

Behaviour of a young Cinereous Vulture *Aegypius monachus* for one hundred days after leaving the nest in the Tianshan Mountains, China.

Roller MaMing*, Junwei Li, Xu Liu and Shuchao Wang

Xinjiang Institute of Ecology and Geography, Chinese Academy of Sciences, No. 818 Beijing Road, Urumqi, 830011, Xinjiang, P. R. of China,

*Corresponding author: maming@ms.xjb.ac.cn and maming3211@yahoo.com

<http://dx.doi.org/10.4314/vulnew.v75i1.5>

Introduction

There are few breeding records or reports on Cinereous Vulture *Aegypius monachus* in China. The species is vulnerable to mortality from poisoning and collision, such as during migration seasons and in wintering areas (Kenny *et al.* 2008). From 2016 to 2017, we investigated and reported for the first time on the breeding ecology of the vultures in the central Tianshan Mountains (MaMing *et al.* 2017). In addition to observing behaviour in the nest, we also tracked several young birds after they left the nest, from the end of July to October. Although young birds are relatively easy to observe during their stay in the nest (Reading *et al.* 2010), it is difficult to understand their fate after leaving the nest. In the Central Asia, only about 25 - 30 % of the sub-adult birds survive, and sometimes the success rate of reproduction is very low (Batbayar 2004, Reading *et al.* 2010, MaMing *et al.* 2017).

Methods

We used telescopes for on-site observations of nests every other week. Additionally, we installed three infrared cameras (Bushnell or Reconyx) near one of the nests (nest #3) to take pictures and videos. The cameras were set to operate in 24-hour mode, recording all behaviours including those of young and adult individuals from March to November. By the middle of July, the weight of the young vulture in nest #3 reached

8.56 kg, which is just before young Cinereous Vultures are expected to fledge (Reading *et al.* 2005). At this point we fitted a 40g satellite tracker (GSM/GPS telemetry by Hangzhou Yuehai Technology Co. Ltd.) on the back of the young bird. The life of this domestic tracker is very short, and it was expected to operate for three months only. It is during the period from July to October that young Cinereous Vultures are expected to be moving most frequently near their nests. We recorded 4 - 12 pieces of information about the position of the young vulture every day from GSM/GPS telemetry, leading to a total of 742 positions with information including the latitude and longitude, flight speed, altitude and ambient temperature during the three months. The nest cameras recorded more than 110,000 photos between March and December. All data were processed in Microsoft Excel 16.0 and SPSS 18.0.

Results and Discussion

On July 22 2017, the young vulture was about 100 days old when it fledged for the first time. It flew only 130 meters. During this period, the young bird was careful in its activities and soon returned to its nest. It was not until August 2 that the young bird began to leave its nest more frequently. During this period of early fledging, the young vulture took short practice flights and began to forage; it also returned to the nest regularly to rest and

roost, usually with its parents and getting food supplies sometimes.

Speed and height of flights

During the early fledging period, the speed and height of

the young vulture increased gradually. Velocity varied from 6.9 km/h to 69 km/h, but below 75 km/h. The height of flights ranged between 2340-3733 meters above sea level (Figure 1), but the relative height or actual height, that is the height from the nest or hilltop, was only between 40-1400 meters.

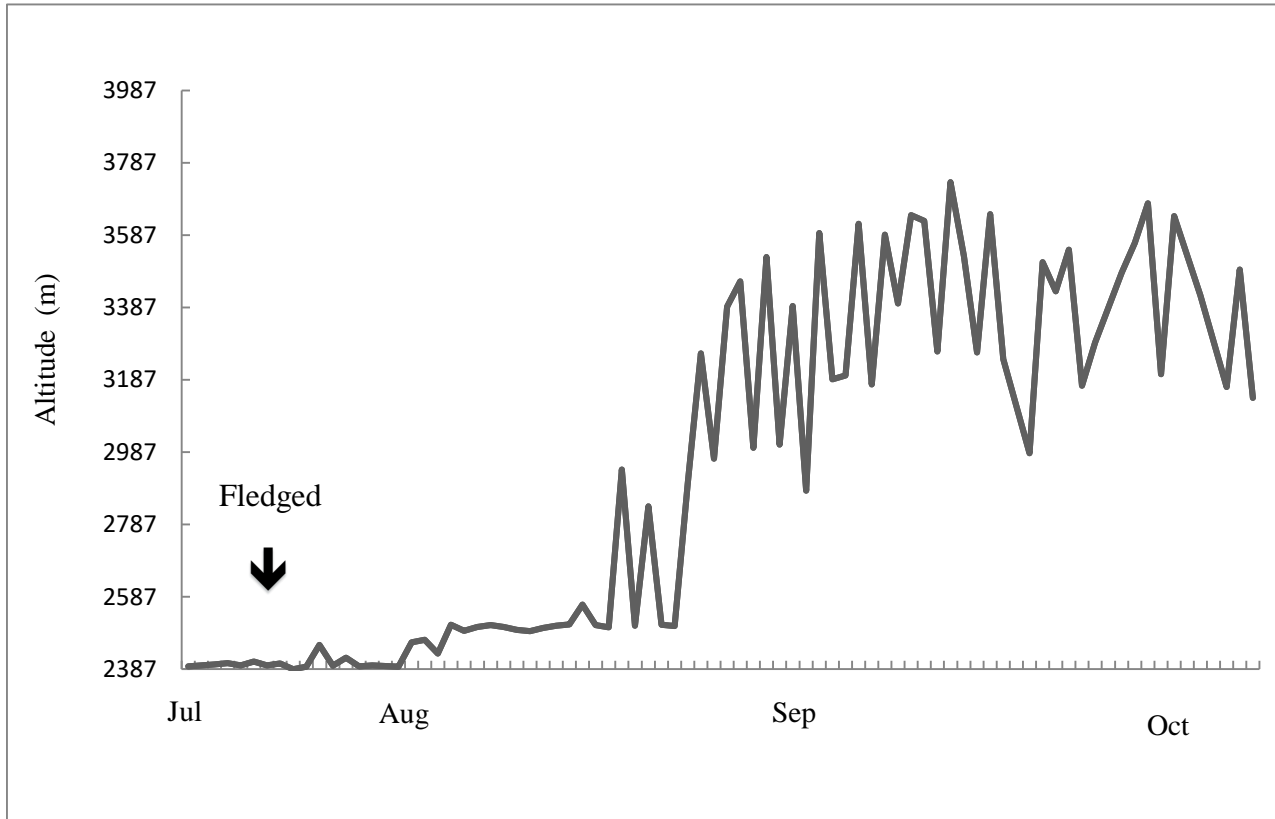


Figure 1: Flying altitude of a juvenile Cinereous Vulture after fledging

Flight distance and activity coverage areas

For the first 10 days after fledging, the vulture returned to its nests every day and stayed there for extended periods. Movements from the nest were within a radius of less than 130 meters (Table 1). Over the following 10 days, the young vulture’s flight ability increased gradually, and it began to stay on the top of the mountain for a long time or roost away from the nest. By the end of August, the total flying distance of the young vulture

had reached 36 km per day, and the area covered was about 30 km². On September 19, the distance travelled from the nest reached 31 km, with a maximum area of 156 km², but the vulture was still returning to its nest (or nearby) to roost each day. However, by November and December, there was no observation of the young vulture returning to its nest. Overall, the activity distance of the juvenile was positively correlated with the number of days away from nest (Figure 2).

Table 1: Movement data of a juvenile Cinereous Vulture from July to September 2017

Activity patterns	July	August	September
Number of recorded movements	3	95	107
Total active distance (km)	2.37	286	1076
Average daily distance (km/day)	0.13	9.23	35.9
Average flying height (masl)	2461	3665	3733
Maximum Flying speed (km/hour)	6.90	69.3	75.0
Average active area (km ² /day)	0.0013	3.54	31.7
Single active distance (km)	0.55	17.5	30.6

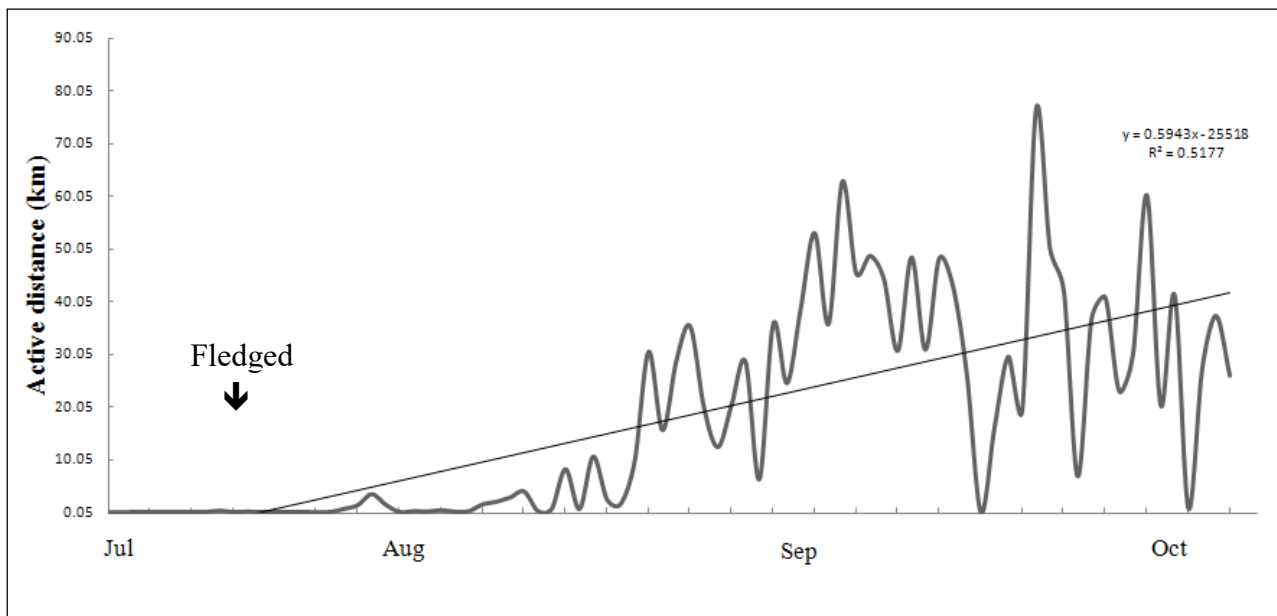


Figure 2: Distance travelled of a juvenile Cinereous Vulture after fledging

Daily activity rhythm and intensity

In total, 214 activity or mobile signals were obtained from the satellite tracker, averaging 2.6 times a day. Although vultures are diurnal, the daily activities of young and adults are sometimes different. The peak of

the young vulture's travel for food was between 10:00h-14:00h, with a single activity peak (Figure 3). This is in contrast to the adults' activities, which usually display a double peak (Ma Ming *et al.* 2017, Liu *et al.* 2018).

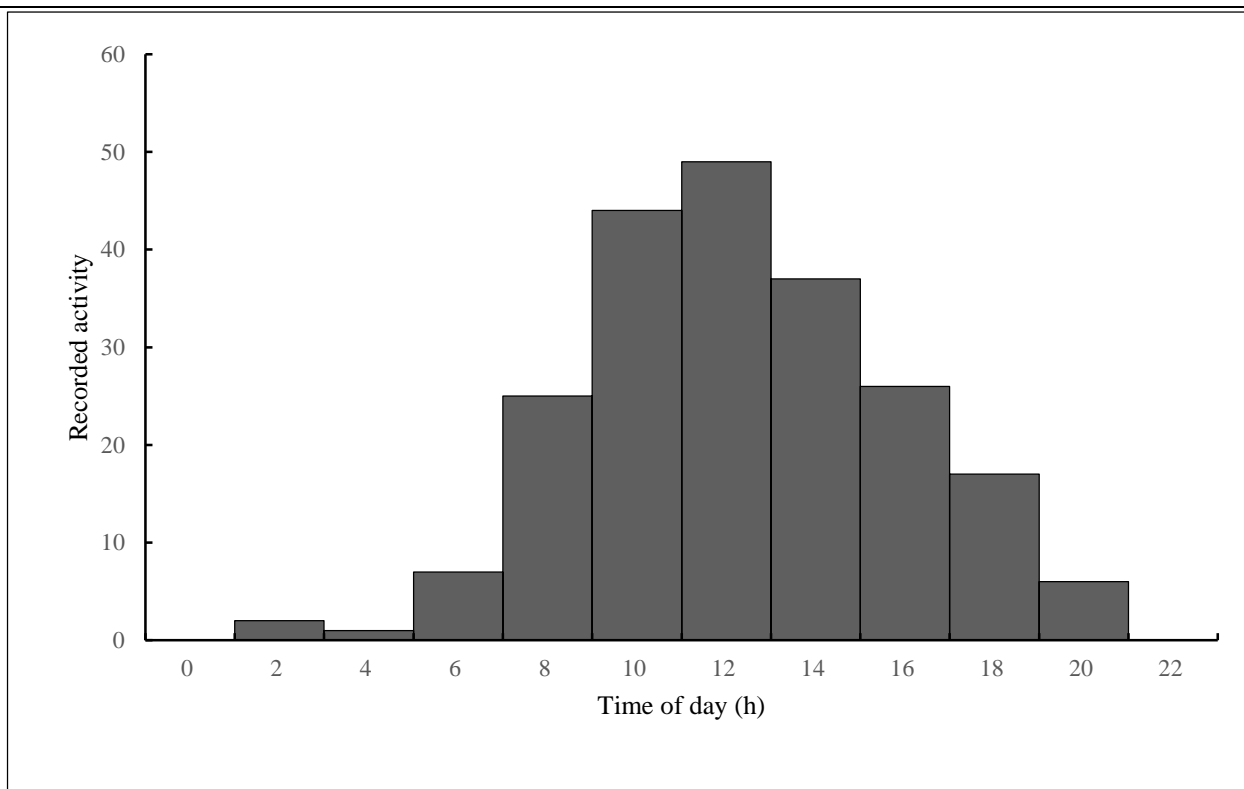


Figure 3: Activity frequency of a young Cinereous Vulture during the day

Patterns of area use

The young vulture avoided areas of human disturbance, such as busy highways and human residential areas (Figure 4). Related to this pattern of movement is the availability of food, and it is known that the area to the north of the nest is an autumn pasture area (Figure 4). The main food for the vultures are usually dead livestock, which would be more likely to occur in the areas to the north and west of the nest.

Conclusion

The reliability of the satellite trackers we used was low, so we did not monitor the migration of the young bird. However, GPS-GSM telemetry enabled us to track the

juvenile Cinereous Vultures for up to three months after fledging. Similarly, the telescope observations and the three infrared cameras installed near the nest from April to December recorded many interesting observations (MaMing *et al.* 2017, Ma *et al.* 2017, Liu *et al.* 2018), such as how adults fed their young, how often they fed their young and behaviour of the young vulture. For example, the nest-rearing (nestling) period for Cinereous Vultures usually lasts between 90 and 120 days (Reading *et al.* 2005). However, the camera data in our study revealed that the parent birds spent almost the same, or even longer periods, away from the nest as they did feeding and attending the chick.

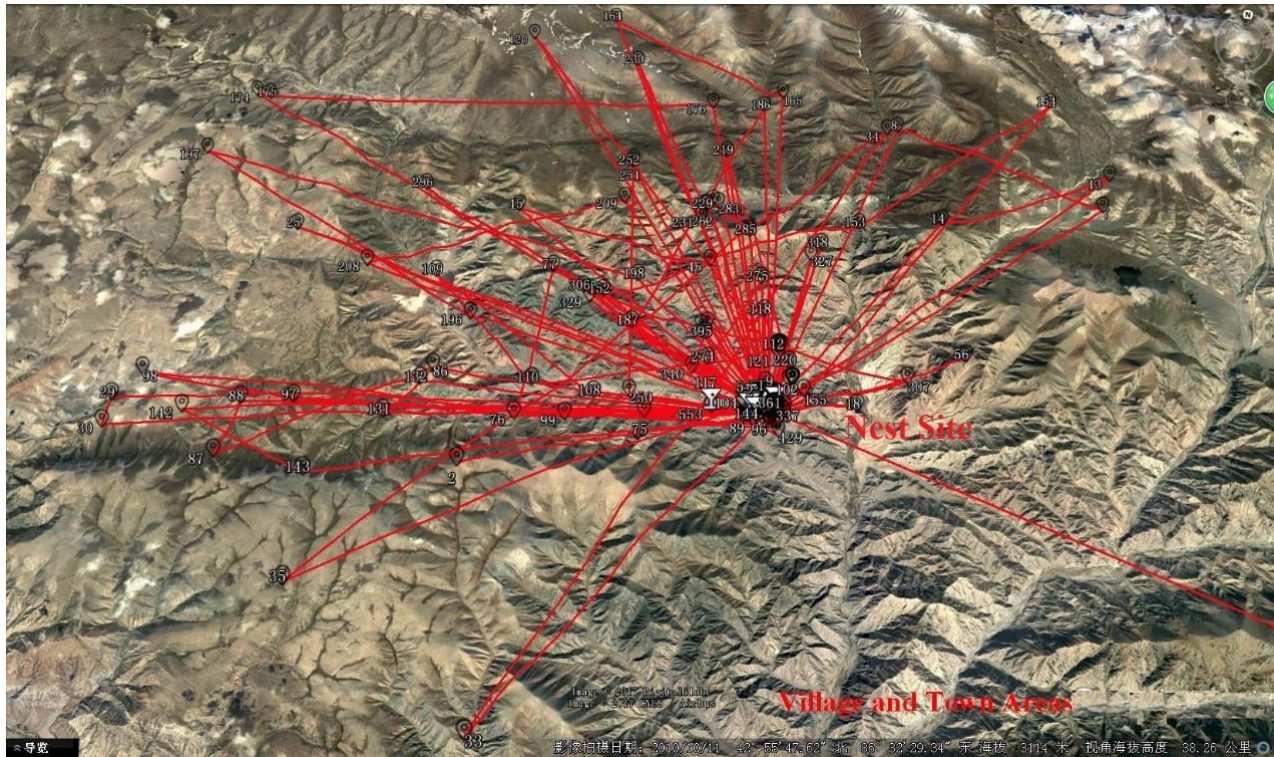


Figure 4: Location of the Cinereous Vulture nest and the movement patterns of a newly-fledged bird between July and October 2017

There are relatively few small-scale observational and research references available for Cinereous Vultures in China (Reading *et al.* 2005, Kenny *et al.* 2008, Yamac *et al.* 2012, Gavashelishvili *et al.* 2012). Although the scope of our study was limited to one bird, we were able to draw some general conclusions about the nesting behaviour of Cinereous Vultures and the movement patterns of a recently-fledged vulture in this part of China.

Acknowledgments

We thank the staff from our institute, the volunteers from

Huangye Xinjiang, and the many friends, students and local families that assisted with finding, examining, and banding vultures including the GPS-GSM telemetry in the Tianshan Mts. Thanks to some foreign friends, such as Paul Buzzard, Richard P. Reading, Chris Bowden, Dave Kenny, Campbell Murn and Hansoo Lee. Special thanks to the cooperation team from Wuhan University, such as Lu Xin, Zhao Huabin, Zou Dahu, Xie Huanwang and Wang Yi. The project was supported by the National Natural Science Foundation of China (No.31572292, No.31272291, No. 30470262).

References

- Batbayar, N. 2004. Nesting ecology and breeding success of cinereous vultures (*Aegypius monachus*) in central Mongolia. M.S. Thesis. Boise State University, Boise, Idaho, USA.
- Gavashelishvili, A., McGrady, M., Ghasabian, M., Bildstein, K. L. 2012. Movements and habitat use by immature Cinereous Vultures (*Aegypius monachus*) from the Caucasus. *Bird Study* 59: 449–462.
- Kenny, D., Batbayar, N., Tzolmonjav, P., Jo Willis, M., Azua, J. & Reading, R. 2008. Dispersal of Eurasian Black Vulture *Aegypius monachus* fledglings from the Ikh Nart Nature Reserve, Mongolia. *Vulture News* 59: 13-19.
- Liu Xu, Ma Ming, Wu Daoning, Wang Shuchao. 2018. Behavior and time budget of Cinereous Vulture *Aegypius*

- monachus* at nest during the nestling period. *Chinese Journal of Zoology* 53: 172-179. (In Chinese with English summary)
- Ma M., Xu G. H., Wu D. N. 2017. Vultures in Xinjiang. Science Press, Beijing, 1-214. (In Chinese with English contents and summary)
- MaMing R., Li Lee, Xiaomin Yang, Paul Buzzard. 2016. Vultures and sky burials in the Qinghai-Tibet Plateau. *Vulture News* 71: 22-35.
- MaMing R., Liu Xu, Wang Shuchao and Wu Daoning. 2017. Breeding Ecology of Cinereous Vulture in Tien-Shan Mountains, China. *Raptors Conservation* 35: 252-259. (In Russian and English)
- Reading, R. P., Amgalanbaatar, S., Kenny, D. & Dashdemberel, B. 2005. Cinereous Vulture nesting ecology in Ikh Nartyn Chuluu Nature Reserve, Mongolia. *Mongolian Journal of Biological Sciences* 3: 13–19.
- Reading, R. P., Kenny, D., Azua, J., Garrett, R., Willis, M.J., & Tsolmonjav, P. 2010. Ecology of Eurasian black vultures (*Aegypius monachus*) in Ikh Nart Nature Reserve, Mongolia. *Erforschung Biologischer Ressourcen der Mongolei* 11: 177-188.
- Yamac, E., Bilgin, C. C. 2012. Post-fledging movements of Cinereous Vultures *Aegypius monachus* in Turkey revealed by GPS telemetry. *Ardea* 100:149-156.

Key words: Juvenile activity, movement, flight route, distance, altitude, China



Pictures: We installed the satellite tracker on July 14, when the young bird is nearly 90 days old. Fledging was estimated in another 10-15 days.
