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POSTER

Upland villages as micro-hotspots of avian biodiversity: a case study of the Sainj Valley, Western Himalayas

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Upland villages have played pivotal roles in the development of the socio-economic and cultural life of Himalayan people. However, their role in terms of biodiversity conservation has been largely ignored and is poorly understood. Therefore, I investigated the ecological importance of upland villages by using avian diversity as a surrogate of overall biodiversity.

The study area is situated in the Kullu District of Himachal Pradesh state, northern India. It encompasses the entire Sainj Valley, which constitutes the catchment area of the Sainj Khad (River) an important tributary of the Beas River. The total size of the study area is 736.92 km².

I surveyed 14 villages within the Sainj Valley. These villages are located in the eco-zone of the Great Himalayan National Park (an Endemic Bird Area identified by Birdlife International) within the mid-altitudinal ranges of the Western Himalaya (1300–2800 m a.s.l.). Breeding bird surveys were conducted in spring (April–May) 2013. A variable radius point count method was used to count birds (Bibby *et al.*, 2000). A total of 38 point counts in lower villages and 69 point counts in upland villages were carried out. Estimate S (Version 8.2; <http://viceroy.eeb.uconn.edu/>) was used to compute species richness and perform rarefaction analysis of surveyed villages. Villages were classified into two categories (i) 'lower villages' – located between 1300 and 1700 m, and (ii) 'upland villages' – located between 1700 and 2800 m. Beyond 2800 m there were no villages recorded in the valley.

Sampling adequacy was determined by rarefaction analysis. Figure 1(a) shows that after 30 point counts, species richness curves of both upland and lower villages reached an asymptote. Thus, both were adequately sampled.

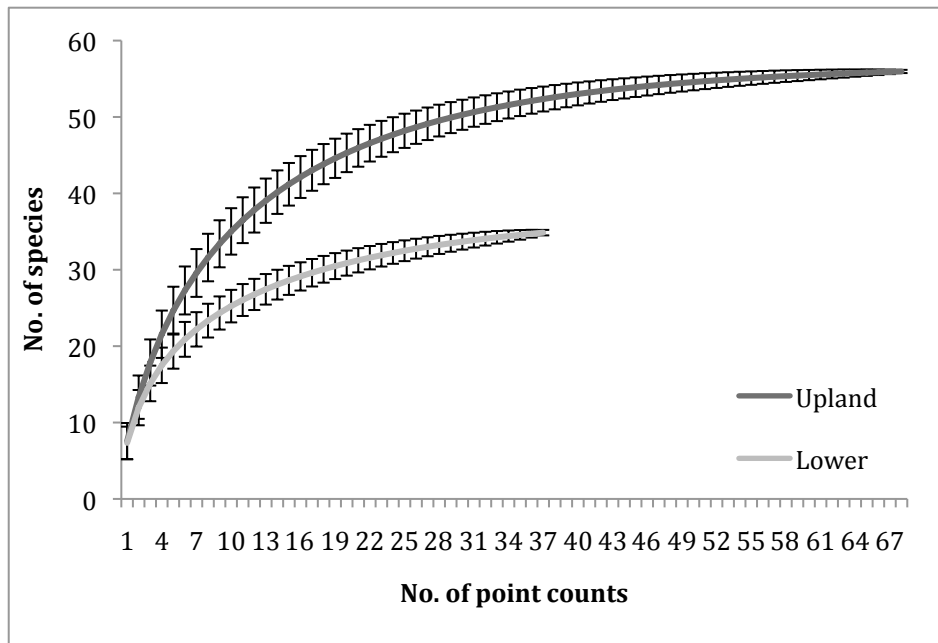
The estimated mean (\pm sd) species richness (Jackknife 1) for upland villages was 65.86 ± 3.52 , which was higher than for lower villages, which was 44.74 ± 3.02 (Fig. 1b). The upland villages supported some rare and threatened bird species such as Cheer Pheasant *Catreus wallichii*, Himalayan Monal *Lophophorus impejanus* and Kalij Pheasant *Lophura leucomelanos*. The bird communities showed mixed assemblages of forest and agricultural species.



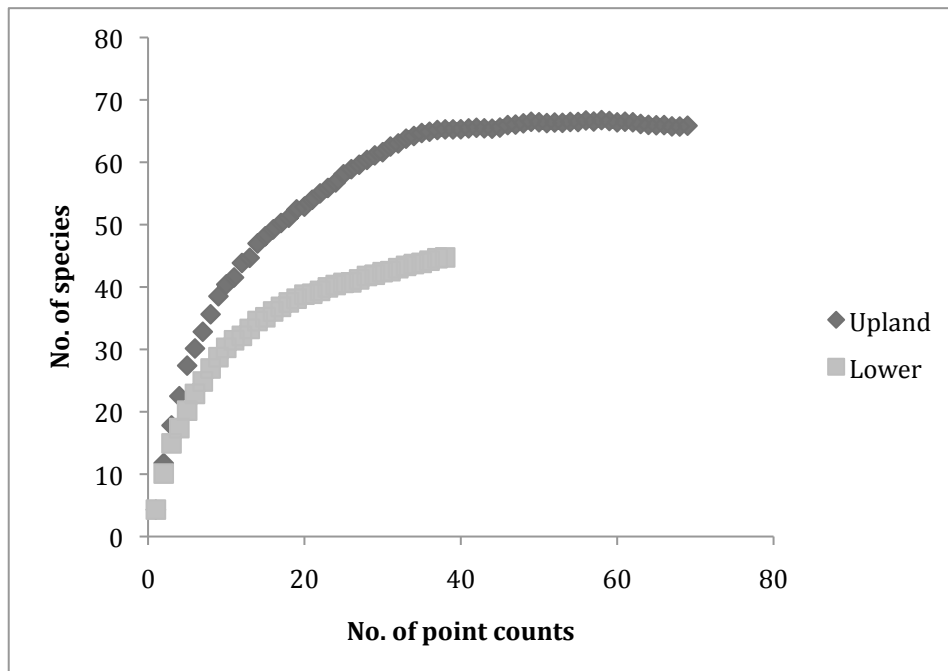
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(a)



(b)

Figure 1 (a) Rarefaction analysis of upland and lower village bird species.

(b) Species accumulation patterns of birds of upland and lower villages in Sainj Valley, 2013 (Jacknife 1).

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These villages were visited by forest bird species such as Himalayan Woodpecker *Dendrocopus himalayensis*, Black-and-yellow Grosbeak *Mycerobas icteroides* and Speckled Woodpigeon *Columba hodgsonii* for foraging. The upland village birds associated with agricultural habitat included Pink-browed Rosefinch *Carpodacus rodochroa*, Upland Pipit *Anthus sylvanus*, Chukar *Alectoris chukar* and Fire-fronted Serin *Serinus pusillus*.

The use of eco-friendly indigenous agriculture techniques is used to cultivate food crops such as wheat, maize, peas, kidney beans, garlic and potatoes. The application of organic manure or fallowing of agricultural fields is used to restore soil fertility instead of applying chemical fertilizers. The agricultural fields provide easily available food resources to upland forest birds during the winter, for example to Himalayan Monal and Kalij Pheasant. Thus, a moderate level of anthropogenic disturbance facilitates high species richness of birds in upland villages.

The agriculture system in upland villages is mixed cropping instead of mono-cultivation. The agricultural landscape comprises patches of oak (*Quercus dilatata*) and coniferous trees such as *Pinus wallichiana* and *Cedrus deodara*. The mosaic landscape at the forest edges further adds habitat heterogeneity, and thus provides superior habitats to upland birds. These villages act as micro-hotspots of biodiversity where humans and birds can coexist. Therefore, there is an urgent need to conserve the upland villages of the Western Himalayas.

Reference

Bibby, C.J., Burgess, N.D., Hill, D.A. & Mustoe, S.H. 2000. *Bird Census Techniques*. Academic Press, London.