

# DO NATIVE BEES HAVE THE POTENTIAL TO PROMOTE INTERSPECIFIC POLLINATION IN INTRODUCED *IMPATIENS* SPECIES?

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The anthropogenic movement of species can bring together species which would be naturally separated by geographical barriers. One potential consequence is cross-fertilization and hybridisation between closely related species, which could result in novel, more versatile offspring, which could become more invasive than the parents. In order for hybridisation to occur between non-native plant species, they must flower at the same time, and their reproductive systems must allow interspecific (cross-species) pollen transfer. In addition, animal-pollinated species require appropriate flower visitors who include both species in their diet and who switch between them during a single foraging bout, thus mediating interspecific pollen transfer. Moreover, interspecific pollen must be able to germinate on the stigma and grow a pollen tube through the style, fertilize the ovule and form a functional seed, and the seed must be able to germinate and grow into a new plant.

The genus *Impatiens* contains several biotically pollinated species which vary in their invasive capacity throughout their introduced range. The most common *Impatiens* species in Ireland, Britain and continental Europe is the aggressive invader *I. glandulifera*. Its less aggressive congener, *I. balfourii*, has spread to southern and central Europe. These *Impatiens* species have similar ecological requirements and have been observed to grow together in the same habitat. It is possible that *I. balfourii* is only in an early stage of invasion and may become more established and widespread in the future. This might result in the frequent occurrence of this species in habitats already invaded by *I. glandulifera*. We investigated potential for interspecific



Fig. 1. *Impatiens glandulifera* (the larger species) and *I. balfourii* growing and flowering together in Saint Christophe en Oisans (Rhône-Alpes, Isère, France), August 2010. Photograph by P. Ugoletti.

pollen transfer between *I. glandulifera* and *I. balfourii*. We examined behaviour of pollinators, including their foraging preferences and whether they switched from one species to the other. In addition, conspecific (same-species) and interspecific pollinations were done by hand and seed production and the germination success of hybrid seeds were assessed.

Both *I. balfourii* and *I. glandulifera* had relatively long flowering periods which mostly overlapped. Visitors included *Apis mellifera*, *Bombus hortorum* and *Bombus pascuorum*, which switched from flowers of one species to the other during a single

foraging bout. Since pollen placement on the bees is identical for both *Impatiens* species, there is a high probability that a switch between species by a foraging bee results in interspecific pollen transfer. *Impatiens glandulifera* attracted more pollinators (perhaps because of the large nectar and pollen reward of this species), which could promote its reproductive success and invasion capacity.

Seed production following interspecific pollen deposition was lower than after conspecific crosses, suggesting that interspecific pollen deposition would reduce the reproductive success/output of plants. Hybrid seeds were only able to germinate when *I. glandulifera* was the mother plant but the germination rate was very low (1.1%). Seeds produced from

interspecific crosses mostly failed to germinate, suggesting the presence of post-fertilization reproductive barriers, which make it unlikely that hybridisation between these two species will result in a more aggressive invasive hybrid taxon. The probability that seedlings originate from hybrid crosses is much lower than the chance that seedlings originate from conspecific crosses. Nevertheless, because of the prolific reproductive output of these species we would not exclude the possibility that some viable hybrid seeds could be formed and become established. Further investigation of the fitness of hybrid seeds is required as hybridisation may allow *Impatiens* to exploit different ecological niches.