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Short Communication

Conservation ecology of red panda in Himalayas

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ABSTRACT

Red panda (Ailurus fulgens) is listed as endangered in IUCN red data list, protected for Nepal and distributed in Himalaya region of Nepal, and is commonly known as "Habre" in Nepalese language. The species is distributed in different protected areas of Nepal, however the detailed information on ecological, biological and conservation aspect are still lacking. The study was conducted in Dhorpatan Hunting Reserve (DHR), Nepal to investigate diet, habitat preference and distribution of red panda. Micro histological fecal analysis methods were used to investigate feeding species on red pandas' diet. The habitat preference of red panda was analyzed by using Ivelve's electivity index. A total of 120 plots were laid out for sampling the vegetation (trees, shrubs, and herbs respectively) and habitat features. Red panda preferred gully with forest area and tree species Acer caesium (IV=1). Most important forest species in the habitat of red panda were Abies spectablis (IVI=66.22) and Betulautilis (IVI=17.15) with ground cover of Arundinaria spp. Red panda preferred 3000-4000 m elevation range, 26-50% slope, 51-75% crown cover and 26-50% ground cover. Arundinaria spp. was found as a major (81.7%) diet of red panda. For protecting this species human consumption of the Arundinaria spp. should be discouraged.

Background:

Understanding the influence of anthropogenic disturbances on species' habitat use and distribution is critical to conservation managers in planning effective conservation strategies and mitigating the impact of development. Few studies have focused on the Himalayan red panda (Ailurus fulgens) in Bhutan. This study aimed to assess the habitat requirements and threats to this endangered species in the Khamaed subdistrict of the Jigme Dorji National Park, Bhutan. We employed a transect walk and plot-sampling survey design across two seasons, that is, winter and spring. In total, we surveyed 84 × 50 m radius circular plots along 51 km of existing trails within a 25.4 km2 study area. At 500 m intervals, we established plots at random distances and direction from the trail. We recorded direct sightings (n = 2) and indirect signs (n = 14), such as droppings and footprints as evidence of red panda presence within an altitudinal range of 2,414–3,618 m. We also noted 21 tree and 12 understory species within plots with red panda evidence; the dominant tree species was the Himalayan hemlock (Tsuga dumosa) and the Asian barberry (Berberis asiatica) as an understory species. Red panda presence showed a significant positive association with distance to water sources and fir forests. Plant disturbance and infrastructure, such as power transmission lines, were identified as prominent anthropogenic threats in the study area. Based on our findings, we recommend the development and implementation of local forest management plans, livestock intensification programs, and strict application of environmental impact assessment regulations to promote the conservation of the red panda in the region.

INTRODUCTION

Information and knowledge on species' distribution are vital to understand their presence and infer habitat and ecological requirements. Local small-scale distribution surveys can shed light on species habitat preferences, existing threats, and responses to management interventions. Such studies can help conservation managers plan and revisit species conservation policies and guide informed management. The Red List of International Union for Conservation of Nature lists the red panda as an endangered species. Recently, recognized the red panda of Nepal, Bhutan, northern India, northern Myanmar, Tibet and western Yunnan Province of China as the Himalayan red panda and its relative in Yunnan and Sichuan provinces of China as the Chinese red panda. This new taxonomic identification has underpinned the need of more studies to secure the survival of these two red panda species in the wild.

Globally, red pandas are reported from 49 protected areas in China 11 in India; 10 in Nepal; and 3 in Myanmar. In Bhutan, red pandas are reported in eight PAs and six biological corridors and red panda areas in Bhutan account for about 43.5% of the predicted red panda habitat across range countries. Red panda habitat, in general, includes evergreen forests, mixed broadleaf forests, deciduous forests, conifer mixed forests, and conifer forest with bamboo thicket understories. Bamboo leaves and shoots form the main bulk of the red panda diet with insects, grubs, lichens, and fruits acting as supplements. Vegetation characteristics are strong predictors of habitat use. Studies have also indicated that red pandas favor habitats close to water sources. However, habitat requirements for the red panda vary across different landscapes. In Phurmsingla National Park, habitats close to water sources were,

for example, not a significant predictor of red panda presence.

Threats to red panda survival are greatest in Bhutan, India, and Nepal than other range countries. Habitat loss, fragmentation, and degradation are some of the major threats to the red panda populations in these countries. The harvesting of forest resources and infrastructure development are some of the main drivers of red panda habitat destruction and fragmentation. Hickman, Roberts, and Larson reported habitat loss as a main cause for population decline, especially affecting endangered species that are sensitive to changes in their environment. Red pandas are known to avoid areas close to human settlements and areas disturbed by livestock. As habitat specialist, red pandas prefer less disturbed habitats; however, their responses to habitat disturbances may vary across locations. Field observations made in some parts of Nepal have revealed extensive spatial overlap between the red panda and the livestock. During winter months when ground vegetation is scarce, livestock are seen feeding on bamboo. As a generalist species, livestock adapt to feed on any available resources. Habitat-generalist species in a community are reported to overexploit the environment and occupy habitats unexploited by habitat specialists at a larger spatial scale.

Poaching and illegal trade for pelts have been identified as important threats to the red panda, although their intensity varies across different countries. Free-ranging domestic dogs also threaten red pandas and other wildlife. There are reports of stray dogs killing red pandas in Nepal and Bhutan. One of the major goals of conservation biology is to document environmental and anthropogenic factors that influence species' distribution. Understanding species' habitat requirements and disturbances contributing to habitat destruction is very important to conserve endangered species like the red panda. Despite Jigme Dorji National Park harboring key red panda habitats in Bhutan, very few studies have focused on documenting the conservation threats to this species in this region. This study hence aimed to fill this gap and assess the conservation status of the red panda in a critical but poorly studied area of the JDNP in Bhutan. In addition, this study sought to identify the threat factors affecting red panda habitat use.

Conclusion:

Understanding the influences of habitat variables and important ecological requirements of the red panda is essential for better habitat management that has enlightened through this study. The potential habitat of the red panda is distributed in a narrow elevation across the country. Such potential habitat would be highly sensitive from anthropogenic activities thus management interventions should be priorities to protect habitats. Furthermore, our study filled a gap in the ecological knowledge of habitat requirements at the microhabitat and landscape levels. Our study strongly suggests that red panda occurrence is broadly influenced by a group of variables, including habitat, climate and geography, as well as by disturbance. Mixed broadleaf forest, East Himalayan oak-laurel forest, canopy cover >20%, ground substrate use, bamboo cover >20%, tree stump presence, fallen logs of small trees and grazing absence are important variables in habitat of the red panda. Implementation of habitat management practices in consideration of these important ecological requirements will be vital for conservation of the red panda in the Nepal Himalayas.