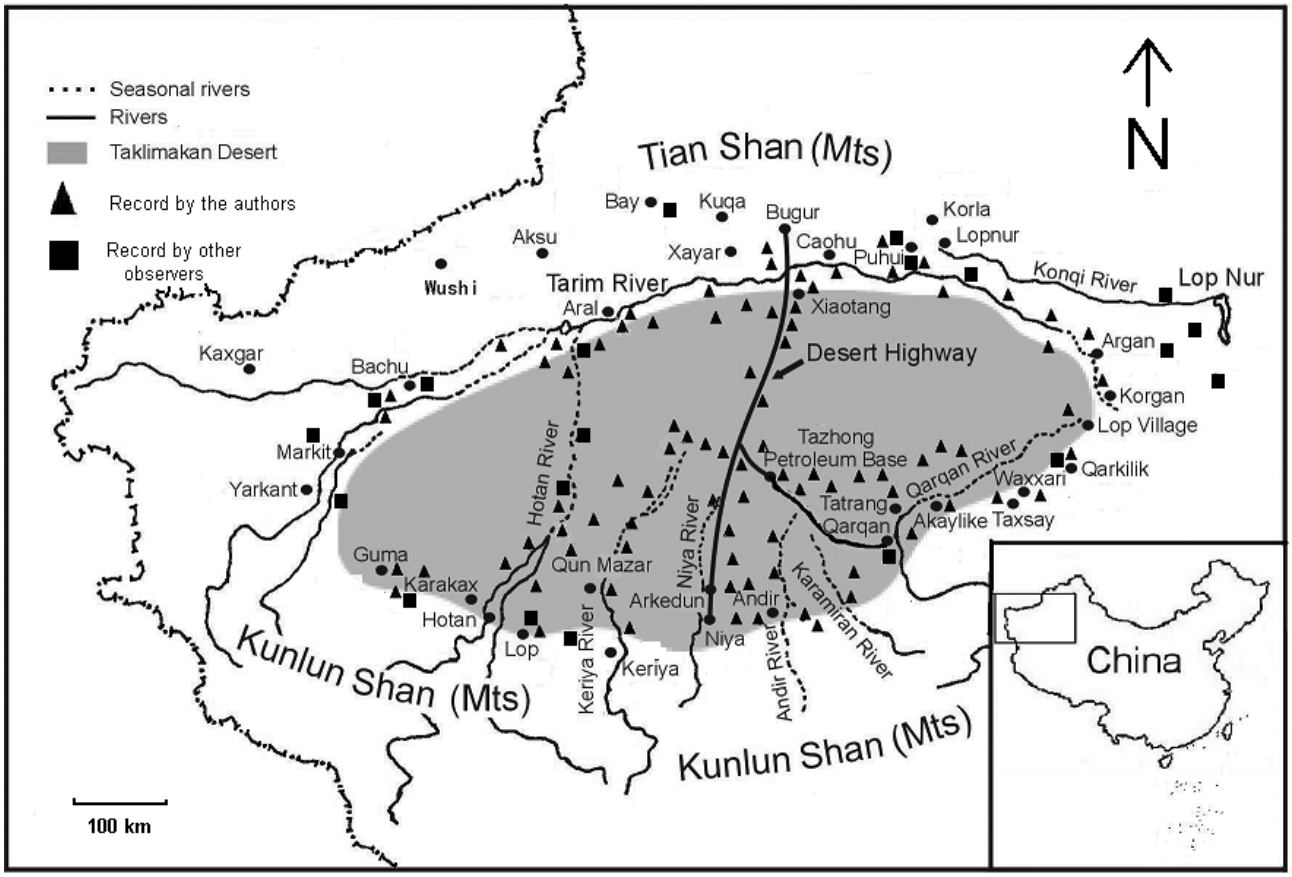

Figure 1. Locations in Taklimakan Desert where Xinjiang Ground-jay was recorded.

METHODS

Transects were driven (or occasionally walked), mainly along the Tarim Highway, sampling a strip 500 m wide, searching for ground-jays between 1988 and 2003 (Table 1). More than 130 people from villages and towns in Kaxgar, Aksu, Kuqa, south of Bugur, Tazhong Petroleum Industry Base, Niya, Qarqan, Andir, Keriya, Karakax, Hotan, Lop and Yarkant were interviewed between 2000 and 2001 for information about sightings of Xinjiang Ground-jays. Coordinates for all sites mentioned in the text are given in Tables 1–3.

RESULTS

A total of 172 jays were recorded along 4,328 km of transects (Table 1, Figure 1). The average width of the transects was about 500 m, giving a total area surveyed of 2,164 km^2. This yields a density of 7.9 birds/100 km^2. This calculation makes the following assumptions: (a) no birds were overlooked (even when travelling by vehicle); (b) the full width of transect was completely searched; and (c) densities adjacent to the road are representative of densities elsewhere in the desert. We estimate that only 40% of the Taklimakan Desert represents suitable habitat for the species (the remainder has insufficient vegetation cover), yielding a potential population size of c.10,700 individuals (0.4 x 337,600 km^2 x 0.083 birds/km^2).

Xinjiang Ground-jays were recorded at 800–1,500 m. Birds were only found in areas of soft sand, mostly in areas with sparse vegetation cover (mainly *Phragmites australis* and *Tamarix taklamakanensis*) in low areas between sand dunes. They were often seen around temporary car parks, garbage stations, road maintenance camps etc., presumably where food was easier to find. Birds appeared to be territorial and

Table 1. Records of Xinjiang Ground-jay found during transects in the Taklimakan Desert in 1988–2003.

Location	Coordinates	Transect length (km)	Dates	No. birds	Surveyors
Niya–Qarqan	36°49′N 81°53′E–38°08′N 85°33′E	300	5/7/1988	1	MM, Feng
Argan–Lop village	40°10′N 88°25′E–39°30′N 88°20′E	30	19/4/1989	1+	MM, Gu
Qarkilik–Waxxari	39°00′N 88°30′E–38°45′N 87°35′E	80	27/4/1989	1+	MM, Jia
Waxxari–Qarqan	38°45′N 87°35′E–38°08′N 85°33′E	250	29/4/1989	1	MM, Gu
Qarqan–Tatrang	38°08′N 85°33′E–38°29′N 85°45′E	40	1/5/1989	4	MM, Gu
Niya–Arkedun	36°49′N 81°53′E–37°28′N 82°48′E	60	6/5/1989	2	MM, Jia
Keriya–Qun Mazar	36°50′N 82°20′E–37°38′N 81°24′E	85	9/5/1989	1 (specimen)	MM, Jia
Qun Mazar–Keriya	37°38′N 81°24′E–36°50′N 82°20′E	85	10/5/1989	4	MM, Jia
Moyu–Mayarkdun	37°17′N 79°45′E–38°05′N 80°30′E	97	13/5/1989	4 (incl. 1 juv.)	MM, Jia
Mayarkdun–Tawark	38°05′N 80°30′E–37°35′N 80°05′E	35	15/5/1989	4	MM, Jia
Qarqan–Ark-ai-lek	38°08′N 85°33′E–38°44′N 86°40′E	156	6/12/1996	5	MM, Duan
Tazhong–Lop village (by foot)	40°00′N 84°08′E–39°30′N 88°20′E	400	2-3/1997	21+	MM, Ki
Korla–Puhui	41°30′N 85°48′E–41°26′N 85°53′E	60	10/6/1998	5 (incl. 3 juv.)	MM, Kilburn
Bugur–Niya	41°45′N 84°00′E– 36°49′N 81°53′E	200	11/6/1998	7	MM, Hackett
Tazhong–Xiaotang	40°00′N 84°08′E– 40°30′N 84°09′E	120	12/6/1998	24	MM, R.Lewthwaite
Xiaotang–Tazhong	40°30′N 84°09′E– 40°00′N 84°08′E	250	21/9/1998	2	MM, G. Carey
Xiaotang–Tazhong	40°30′N 84°09′E– 40°00′N 84°08′E	130	23/5/1999	3	MM, J. Albertsen
Xiaotang	40°30′N 84°09′E	98	9-24/4/2000	4	MM
Southern Luntai–Tazhong	41°11′N 84°16′E– 40°00′N 84°08′E	250	28/3/2001	0	MM
Tazhong–Southern Luntai	40°00′N 84°08′E–41°11′N 84°16′E	250	29/3/2001	1	MM
Southern Luntai–Tazhong	41°11′N 84°16′E– 40°00′N 84°08′E	250	29/3/2001	3	MM
Tazhong–Niya	40°00′N 84°08′E–36°49′N 81°53′E	250	30/3/2001	0	MM
Andir–Tazhong	37°30′N 83°48′E–40°00′N 84°08′E	250	1/4/2001	1 (tracks)	MM
Tazhong Petroleum Base	40°00′N 84°08′E–39°55′N 84°15′E	40	2/4/2001	2 (interview)	MM
Tazhong–Xiaotang	40°00′N 84°08′E–40°30′N 84°09′E	220	3/4/2001	4	MM
Luntai–Tazhong	41°45′N 84°00′E–40°00′N 84°08′E	330	11/6/2001	12	MM, Cheung
Tazhong–Luntai	40°00′N 84°08′E–41°45′N 84°00′E	250	12/6/2001	3 (incl. 1 juv.)	MM, Kwok
Luntai–Xiaotang	41°45′N 84°00′E–40°30′N 84°09′E	110	13/6/2001	5	MM, M. Kilburn
Keriya–Daheyan–Majianlik	36°50′N 82°20′E–38°21′N 81°52′E–38°40′N 81°57′E	230	24–25/10/ 2001	11	MM
Xiaotang–Harde oil station	40°30′N 84°09′E–40°34′N 84°05′E	27	25/3/2003	4	MM, Z. Jia, Barturhan
Niya–Andir	36°49′N 81°53′E–37°30′N 83°48′E	120	29/3/2003	4	MM, C. Wang, Z. Jia, Barturhan
Yawatongguz Oasis (Niya)	37°55′N 83°14′E	10	1–15/4/2003	12	MM, C. Wang, Barturhan
Andir–Bowakule	37°30′N 83°48′E–37°33′N 83°59′E	15	24/4/2003	7	MM, E. Potapov
Keriya–Qun Mazar	36°50′N 82°20′E– 37°38′N 81°24′E	50	26/6/2003	4	MM, G. Carey, P. Leader, Ying Hak King
Total		4,328		172	

Table 2. Additional records of Xinjiang Ground-jay in the Taklimakan Desert made by other observers during 1983–2003, and by the authors away from transect routes.

Location	Coordinates	Dates	No. birds	Observers
Aral–Hotan (Marza Tag; 320 km)	40°35′N 81°10′E–38°10′N 80°30′E	5/10– 13/11/1983	10-20	Yuan (1988)
Korla–Puhui (40 km)	41°30′N 85°48′E–41°26′N 85°53′E	6/1988	6	R. Grimmett
Qarkilik–Lopnur	39°00′N 88°30′E–41°26′N 86°16′E	31/8/1988	1+	MM, Feng
Andir	37°30′N 83°48′E	2/5/1989	1 (fledgling)	MM, Gu
Andir	37°30′N 83°48′E	4/5/1989	1	MM, Gu
West of Korla	c.41°50′N 86°00′E	25/7/1989	3	H. Dissing
Puhui	41°26′N 85°53′E	27-30/7/1989	4	H. Dissing
North of Korla	c.41°50′N 86°10′E	28/7/1989	2	H. Dissing
Xiaotang	40°30′N 84°09′E	14/7/1999	5+	Ma, G. Dornbusch
Hinterland of Taklimakan Desert	c.40°00′N 84°08′E	22/12/1990	1 (specimen)	MM, Luo
Hinterland of Taklimakan Desert	c.40°00′N 84°08′E	25/12/1990	1 (specimen)	MM, Luo
Hinterland of Taklimakan Desert	c.40°00′N 84°08′E	29/12/1990	1 (specimen)	MM, Luo
Puhui	41°26′N 85°53′E	4-6/6/1995	18?	J. Hornskov
Tazhong	40°00′N 84°08′E	30/11/1996	1+	MM, Duan
Qarkilik–Lopnur	39°00′N 88°30′E–41°26′N 86°16′E	8/12/1996	1	MM, Duan
Andir (Niya)	37°30′N 83°48′E	31/3/2001	2	Cheng Qun

remained faithful to particular locations. In April 2000, a nest was found below a 3-m high *T. taklamakanensis* bush. The nest was 10–12 cm above ground, with an outer diameter of 26–28 cm, an inner diameter of 12–15 cm and a depth of 3–5 cm. A pair of adults were in attendance. A recently fledged juvenile Xinjiang Ground-jay was caught by local people at Andir, near Niya on 2 May 1989. Family flocks (of up to six birds) were only seen in June and July (most observations during the survey were of singles or pairs). The species was least frequently encountered during March–May, presumably when birds are incubating eggs and caring for chicks. Records of this species made by additional observers and by the authors outside of the survey transects are listed in Table 2.

Table 3. Coordinates of other sites mentioned in text.

Locations	Coordinates
Golmud	36°23′N 94°49′E
Kaxgar	39°29′N 76°02′E
Aksu	41°10′N 80°20′E
Kuqa	41°35′N 82°30′E
Tazhong Petroleum Industry Base	40°00′N 84°08′E
Karakax	37°55′N 80°20′E
Hotan	37°25′N 79°55′E
Lop	37°10′N 80°10′E
Yarkant	38°30′N 77°20′E
Luntai oasis and desert (Burgar)	41°40′N 84°08′E
Xayar	40°55′N 82°50′E
Bachu oasis	39°30′N 78°30′E
Markit oasis	38°54′N 77°50′E
Yarkant valley	38°25′N 77°30′E
Guma oasis and desert	37°45′N 78°30′E
Hotan river and oasis	37°55′N 80°25′E
Keriya valley and oasis	37°00′N 81°40′E
Niya river and oasis	37°15′N 82°45′E
Qarqan valley and oasis	38°30′N 85°45′E
Konqi river and Lop Nur	40°20′N 90°10′E

CONSERVATION

Xinjiang Ground-jays are threatened by habitat degradation resulting from the increasing human population in the Taklimakan Desert which has grown from 4 million in 1950 to 20 million people in 2000. Unplanned exploitation of natural resources has had profound impacts on the desert vegetation, rivers, lakes, groundwater and climate. Vegetation cover has been severely affected by collection of the medical herb *Cistanche salsa* and by overgrazing by livestock (e.g., goats and oxen). Poorly planned or illegal construction of reservoirs and dams has reduced flow in many rivers and has impacted groundwater levels, leading to desertification. The 'Go West Campaign' promoting immigration to Xinjiang Province is leading to further exploitation of natural resources and consequent environmental degradation in the Taklimakan Desert.

Road-kills from traffic on the Tarim Highway may pose a threat to the Xinjiang Ground-jay. Expansion of the oil industry may impact the species directly through pollution and indirectly by increased human pressures including hunting. The ability of Xinjiang Ground-jays to live in harsh desert environments has led to the local belief that this species can provide special medical effects. The bones, flesh, blood and brains are used to treat gastric disease, heart disease, arthritis, aphasia, geriatric illnesses and neurological disorders.

Xinjiang Ground-jay should be added to national and regional lists of protected species. Local education activities should be carried out to promote the fact that the species is unique to the region and to discourage hunting. Thirteen localities in Tarim basin should be considered for protecting as nature reserves and for listing as Important Bird Areas: Luntai oasis and desert (Burgur), Xayar, Aksu, Bachu oasis, Markit oasis, Yarkant valley, Guma oasis and desert, Hotan river and oasis, Keriya valley and oasis, Niya river and oasis, Qarqan valley and oasis, Konqi river and Lop Nur, Tazhong.

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Unexplored Philippine forests as revealed by point-locality mapping

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The Philippines has extremely high levels of both endemism and endangerment in its fauna and flora (Mittermeier *et al.* 1999), and in many respects it is relatively well-explored and documented, at least in ornithological terms (see Dickinson *et al.* 1991). Even so, while almost all islands have received some coverage, many parts of the larger islands have received little or no attention. A number of tracts of forest—the habitat in which the great majority of terrestrial biodiversity resides, and which has suffered the most catastrophic contraction in extent—fall into this category, and our aim in this paper is to highlight certain among them which are likely to prove important for threatened birds and other species.

As part of the process of identifying key areas for bird conservation from data on the distribution of threatened species, an outline map of the Philippines was overlaid with (1) all point-localities where threatened species have been recorded (from Collar *et al.* 1999, including, for convenience, and since it would not impact on the result, non-forest localities), and (2) areas of remaining forest cover as identified by satellite in 1987 and published in SSC (1988)—the same source as used for Plate 4 in Dickinson *et al.* (1991). The result is given in Fig. 1. We identify unexplored forests (boxed areas) wherever the map indicates forest but few or no point-localities.

We acknowledge three potential drawbacks to this very simple exercise. First, threatened species records are a biased sample of all bird records. However, since the 70 threatened bird species in the Philippines occur on all major islands, and since they are in general likely to remain remote from centres of human economic activity, occupying the least-disturbed habitats, the bias is probably insignificant with respect to areas of remaining forest. Moreover, although many threatened species are 'rare' in the sense of being uncommon even within intact habitat, this is not universally the case. Therefore we feel fairly confident that areas of forest that possess no records in Collar *et al.* (1999) have probably never or only fleetingly been surveyed for birds. Second, the forest cover map data are today 17 years out of date, and subsequent deforestation has been rapid but uneven, so we cannot know if all the forest areas identified on Fig. 1 remain. Moreover, the quality of remaining forest is hard to predict. Even so, we know that some of it, at least, is still standing and in reasonable condition, because (a) as part of the process of selecting Important Bird Areas (IBAs)—most of which these sites are—information on habitat quality in the least-known areas was sought from local officials and IBA status only conferred where quality was reported as high (Mallari *et al*. 2001: 44), (b) we checked the areas against modern road maps and found little evidence of new access, and (c) recent Haribon surveys of Balbalasang, Samar and the Mt Kaluayan–Mt Kinabalian complex confirm that all three remain very largely as mapped in 1987. Third, we would not wish to minimise the potential importance of much smaller areas of forest which may never have been visited by an ornithologist (or may only have been visited in the distant past), as for example occur on Jolo, Basilan, Masbate and Burias.

We discriminate 15 forested areas which show up as ornithologically neglected and which seem to us to be of considerable significance, mainly on the basis of their size and also often because of their isolation. All of them are at least partly montane, but some are at