BIODIVERSITY AND SPECIES SUCCESSION OF THE BLACK VEN – SPITTLE'S LANDSLIDE COMPLEX, DORSET

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Many landslides are known locally as important landforms that may contain rare or protected species of flora or fauna. Landslides, especially active ones, may present complex, unique habitats for such species to thrive. Difficulties posed to development or agriculture also tends to reduce anthropogenic influences. Landslide terrains are often subject to careful investigation and monitoring during any remediation or chance discovery of a particular organism. However, few detailed studies have been carried out on the ecology of landslides in Britain. Thus, the ecological value of landslides is little known and the impact of remediation is not fully understood. Fundamental knowledge of the mechanisms that control the biodiversity and species succession on British landslides is lacking. This paper describes the results of a preliminary survey to examine plant species succession and biodiversity on a section of the Black Ven landslide complex in West Dorset. Eight sites were examined in areas (zones) of the complex representing different rates of movement: stable, incipient (recently active) and active. In total, 39 plant species were identified and described. The greatest species diversity was found to be present in the active zone. The active zone also coincided with the lowest ground cover. Three notable (locally important) species were found in the active zone whilst none was found in the stable zone. Although only a small-scale study, we have demonstrated that there is value in considering further research into plant succession in landslides, and that studies of unimproved habitats might usefully consider landslide activity as an important factor. This now forms part of a larger study at Portsmouth to investigate fundamental relationships between ground disturbance and ecosystem services and implications for planning and engineering decisions.

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BIODIVERSITY AND LANDSLIDES

Landscape disturbance performs an important role in the creation and maintenance of ecosystems. However, a review by Stokes *et al.* (2007) found there to be little understanding of the vegetation-landform interactions on many landslides. This study presents results of an investigation into the plant biodiversity of the Black Ven landslide complex, and an assessment of this site for future investigation.

Landslides provide important areas of disturbance on which plant succession may occur and thereby create and enhance local biodiversity. The principle of ecological succession on landslides is well established (e.g. Walker *et al.*, 1996; Stokes *et al.*, 2007; Myster and Walker, 1997) with the nature and rate of succession being determined by changes in soil type, available nutrients, light, wind and hydrology. Re-population following such disturbance is considered 'primary' where colonisation occurs on newly exposed rock or previously unpopulated soils. 'Secondary' succession occurs where an area has been previously occupied by biological communities but they have been reduced in size due to events such as forest fires, harvesting and hurricanes. Seeds and/or roots of plants survive in these areas and are able to re-populate (Walker and Moral, 2003; Mongillo and Zierdt-Warshaw, 2000). Re-population is determined by environmental conditions and the availability of propagules (e.g. seeds, spores or root fragments), germination sites and nutrient availability (Walker *et al.*, 1996; Walker, 1999). Succession is then secured as plants initiate recovery, preparing soil for further succession; stabilising soil by root growth, fixing nitrogen, increasing moisture-holding capacity, increasing temperature in the lower canopy and reducing exposure to wind (Connell and Slatyer, 1977).

In ecological terms, landslides are usually considered as relatively discrete upper, middle and lower zones (Walker *et al.*, 1996; Lundgren, 1978) based on landslide morphology and its impact on properties important for plant growth. The upper zone, typically near the head-scarp, may be characterised by partial or total removal of soil mixed with areas of little movement. Here, relatively stable, low-nutrient soils are typically colonised by slower growing, larger vascular plants. If movement is persistent, this can lead to slow colonization. The middle zone, typically associated with the landslide zone of transportation, is characterised by scouring and movement of soil in transition from above. The lower zone, analogous to the zone of accumulation, is characterised by a combination of broken plant parts and the deposition of organics and soils from upslope. Soil organic matter and nutrients are generally higher in the lower zone (Adams and Sidle, 1987; Guariguata, 1990; Lundgren, 1978). This, and a higher occurrence of propagules, often leads to more rapid succession here than elsewhere in the landslide system, typically by pioneer species (Guariguata, 1990; Myster and Walker, 1997). This simple pattern is often complicated by variations in geology, drainage, movement rates and the presence of vegetation 'islands' that remain fairly intact