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Does the invasive plant, Impatiens glandulifera promote soil erosion from riparian zones? An investigation on a small watercourse in northwest Switzerland

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Impatiens glandulifera (common English name: Himalayan Balsam) was introduced into Europe in the mid-19th century, whereupon its invasive tendency has facilitated its expansion throughout many mainland European countries. Its rate of expansion can be attributed to certain lifecycle traits that allow it to become rapidly established and crowd-out many native floral species. Its preferred habitat includes damp, nutrient-rich soils that experience frequent natural disturbance, such as along riparian zones. Once present, nearby watercourses then inadvertently act as conduits that facilitate the movement of seeds downstream into un-colonised parts of a catchment. Once established, individual plants form discrete and often mono-cultural stands of dense vegetation that can typically range in area from a few m-2 to > 150 m-2. Impatiens glandulifera is cold-intolerant however, and in temperate countries rapidly dies when exposed to the first frosts of the season. Once die-back occurs, it is hypothesised that a reduction in the protection afforded to the underlying soil by the vegetation canopy will promote the mobilisation of material from areas contaminated with I. glandulifera at a greater rate that areas supporting indigeneous vgetation, due to their increased exposure to erosion processes. An investigation was conducted to test this hypothesis in a contaminated sub-catchment of the Birs River in northwest Switzerland. A measurement technique consisting of erosion pins, an erosion bridge and a digital caliper was employed to quantify changes in the soil profile, as this approach represented the least invasive way of repeatedly measuring through vegetation without undue disturbance. An initial soil surface profile was established at five contaminated sites in late summer 2012 before die-back occurred, as well as at five nearby reference sites where I. glandulifera was absent. All soil surface profiles were re-measured at ca. 25-day intervals and the average net change was quantified for each site and converted to an equivalent soil flux value (i.e. kg m-2) between re-measurements. Net soil loss from contaminated and reference sites were statistically compared in order to determine whether the difference is significant. The preliminary findings suggest that I. glandulifera does play a significant role in promoting soil loss from riparian zones.