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Distribution and breeding ecology of Red-headed Vulture *Sarcogyps calvus* in Nepal

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Introduction

Vultures are medium to large sized scavenging birds, feeding mostly on the carcasses of dead animals and are found on every continent except Antarctica and Oceania (Del Hoyo *et al,* 1994). Vultures play important role in maintain clean environment through rapid consumption of animal carcasses and human dead bodies in the form of sky burials within Nepal and Tibet, China.

Four species of vultures in Asia are in grave danger of extinction across the Indian subcontinent. Research and monitoring of vulture species undertaken in lowland areas of Nepal revealed declines of 91% for White-rumped Vulture *Gyps bengalensis* and 96% for Slender-billed Vulture *G. tenuirostris* between 1995 and 2011 (Chaudhary *et al.,* 2012). Due to similar trends of decline elsewhere in South Asia in 1990s four vulture species of South Asia namely White-rumped Vulture, Indian Vulture *Gyps indicus*, Slender-billed Vulture and Red-headed Vulture *Sarcogyps calvus* have been listed by IUCN as "Critically Endangered" (IUCN, 2014).

Vultures are highly susceptible to Non-Steroidal Anti-Inflammatory Drug (NSAID), diclofenac, they are exposed to the drug through

Photo: Adult Red-headed Vulture on its nest in Palpa district by Ishwari Chaudhary

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the carcasses of treated livestock. Diclofenac kills gyps vultures (Oaks *et al*., 2004; Swan *et al*., 2006) including Himalayan Griffon (Das *et al*., 2010) and possibly other species as they too have declined (Cuthbert *et al*., 2006; Acharya *et al*., 2009).

It was estimated that Red-headed Vulture populations in India declined by 91% during the period 1999 to 2003 and rates of decline per year was 41% during this time period (Cuthbert *et al*., 2006). If these rates of decline have continued then this previously scarce population has now declined by >99% (Cuthbert *et al.,* 2006). Whilst there is already strong suggestive evidence that nimesulide is toxic to vultures, aceclofenac (Sharma, P., 2010) and ketoprofen (Naidoo et al. 2009) are already known to be toxic to vultures through previous safety-testing experiments.

Diclofenac might be toxic to Red–headed Vulture, but we do not have firm evidence and due to inter-specific differences in diclofenac toxicity this assumption may not be true for this species which belongs to a different genus: *Sarcogyps*.

Red-headed Vulture is a resident, still widespread in the west central to far west Nepal but virtually absent in eastern part of Nepal (Inskipp *et al.* 2016). Population of Red-headed Vulture has been estimated to be less than 500 in Nepal (BCN and DNPWC, 2011). There is only little information available about this species. Nest of Red-headed Vulture have been recorded on recent year after a gap of more than ten years in Nepal. First nest of Red-headed Vulture was found at Tansen-12, Palpa district in 2012 (Dhakal *et al*., 2014).

Study Area

The study on distribution of Red-headed Vulture was carried out in western mid hill of Nepal. Exploration of active nests of Red-headed Vulture and ecological monitoring was done in Jajarkot and Palpa districts. Jajarkot district is one of the districts of Bheri Zone in mid-western region of Nepal. It is located between N28°37'22" to 29°07'32" and E81°49'22" and 82°34'46". The climatic zone of the district ranges from subtropical to alpine. One nest of Red-headed Vulture was found at Lanha VDC ward no. 6 of Jajarkot district (Bhusal 2014). The nest was built at the main trunk of Pine tree *(Pinus roxburghii)*.

Palpa district is one of the district of Lumbini Zone in western region of Nepal. It is located between N 27°34' to 27°57' and E 83°15' to 84°22'. Two active nests of Red-headed Vulture are being monitored in this district. One active nest of Red-headed Vulture on *Adina cordifolia* tree has been located at Tansen Municipality 12, Dharampani and another has been located on *Pinus* tree at Baugha Pokharathok 6, Luhung.

Methods

The exploratory and preliminary field visit was conducted in Jajarkot district from 8 April to 18 April 2014. On an average 10 hours a day was spent in the field to keep the record of vulture sightings along with exploring nests of vultures. One Red-headed Vulture nest was found at Lanha-6, Mahadevpuri, Jajarkot on 16 April 2014. After its first record, regular nest monitoring was done by trained local assistant. Similarly, another active nest of Red-headed Vulture was found in Baughapokharathok-6, Luhung, Palpa on 15 May 2014; the nest has been regularly monitored

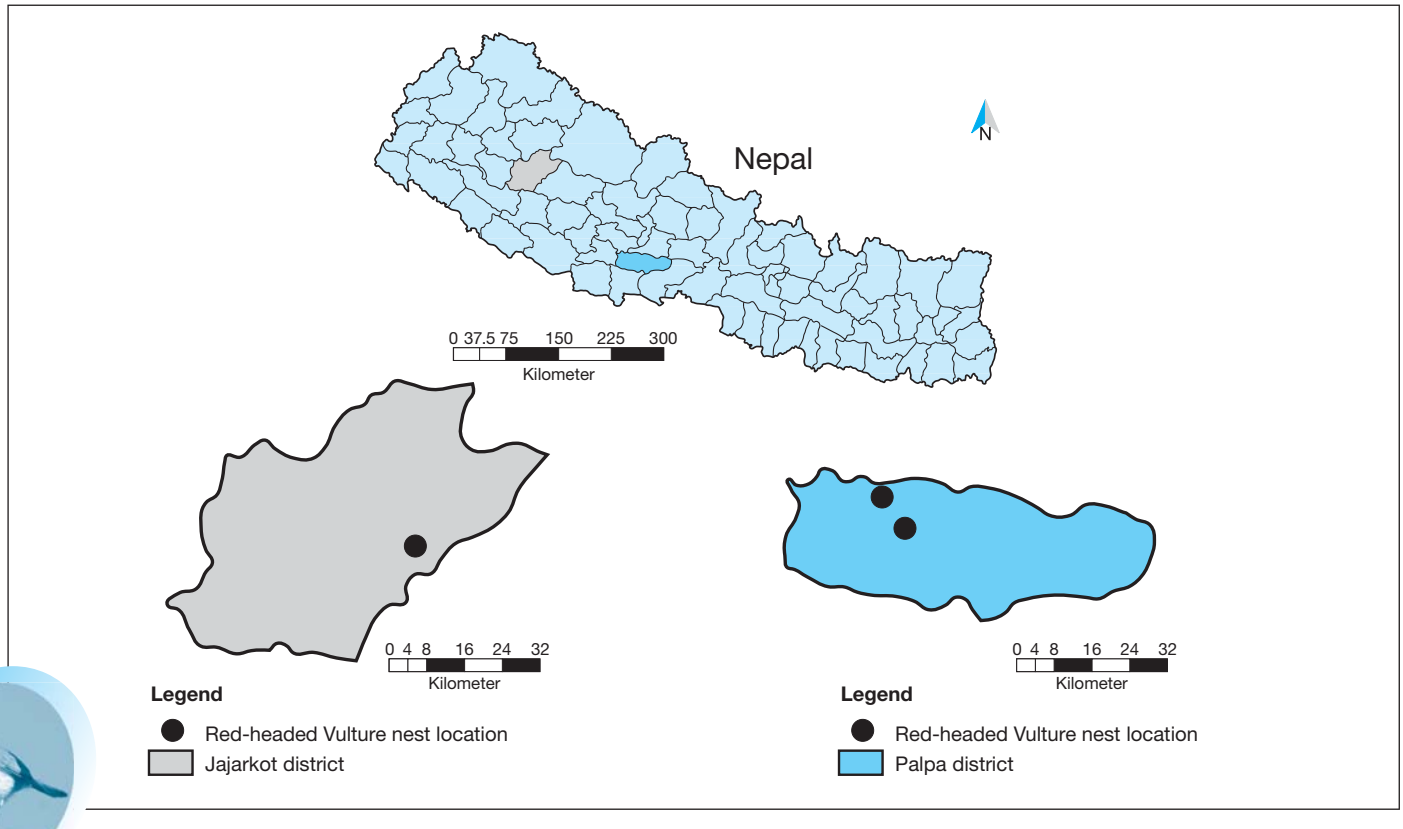

Fig 1. Map showing the nest location of Red-headed Vulture in Nepal.

since then. Likewise, another nest of Red-headed Vulture which lies in Tansen-12, Dharampani of Palpa district was monitored during the breeding season 2013-2014.

Absolute Count

Absolute count and monitoring of Red-headed Vulture was conducted in western Nepal from March 2012 to May 2015. During the field visits the details on sighting of Red-headed Vulture i.e. number, age class and location were recorded between 8 am to 5 pm.

Nest Monitoring

In order to study the breeding ecology, the nest occupancy, breeding status and general behavior were recorded for all three known nest for Red-headed Vulture in Palpa and Jajarkot districts of Nepal. Observation of nests in tree were made from the ground without disturbing the vulture. Monitoring of each nest was done to access the nest status and breeding success for the breeding season 2013-14. Following Postupalsky (1974), an active nest was defined as a nest in which eggs had been laid, whereas an occupied nest is one in which an egg need not have been laid, but a minimum of nest building must have taken place. A nest from which a chick fledged is termed as productive or successful. Breeding success of Red-headed Vulture was calculated using following formula:

$$\text{Breeding Success} = \frac{\text{Number of productive nest}}{\text{Number of active nest}} \times 100$$

Results

During the three years study period from 2012 to 2015, there were recorded the 102 sightings of Red-headed Vulture in different places with respective time (Fig. 2). The average flock size of Red-headed Vulture from these sighting records was found to be 1.78. Mostly single individual or pairs were recorded during their monitoring. Remarkably the maximum number of Red-headed Vulture was 20 in a single sighting, recorded at Vulture Safe Feeding Site, Ghachok, Kaski on 24 June 2013.

Monitoring of three active nests in Palpa and Jajarkot district during the breeding season 2013-2014 results the 100% breeding success based on the active nest as primary unit. One old previously used nest also recorded nearer to active nest in Jajarkot but not occupied for this breeding season. It was found that Red-headed Vulture built nest at the top of a large tree. The large, flat nest was constructed from sticks and lined towards the centre with leaves and dry grass. The average nest height was 27 m from the ground level. Mainly breeding activities of Red-headed Vulture were observed from November to June. Red-headed Vulture laid only one egg during one breeding season and both male and female took part in incubation and provide parental care. The incubation period took about two months and hatches egg in March. Nestlings were fledged after four months in late June.

Discussion/Conclusion

Since 2005 sightings have been recorded at a number of localities by several birders and researcher in the central and western part

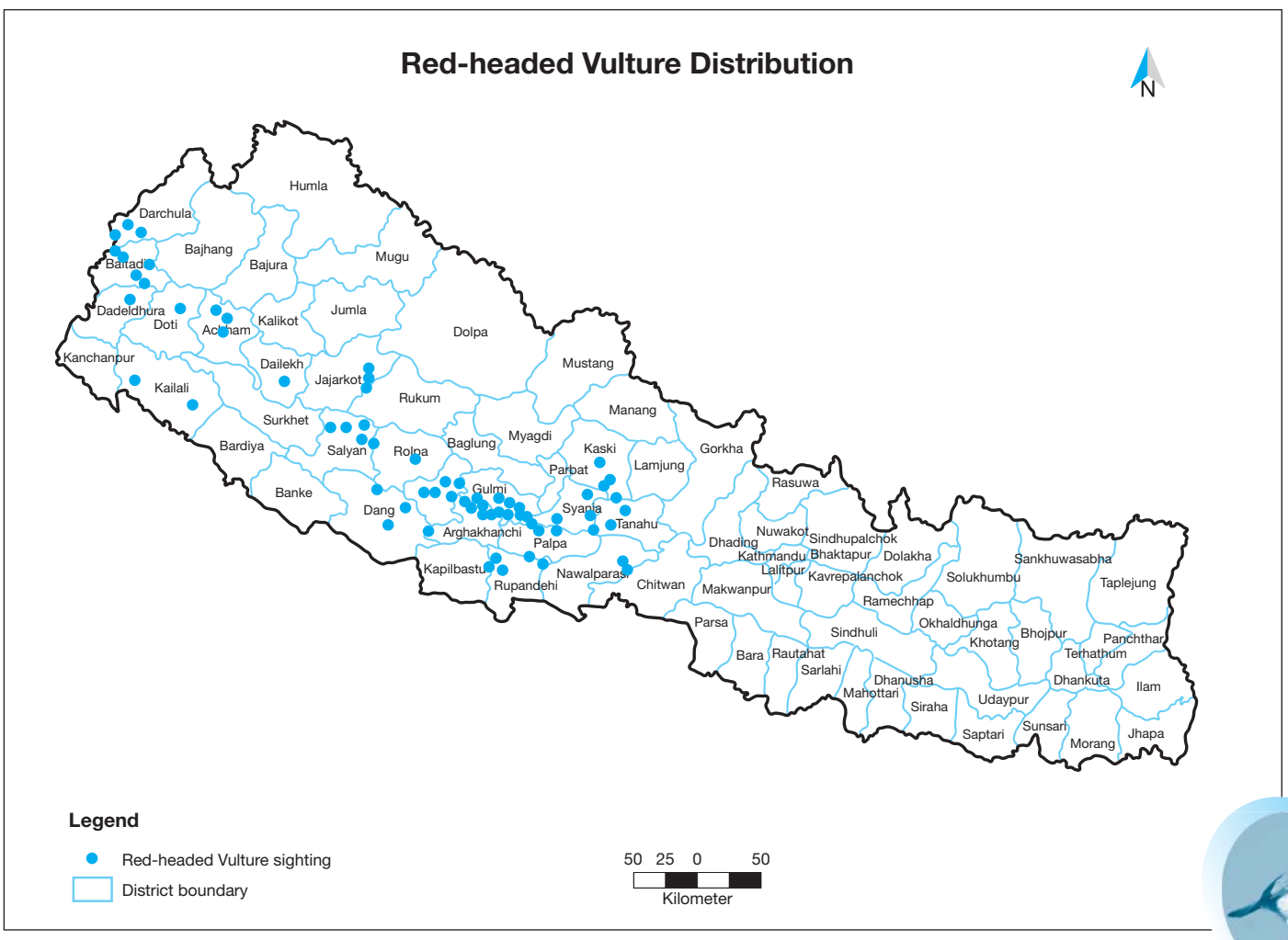

Fig 2. Distribution and sightings record of Red-headed Vulture in Nepal

of country. During a raptor survey near Khande, Kaski District, 75 Red-headed Vultures were seen migrating west between 30 October and 2 December 2005 (Gurung 2005). A population survey of Red-headed Vulture was carried out in the western Middle Mountain region in 2012. A total of 24 birds were estimated: nine in Kaski District, six in both Palpa and Arghakhanchi Districts, three in Pyuthan and none in Salyan Districts. No nests were located during the study, although fresh juvenile birds were repeatedly recorded in the autumn (Subedi 2013). Unlike most of the larger species of vulture, Red-headed Vulture does not live in large groups and is most often found solitary or in a breeding pair. The average flock size for Red-headed Vulture as 1.78, explains that they are mostly seen in pairs. During the breeding season 2013-14, breeding success of Red-headed Vulture in the studied area was 100%.

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