

The Potential for the Biological Control of Himalayan Balsam Using the Rust Pathogen *Puccinia cf. komarovii*: Opportunities for Europe and North America

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Abstract

Himalayan balsam (*Impatiens glandulifera* Royle) is a highly invasive annual herb, native to the western Himalayas, which has spread rapidly throughout Europe, Canada and the United States since its introduction as a garden ornamental. The plant can rapidly colonize riparian systems, damp woodlands and waste ground where it reduces native plant diversity, retards woodland regeneration, outcompetes native plants for space, light and pollinators and increase the risk of flooding. Current control methods are fraught with problems and often unsuccessful due to the need to control the plant on a catchment scale. Since 2006, CABI and our collaborators have surveyed populations of Himalayan balsam throughout the plants native range (the foothills of the Himalayas, Pakistan and India) where numerous natural enemies have been collected and identified. Agent prioritization, through field observations and host range testing has narrowed the potential candidates down to the rust pathogen, *Puccinia cf. komarovii* Tranzschel. This autoecious, monocyclic pathogen shows great promise, not only due to its impact on the host but also due to its high specificity as observed in the field and preliminary host range testing. The aecial stage infects the hypocotyl of young seedlings as they germinate through leaf litter containing teliospores. This initial infection severely warps the structure of the developing plant. The aeciospores then infect developing leaves to produce the cycling phase (uredia). This severely affects the photosynthetic capacity of the maturing plant, with the potential of reducing seed-set. Late in the season, teliospores are produced which overwinter in the leaf litter. This paper will review the research conducted to-date, including a molecular comparison of *P. cf. komarovii* with other closely related species, the life cycle and infection parameters of the rust and an up-date on the current host specificity testing under quarantine conditions in the UK.