



The invasive alien plant, *Impatiens glandulifera* (Himalayan Balsam), and increased soil erosion: causation or association? Case studies from a river system in Switzerland and the UK

Phil Greenwood (1), Patrick Baumann (1), Simon Pulley (2), and Nikolaus Kuhn (1)

(1) Basel, Environmental Sciences, Basel, Switzerland (philip.greenwood@unibas.ch), (2) Sustainable Agriculture Sciences, Rothamsted Research, North Wyke, UK

A monitoring investigation undertaken along the River Ibach, northwest Switzerland over the winter 2012/2013, found that riparian areas recently supporting the invasive plant Himalayan Balsam (HB) recorded significantly higher erosion rates than nearby uninvaded areas. This communication synthesises the latest findings about the influence of HB on sedimentation processes, again, from the Ibach, but also from a second river system in southwest UK. Erosion pins, a micro-profile bridge and a digital caliper were used to measure changes in soil surface profile (SSP) at selected riparian areas supporting HB plants along both rivers. Values were statistically compared against equivalent data recorded from nearby reference areas supporting mixed perennial vegetation. A comparison of source and sediment geochemistry was also undertaken on soil from HB-invaded and uninvaded floodplain areas along the Ibach, to assess the potential for identifying the extent to which either group acts as a sediment source. Erosion pin data indicate that soil loss from HB-colonised areas was significantly greater than soil loss from reference areas in two out of the four periods at the River Ibach site, and in two out of three measurement periods at the River Taw site. Colonisation of new HB sites may initially occur by hydrochorous processes, but HB plants may increase colonisation potential by trapping additional fine sediment and organic matter, including viable HB seeds. Geochemical results from the Ibach suggest that high inputs of suspended sediment originate from sources close to the river channel, but HB-invaded floodplain sources have geochemical properties that are most similar to suspended river sediment. The findings from both rivers led us to rethink our original hypothesis; that HB promotes soil erosion, to an amended hypothesis in which HB may be associated with areas where high erosion is sometimes recorded. Whilst initial colonisation may be due to hydrochorous processes, as HB becomes increasingly established, the displacement of perennial vegetation increases the risk of erosion during the winter period when live HB plants are absent. Preliminary geochemical findings of floodplain soils supporting different vegetation types along the Ibach tentatively suggest that at least some material originating from HB sites may enter the watercourse.