

Bioindicator for long-term ecological monitoring in mountainous ecosystems, Kailash Sacred Landscape, Western Himalaya, India

Mona Chauhan and V.P. Uniyal

Wildlife Institute of India, Chandrabani, Dehradun- 248 001, India.

E-mail: mona@wii.gov.in

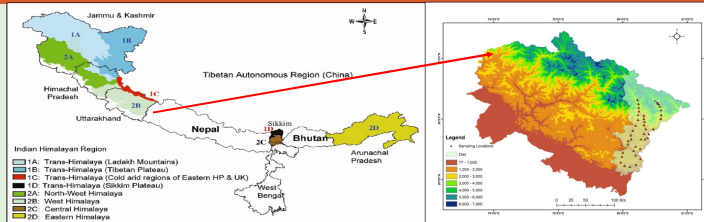


Introduction

Bioindicator can be defined as a species or group of species that readily reflects ecosystem stress, habitat degradation, loss, and fragmentation. Dung beetles are highly sensitive to habitat modification, changing land use patterns and environmental condition. This sensitivity makes them useful indicators of ecosystem health and strengthen their potential utility as ecological indicator taxa.

Study area: Indian Trans Himalayan Region

- Indian Kailash landscape falls under western Himalayan range, Characterized by a wide altitudinal range i.e. 800m asl to over 7000m.
- Chir Pine, Oak, Broadleaved mixed, Subtropical scrub, Temperate conifer and Alpine meadows

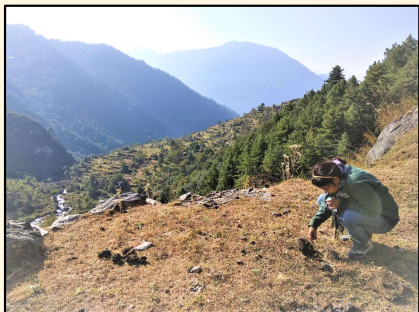
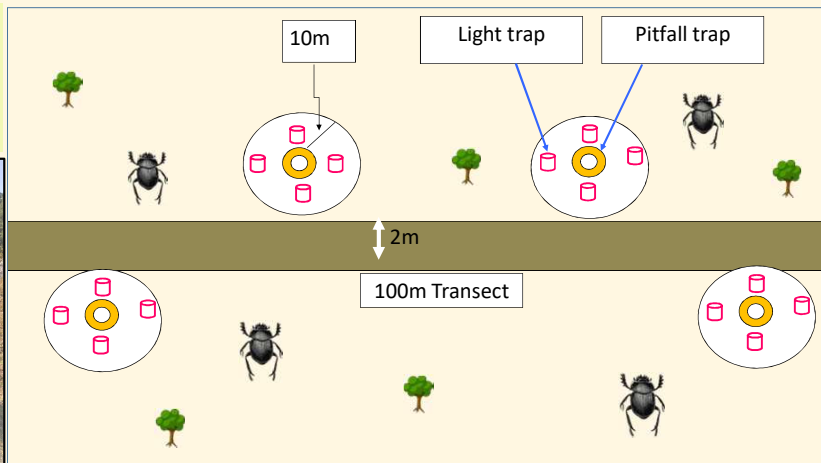


Objectives

Assessment of potential role of Dung beetles (Scarabaeidae) as bio-indicator of ecosystem-health and highlight the importance of bio-indicator based approach for the ecological monitoring.

Methodology

- Stratified random sampling
- Insect collection methods viz; hand sorting, pitfall trapping, light trapping and vegetation beating



Indicator species analysis

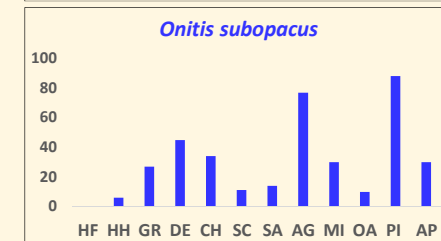
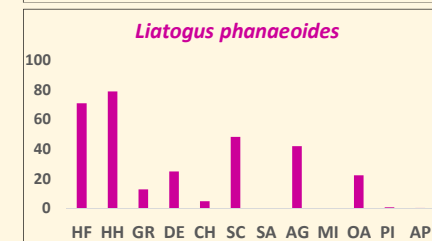
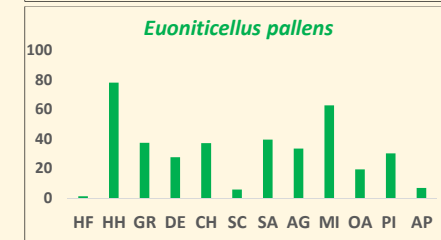
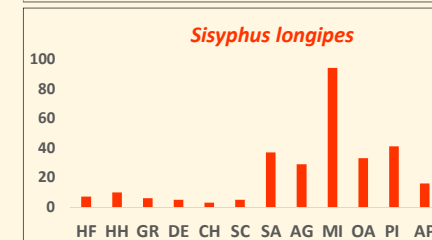
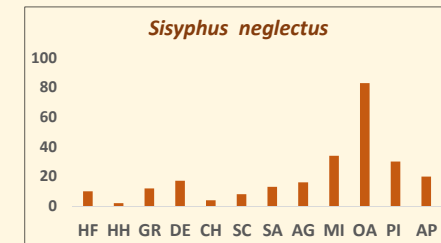
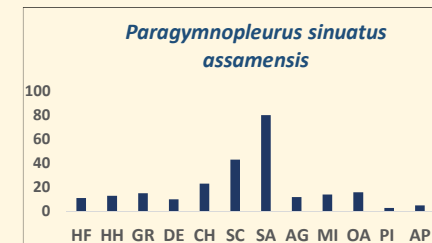
Important indicator species of dung beetles have been identified for each habitat type by using the indicator value (*IndVal*) method (Dufrene and Legendre 2007). Indicator value (*IndVal*) quantifies the fidelity and specificity of species in relation to groups of sites in a user-specified classification of sites, and tests for the statistical significance of the associations by permutation.

Specificity (A_{ij}) = $N \text{ individuals}_{ij} / N \text{ individuals}_i$

Fidelity (B_{ij}) = $N \text{ sites}_j / N \text{ sites}_i$

Indicator value of species in cluster (habitat) $IndVal_{ij} = A_{ij} \times B_{ij} \times 100$

The indicator values is highest (100) when all individuals of a species are found in a single habitat (high specificity) and when the species occurs in all samples of that habitat (high fidelity).



Acknowledgement

- The International Centre for Integrated Mountain Development, Nepal
- Ministry of Environment, Forest & Climate Change (MoEFCC), Govt. of India