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The recent increase of the Red-billed Starling *Sturnus sericeus* in the Republic of Korea

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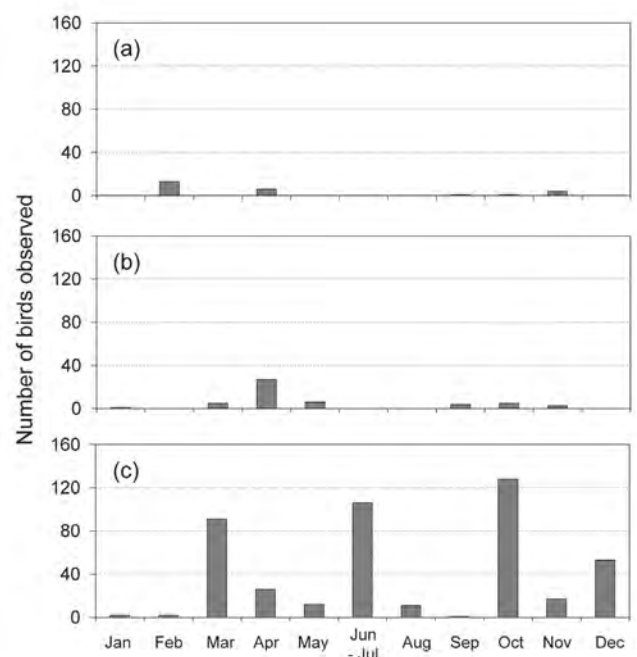
The Red-billed Starling *Sturnus sericeus* is considered to have a stable population (BirdLife International 2009), and is mapped largely as resident in mainland East China (Brazil 2009). The species has, however, undergone a remarkable change in status in the Republic of Korea (ROK) during the past decade. It was first recorded on 16 April 2000 on Ganghwa Island, Gyeonggi Province (37°36'N 126°28'E) (Jin-Man Kim *in litt.* 2000, Kim & Choi 2007). The second record of the species followed within two weeks, on Gageo Island in Jeonnam Province (34°04'N 125°06'E), and there were further records in autumn 2000 and again during spring and autumn 2001 (N. Moores unpublished data). As a result of these records, Park (2002) suggested that the Red-billed Starling was likely to prove to be a regular migrant on islands along the west coast of the Korean Peninsula. Since then, the species has been found at many more locations, including during the breeding season.

There is some possibility that the species might have been previously overlooked, as the same decade also witnessed a rapid increase in ornithological activity in ROK, especially in coastal areas and on islands in the Korean West Sea (Yellow Sea), resulting in a corresponding increase in records of previously unrecorded or nationally scarce species (e.g. Moores 2007). Furthermore, prior to 2000, only a few observers in ROK were familiar with the Red-billed Starling. Has the increase in observer coverage and familiarity with the species been the main cause of its apparent increase in ROK?

To help answer this question, we first compiled and reviewed observation records of the Red-billed Starling in ROK between 2000 and 2008. In the absence of a formal national process of record collation, this required gathering records from unpublished and published sources, including personal count data, survey and ornithological reports, media articles and specialised birding websites. We also contacted other experienced photographers and observers to confirm details of their observations (basically with photographs), including the date, location and number of birds picture taken and observed. To begin to identify possible trends in abundance and distribution we then grouped and sorted these records into three periods, each of three years: 2000–2002, 2003–2005 and 2006–2008, and mapped them by three-year period and province.

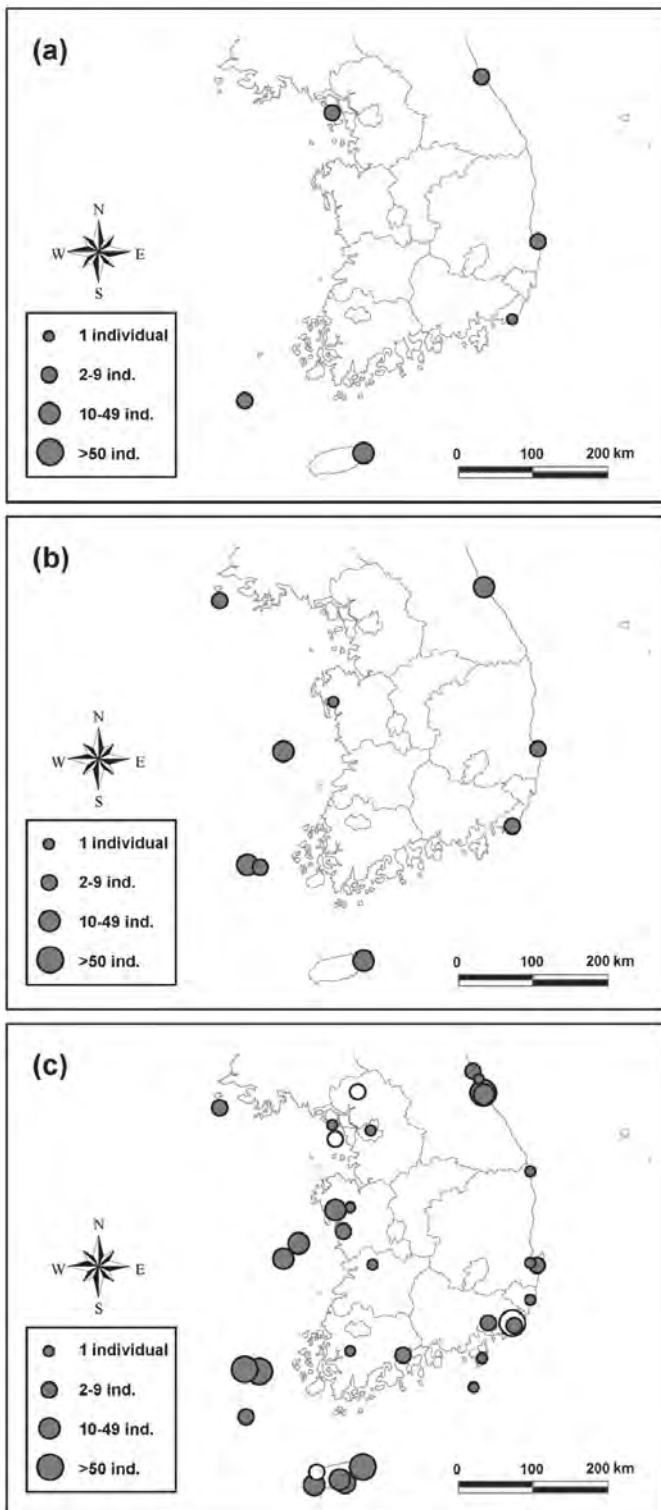
To date we have collected 98 records of a total 531 Red-billed Starlings observed in ROK between 2000 and 2008. Based on our shared experience, we are confident that these include the majority of records during this period, even though later records became harder to recover as the species became less noteworthy for observers. This suggests that the rate of increase in the species might be even greater than our data indicate. The total to date consists of 10 records comprised of 26 individuals in 2000–2002; 24 records comprised of 51 individuals in 2003–2005; and 64 records comprised of 454 individuals in 2006–2008 (Fig. 1). Between 2000 and 2002,

Figure 1. Changes in number of Red-billed Starlings observed in ROK (number of records a: 2000–2002, b: 2003–2005, c: 2006–2008). Observations in June and July were summed due to the prolonged existence of breeding populations.



the mean number of birds per observation was 2.6 ± 3.7 ($n=10$). While most records consisted of one or two birds, this also included the first flock of the species recorded in ROK (13 birds on Jeju Island in February 2002; Kim & Choi 2007). Between 2003 and 2005 the number of records increased but the mean number of bird per observation remained rather similar: 2.1 ± 1.8 ($n=24$). The period between 2006 and 2008 then saw the largest increase in the number of records and the mean number of birds per observation also increased rapidly to 7.0 ± 15.7 ($n=64$). Between 2000 and 2008 too, the geographical distribution of records also expanded, with many more records in the east of the country in later compared to earlier years (Fig. 2).

Figure 2. Observation (filled circles) and breeding (open circles) records of the Red-billed Starling in ROK (records from a: 2000–2002, b: 2003–2005, c: 2006–2008).



The earliest records were largely during the main migration periods shared with many other migrant species (namely March–May and August–November). Subsequent records included birds in winter and also during the summer, and Red-billed Starlings were documented nesting for the first time in 2007, in two well-separated areas: Hallim-eup, Jeju City, Jeju Special Self-governing Province ($33^{\circ}24'N$ $126^{\circ}15'E$; Kim & Choi 2007), and Tanhyun-myeon, Paju City, Gyeonggi Province ($37^{\circ}46'N$ $126^{\circ}42'E$; Seog-Min Kim unpublished data). Moreover, in August 2007, a flock of Red-billed Starlings with more than one newly fledged young was also observed on Yeongjong Island, Incheon Metropolitan City ($37^{\circ}30'N$ $126^{\circ}32'E$; Cheon-Sik Shin *in litt.* 2007). The following June and July 2008, approximately 50 pairs were observed nest-building in Gangseo-gu, Busan Metropolitan City ($35^{\circ}12'N$ $128^{\circ}58'E$; Sam-Rae Jo *in litt.* 2008).

The recent increase in records of Red-billed Starling has not been confined to ROK. Duckworth (2004) noted that the first record of Red-billed Starling in the Democratic People's Republic of Korea (DPRK) was in August 2001 and that it is also spreading in north-east China. In Hong Kong, where the Red-billed Starling has long been regular in winter (Carey *et al.* 2001), the species increased substantially during the 1993–1994 winter, and breeding was proven for the first time in 2007 (P. J. Leader *in litt.* 2010). The population trend is perhaps less clear in Japan; however, since the first fully documented record in 1979 it has probably occurred annually (Brazil 1991), and less than twenty years later it could be described as a scarce to rare migrant or winter visitor to Japan, sometimes found in small flocks (Brazil 2009). The first breeding record in Japan, apparently involving a mixed Red-billed \times White-cheeked Starling *Sturnus cineraceus* pair, has now also been documented (Sato *et al.* 2010).

Reasons for the Red-billed Starling's increase remain unclear. In general, starlings (traditionally included in the family Sturnidae) show marked plasticity in habitat use, and they are thus highly successful and adaptable species in various habitats (Feare & Craig 1998, Lin 2001, Shieh *et al.* 2006, Sontag & Louette 2007). Of seven starling species so far recorded in ROK (OSK 2009) only White-cheeked Starling is a widespread breeding and overwintering species. Although it was first recorded nesting on the Korean Peninsula in the nineteenth century, it too appears to have increased as a breeder, especially since the 1960s (Duckworth & Moores 2008). It frequently associates with Red-billed Starling, and the increase in both species could be related to unspecified changes in their preferred habitats. Human-induced climate change might also be a mechanism leading to the increase, even though Red-billed Starling has recently bred in Hong Kong south of the breeding range mapped in Brazil (2009) as well as north of it. Between 1904 and 2000, the annual mean temperature in ROK increased by $1.5^{\circ}C$ (Kwon 2005), approximately double the mean global temperature increase of $0.74^{\circ}C$ during the same time period (IPCC 2007).

Of interest, two other species that are also more or less confined to eastern China have also shown a rapid increase in ROK since 2000. These are Light-vented Bulbul *Pycnonotus sinensis* and Yellow-bellied Tit *Parus venustus*. Light-vented Bulbul was first recorded in ROK in October 2002 on a West Sea island (Moores 2007) and has subsequently been found breeding on at least three islands, with records now in all months, including individuals in winter on the mainland east to Busan (OSK 2009, N. Moores & Jong-Gil Park unpublished data). Yellow-bellied Tit was also first recorded on a West Sea island in October 2005 (Moores 2007), and we now already know of more than 20 records of this species in ROK, including birds overwintering on the mainland as far east as Busan (OSK 2009, N. Moores & Jong-Gil Park unpublished data).

This short note reveals that between 2000 (when first recorded) and 2008 there has been an increase in the frequency of observations, mean flock size, and geographical spread of the Red-billed Starling in ROK. Its rapid increase in mainland Korea, which

has been regularly and repeatedly monitored over the past century, implies genuine and dramatic changes in number and distribution. Further research and exchange of information will, we suggest, be helpful in better understanding the causes for the genuine population increase and range expansion of the starling and perhaps of these two other species.

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First record of Red-rumped Swallow *Hirundo daurica* in Wallacea

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During a birding trip in March 2006 along the northern peninsula of Sulawesi, we observed a number of Red-rumped Swallows *Hirundo (Cecropis) daurica*, which were then unknown to occur on Sulawesi, or indeed in Wallacea.

On 6 March, between 06h30 and 07h20, we saw several hirundines behind the Pulisan Jungle Beach Resort, near Pulisan village (01°40'N 125°8'E, Likupan district, Minahasa Utara regency, Sulawesi Utara province) in the far north-east of Sulawesi. The birds had very pale underparts, one with discernible streaks at the breast-sides at most, and another with a slightly buffy-rufous wash on the throat. At 08h30 on 8 March at least four more birds were seen above cultivated fields inland from Pulisan village; apart from a pale rufous rump, their black vents, stocky appearance, rather elongated body and slower wing-beats with much gliding distinguished them from Barn Swallow *Hirundo rustica*, and their long forked tails from Pacific Swallow *H. tahitica*, both of which were also present. The pale, only faintly streaked underparts distinguished them from most races of Striated Swallow *H. striolata*, which are always boldly streaked (Carter 2000), and of which resident populations occur in the Philippines and Greater and Lesser Sundas (Coates & Bishop 1997, Turner 2008). The only faintly streaked local race of Striated Swallow in the region, the Malay race *badia*, has deep rufous underparts (Turner & Rose 1989), and is even treated as full species, Rufous-bellied Swallow, by

Turner (2008). The presence (in Red-rumped) or absence (in Striated) of a chestnut collar could not be assessed because the flying birds were seen mostly from below. However, in both Red-rumped races *daurica* and *japonica* the collar can be incomplete and loses its value as a specific distinction. No Red-rumped Swallows were seen in the same area during a visit by SvB in March 2007.

Owing to problems with field identification, the status of Red-rumped and Striated Swallows in the region is unclear. On Sumatra both species are poorly known (van Marle & Voous 1988, Holmes 1996), on Borneo only Red-rumped has been recorded with certainty (Mann 2008), while on Java only Striated has been recorded until now (MacKinnon & Phillipps 1993, Sukmantoro *et al.* 2007). Barn Swallow is the only migratory swallow previously known to occur on Sulawesi (Coomans de Ruiter 1954, Sukmantoro *et al.* 2007). However, the presence of Red-rumped was to be expected, since the species is a regular visitor to Australia (Carter 2000), where the first birds were recorded as recently as 1983. In Papua New Guinea the first Red-rumped Swallow was recorded in 1974 (Filewood 1974), with a subsequent increase in numbers, while the first record for Indonesian New Guinea was in 1994 (Coates 1990, Gregory *et al.* 1996).

The presence of both Red-rumped races *daurica* and *japonica*, winter visitors from Central and East Asia, has been confirmed in