Can MODIS NDVI measurements be used to predict zebra (*Equus burchelli*) foraging patterns?

Andrew D. Zinn

Abstract

As an indicator of above ground net primary productivity, the Normalised Difference Vegetation Index (NDVI) has been identified as important tool in understanding the resource requirements and distribution patterns of large herbivores. The efficacy of NDVI as an ecological tool is however, strongly contingent upon the scale of the foraging hierarchy at which data are interpreted. In this study I investigated whether vegetation greenness, as represented by MODIS NDVI 250 m resolution imagery, is a driver of zebra (*Equus quagga*) foraging patterns at three spatial/temporal scales, namely location within sixteen day home ranges, sixteen day home range within seasonal home range and seasonal home range within total home range, during both wet and dry periods. I also investigated how tree canopy cover influences the ability of MODIS NDVI to see the greenness at which zebra respond. During the wet season, the zebra clearly demonstrated evidence of selecting for greenness and a tendency to avoid areas of high woody canopy at all three scales. Conversely, during the dry season the zebra showed no preference for greenness and no consistent preference for or against woody cover across the three scales. I also noted that despite a positive relationship between ΔNDVI and woody canopy cover, the relationship is not significant and suggests that in savanna ecosystems tree densities may not be high enough to affect overall MODIS NDVI readings.

These results indicate that zebra foraging behaviour is complex and differs according to the scale of analysis, season, and even between individual zebra herds. The ability of MODIS NDVI to elucidate zebra movements is therefore limited to specific spatial and temporal scales and should be accompanied by an understanding of non-forage related factors.