



## **Full satellite remote sensing based approach to assess the plant and tree species diversity using high and very spatial resolution multi-spectral data**

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It has always been an ecologically challenging task to assess the species diversity in large and inaccessible areas such as mountain forests due to difficulties in covering the entire (or representative) range of available species by insufficient field sampling and limitation of ground based observations to cover spatially larger extents. On the contrary, the spatial variability extracted from optical remotely sensed imagery is expected to be related to landscape diversity and is thus beneficial to cover larger extents with high temporal resolution. Therefore, remote sensing could be considered as a proxy of diversity at species level. Thus, the primary objective of this paper is to evaluate the utility of remotely sensed spectral heterogeneity information extracted from high spatial resolution optical data for detection and estimation of plant species diversity in areas affected by *Lantana camara* L., a common invasive species. A full remote sensing-based approach was used to assess plant species diversity in large and inaccessible areas affected by *Lantana camara* L., a common invasive species within the deciduous forests of Western Himalayan region of India. For this spectral heterogeneity principle was used to extract from information from the optical satellite data. Very high spatial resolution Pléiades 1A data was used to precisely map the spread of *Lantana camara* L., followed by comparing Pléiades 1A, RapidEye and Landsat-8 OLI - assessed plant species diversities in invaded areas. Results indicated that the single plant species analysis was improved by Pléiades 1A-based diversity analysis. Furthermore, higher species diversity values were observed for mixed vegetation cover. Subsequently, lower Coefficient of Variation and Renyi diversity values were observed where *Lantana camara* L. was the only species, while higher variations were observed in areas with a mixed spectral reflectance. This study adds a crucial baseline to the previous studies on remote sensing-based solutions for rapid estimation of biodiversity attributes.

\*\* Results of similar type of work has been published in peer reviewed Geocarto International Journal. Details are below:

Khare, S., Latifi, H. and Ghosh, S.K., 2017. Multi-scale assessment of invasive plant species diversity using Pléiades 1A, RapidEye and Landsat-8 data. Geocarto International, pp.1-18. DOI:10.1080/10106049.2017.1289562.