Adjacent nesting by Lammergeier *Gypaetus barbatus* and Himalayan Griffon *Gyps himalayensis* on the Tibetan Plateau, China

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Old world vultures are thought to partition or compete for several types of resources. For example, in Africa, where vulture species diversity is highest, there is evidence that they compete for food (Petrides 1959, König 1983, Mundy *et al.* 1992, Hertel 1994). In Europe, Eurasian Griffon *Gyps fulvus* compete extensively with Lammergeiers *Gypaetus barbatus* for nest sites (Fernández and Donázar 1991, Margalida and Garcia 1999, Bertran and Margalida 2002). Evidence of interspecific aggression at nest sites also has been observed between Eurasian Griffon and Cinereous Vultures *Aegypius monachus* (Blanco *et al.* 1997), between Eurasian Griffon and Egyptian Vultures *Neophron percnopterus* (Pascual and Santiago 1991), and between Cinereous Vulture and Bearded Vultures (Aykurt and Kiraç 2001).

In spite of the potential for competition, patterns in resource availability and population density can sometimes allow species that might otherwise compete to have considerable overlap in resource use (Wiens 1977, Steenhof and Kochert 1988). On the Qinghai-Xizang (Tibetan) plateau, China, we observed an apparently unusual setting where two, and possibly three, large, potentially competing raptors appear to have bred on a single small cliff.

METHODS

These observations were made on a cliff at 4,066 m on the Tibetan plateau in southern Qinghai province, China, near the Yangtze river. The cliff was comprised of three relatively small faces oriented towards the south-west; we estimated their combined length to be c.200 m and their maximum height to be c.100 m. The cliff faced towards a c.5 km long valley of alpine meadow grasslands dominated by *Kobresia* spp. (Cyperaceae). The valley is bisected by an unpaved road and is a traditional pasture for local Tibetan nomads, although it was not being grazed at the time. Our observations were conducted with 10x40 binoculars on 4 August 2002, from several points 100–200 m from the cliff. Two observers independently estimated distances on the cliff face; when estimates were not identical, a mean value was chosen. To map the site, photographs of the cliff face were scanned, outlines of the cliff face were traced on the image using Adobe Photoshop, and nest sites were then identified by comparison with field notes and sketches.

RESULTS

We observed one fully developed Lammergeier chick on a ledge in a cavity on a small face projecting from the main body of the cliff (Fig.1, Site A). An adult Lammergeier sat 1.5 m above the chick, in another similarly sized, similarly shaped cavity (Fig.1, Site B). These birds were present both in the morning and afternoon of 4 August, and did not move much or fly during our observation periods. A nearly full-grown Himalayan Griffon chick was seen on a 1.5 m long ledge c.15 m above the Lammergeier nest (Fig.1, Site C). The chick moved regularly, sometimes flapping its wings, but never left the nest site. An adult Himalayan Griffon visited the nest for c.2 minutes and regurgitated food for the chick.

The cliff face had other large nests and many potentially suitable nest and roost sites (Fig.1, Sites X and Y). The extensive whitewash near several of these

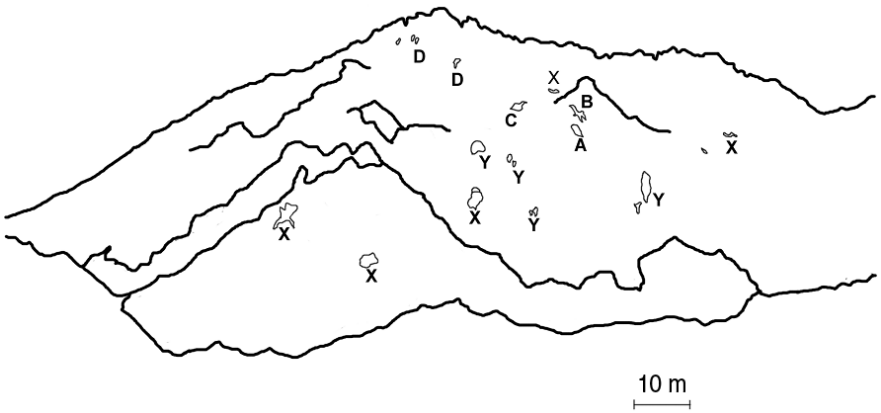

Figure 1. Map of cliff face. Sites are marked as follows: A. Lammergeier nest and nestling. B. Adult Lammergeier. C. Himalayan Griffon nest and nestling. D. Saker Falcon roost. X. Empty nests. Y. Other roosts

suggested that other vultures regularly used the cliff for roosting and that they may have bred there earlier in the summer. Furthermore, we observed eight adult and one immature Himalayan Griffons fly from this area of the cliff between 10h00 and 11h00. We also found two nests on an adjacent cliff face (80 m from the left edge of the face in Fig.1). Their construction suggested that they had been built by either Upland Buzzard *Buteo hemilasius* or Common Ravens *Corvus corax*. We were unable to determine if these nests had been used in 2002.

In addition we observed a Saker Falcon *Falco cherrug* at the cliff exhibiting apparently territorial behaviour. When we approached the cliff, the bird flew repeatedly from a roost (Fig. 1, Site D), circled above the area calling extensively, and returned to the cliff face. Although we were unable to determine the age of this bird or to locate a nest, this bird's behaviour was consistent with that observed at Saker Falcon nests with chicks in other locations in the region.

DISCUSSION

We found active nests of one Lammergeier and at least one Himalayan Griffon in close proximity, with the strong suggestion that Saker Falcon also bred at this site. Our observations are unusual because nest-based interspecific aggression between vulture species or between vultures and other raptors is frequently strong enough to have negative reproductive consequences (Fernandez and Donazar 1991, Pascual and Santiago 1991, Margalida and Garcia 1999, Aykurt and Kiraç 2001, Matus 2002).

Lammergeiers are solitary breeders, often occupying nests high on cliffs in mountains or river valleys (Snow and Perrins 1998). Their nests are often, but not always, well-spaced from conspecifics and other vultures (Margalida and Garcia 1999, Bertran and Margalida 2002). Himalayan Griffon is one of the world's least-known vultures. Some reports suggest that they are not colonial breeders (Flint *et al.* 1989), while others suggest that they are semi-colonial (Ferguson-Lees and Christie 2001). Saker Falcons are solitary breeders, and although often aggressive towards other raptors in their breeding area, they will sometimes nest near to them (Ellis *et al.* 1997).

All three species probably nest at the same time on the Tibetan plateau. Based on observed fledging dates between 1 and 10 August 2002 at several nests in the general vicinity (TK, unpublished data), and breeding timetables from Europe (Snow and Perrins 1998), we estimate that egg-laying by Lammergeiers on the Tibetan plateau occurs in late February or early March. For Himalayan Griffon, if the duration of the breeding cycle is similar to that of Eurasian Griffons in Europe, then initiation of nesting on the Tibetan plateau should occur in about early March (Snow and Perrins 1998). Saker Falcon chicks have been observed in nests on the plateau in June (E. Potapov *in litt.* 2003) and in nearby lowland central Asia their chicks fledge in early July (TK, unpublished data).

Several characteristics of this region and of these species' biology may interact to allow the nesting behaviour that we observed. First, the Tibetan plateau is heavily grazed, primarily by domesticated yak *Bos grunniens* and sheep *Ovis* spp., but also by some wild ungulates. These animals probably provide an ample source of carrion for vultures, and facilitate high population densities. Second, although we did not measure the availability of nest sites, we observed few suitable cliffs for nesting sites in this region of the plateau. If nest site availability is low, these birds may have been forced to nest in closer proximity to each other than usual. Third, in nearly all other areas where Lammergeier and Eurasian or Himalayan Griffons co-exist, they share resources with a third species of vulture (Ferguson-Lees and Christie 2001). Because these two species are the only large vultures in this region (Cinereous Vultures are uncommon in this part of Qinghai), interspecific competition may be less than in other places where they co-exist. Finally, Eurasian Griffon colony size and level of aggression by Lammergeiers have been shown to be positively correlated (Bertran and Margalida 2002). Himalayan Griffons, because of their semi- or non-colonial nesting, may provoke less response from Lammergeiers.

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Hybridisation between Slender-billed Gull *Larus genei* and Black-headed Gull *L. ridibundus* in Irkutsk, Russia

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Slender-billed Gull *Larus genei* breeds from the Iberian peninsula to Central Asia, between 20°N and 50°N. It breeds as far east as western Pakistan, Tajikistan and the Novosibirsk region in western Siberia (Zubakin 1988, Ryabitsev 2001). The species was first recorded around Lake Baikal in June 1989 when an adult male was collected in a colony of Black-headed Gulls in the Selenga delta, in south-western Baikal on 15 June (Tupitsyn and Fefelov 1995). Another was seen in June 1991 between Irkutsk and Angarsk, in a flock of non-breeding individuals of Yellow-legged Gull *L. cachinnans* (Popov and Salovarov 2000). A third record was documented in June 2001 at Gusinoye Ozero lake in Buryatia, south-east of Baikal (Tebb and Ranner 2002). Other vagrants have occurred in east Asia (Moores 2002, Tebb and Ranner 2002).

OBSERVATIONS

On 25 May 2003, we found a Slender-billed Gull near Black-headed Gull colonies in a wetland on the edge of Irkutsk (52°19′N 104°13′E). Black-headed Gulls first bred here during the 1980s, and c.300 pairs have nested since the early 1990s. By the end of the month the Slender-billed Gull was found to be paired to a Black-headed Gull, and building a nest in a small colony of seven pairs of Black-headed Gulls in a marsh with reedmace *Typha latifolia*. On 3 June this contained three eggs measuring 53.4–36.7 mm, 53.0–35.5 mm, and 52.2–35.4 mm. They were brownish-green with blackish spotting. The egg-coloration was at the lighter end of the range found in Black-headed Gull. We assume therefore that the female of the pair was the Black-headed Gull, as the eggs of Slender-billed Gull have a significantly lighter background colour: white with a pinkish or cream, but not green, tinge (Zubakin 1988). The structure and size of the nest showed no consistent differences from nests of Black-headed Gulls in the vicinity.

No displays between the pair were seen. Both birds incubated the eggs. When the Slender-billed Gull was flushed from the nest, it flew 30–50 m away, showed no aggressive behaviour, and called less frequently than Black-headed Gulls normally do. Only twice during our observations did we hear it give the species's distinctive 'ka-ka-ka' alarm call.

On 11 June, the Slender-billed Gull was found dead near the colony, having been shot. It was an adult male in breeding plumage. The following biometrics were taken: wing length: 315 mm, tail length 116 mm, tarsus: 52 mm, bill length: 42 mm. The dimensions of the testicles were 15x8 mm (left) and 8x7 mm (right). The skin has been transferred to the Zoological Institute, St. Petersburg, Russia.

As incubation by single parents is atypical in gulls, the clutch was exchanged with that of a pair of Black-headed Gulls nearby, in order to increase the chance of survival. Two chicks of the mixed pair hatched on 23 June and the third followed on 24 June. In the first few days, their coloration was generally similar to, but lighter than, similarly aged Black-headed Gull chicks. The distinctive grey colour on the upperparts of Slender-billed Gull chicks (Zubakin 1988) was absent. The second chick had less black spotting, and a large (10x12 mm) black patch on the front of the crown instead of many small spots as found on Black-headed Gull chicks. Zubakin (1988) studied Black-headed Gull around Moscow and Slender-billed Gull in the Black Sea, and noted that some Slender-billed Gull chicks may have an almost entirely black head, but that this is never observed in Black-headed chicks. Photographs of the chicks show that they are intermediate in appearance between the two species (V. A.