

What is the Threat from Invasive Knotweed Seed Production?

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Japanese Knotweed

Polygonum cuspidatum

- Japanese knotweed is an introduced perennial species that has become a major weed of riparian areas in many parts of the US and Canada
 - Primarily propagated **vegetatively**
 - Japanese knotweed is **dioecious**
 - Most (all?) plants in PNW produce **only female flowers**
 - Will produce seed if pollination occurs
 - Excellent bee forage

Three Other “Big” Knotweeds

- **Giant knotweed (Sakhalin)**, *Polygonum sachalinense*
 - Flowers are perfect and fertile
 - Reliably produces seed
- **Bohemian knotweed**, *Polygonum xbohemicum*
 - PNW population first described in 2004, hybrid between giant and Japanese knotweed
 - Flowers are presumably not fertile (plants dioecious?)
 - The most widespread of these taxa in the PNW (?)
 - Rarely produces seed
- **Himalayan knotweed**, *Polygonum polystachyum*
 - Flowers are perfect and fertile
 - Less widespread than giant in western WA and OR
 - Does not produce seed in PNW (?)



Female Japanese knotweed



Male (?) Bohemian knotweed

Perfect flowers on
giant knotweed and on
Himalayan knotweed



Photos from WA State Noxious Weed Control Board

Japanese



Bohemian



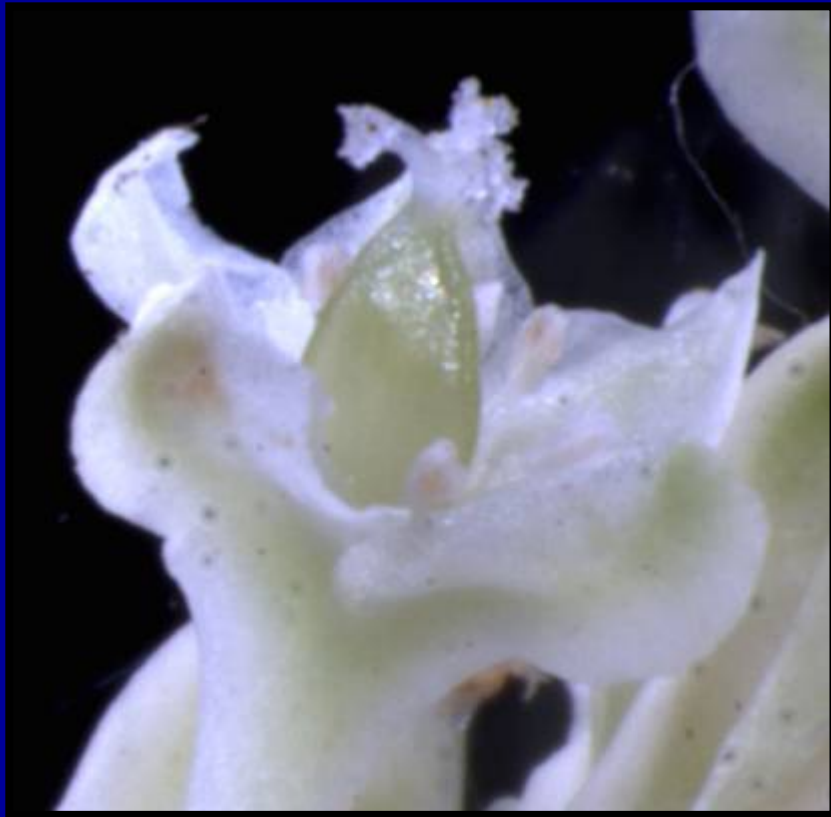
Japanese



Bohemian



Giant flower



Giant seed



Giant fruit



Japanese fruit



Knotweed Seed Production

- Forman and Kesseli (2003*) tested **Japanese knotweed seed** from several sites
 - **1998**: Fifteen plants at four sites near Milton, Dorchester, and Walpole, MA
 - **0 to 70%** germination
 - **10%** mean germination
 - **1999**: Eleven plants at two sites in Braintree and Boston, MA
 - **0 to 100%** germination
 - **63%** mean germination

Knotweed Seed Production

- Pacific Northwest data
 - 2003-04: Japanese knotweed seed from two plants near Acme and Marblemount, WA
 - Acme seed approximately 30% germinable
 - Marblemount not directly tested, but seedling emergence was low
 - 2003: Giant knotweed seed from six plants near Quilcene, WA
 - Approximately 60% germination

Knotweed Seedlings in the Wild?



Giant knotweed shoot
from a rhizome



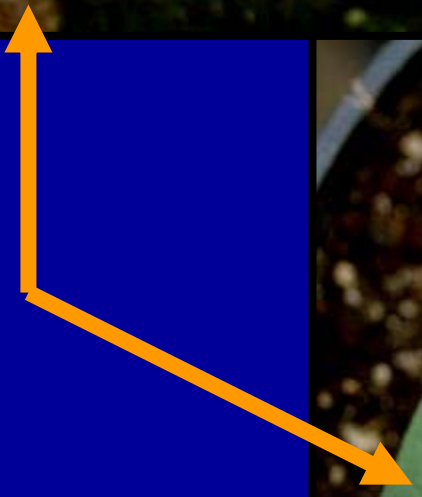
Cotyledons are narrow and long



Photos from Laurel Baldwin, Whatcom County Noxious Weed Control Board



Giant
knotweed
seedlings



Knotweed Seedling Establishment

- Forman and Kesseli reported on three Japanese knotweed sites:
 - Site #1: Neponset River, Milton, MA
 - 2001
 - First-year seedlings emerged
 - Seedlings were overwhelmed by other vegetation and presumably died at about four weeks

Knotweed Seedling Establishment

- Forman and Kesseli reported on three Japanese knotweed sites (cont.):
 - Site #2: Neponset River, Dorchester, MA
 - 2001:
 - First-year seedlings emerged
 - Very dry site, so growth was very slow (still cotyledon-stage at four weeks)
 - A few seedlings produced one leaf before being buried by bike path construction

Knotweed Seedling Establishment

- Forman and Kesseli reported on three Japanese knotweed sites (cont.):
 - Site #3: Monatiquot River, Braintree, MA
 - 2000:
 - Branches from female plants break and fall to base of hill
 - 2001:
 - 100+ first-year seedlings, many of which lost their cotyledons and produced up to five leaves and short rhizomes
 - 2002:
 - Four second-year seedlings broke bud, three were stunted and one was normal, but all continued to grow
 - 2002:
 - There were also additional first-year seedlings

Knotweed Seedling Establishment

- Pacific Northwest

- 2004:

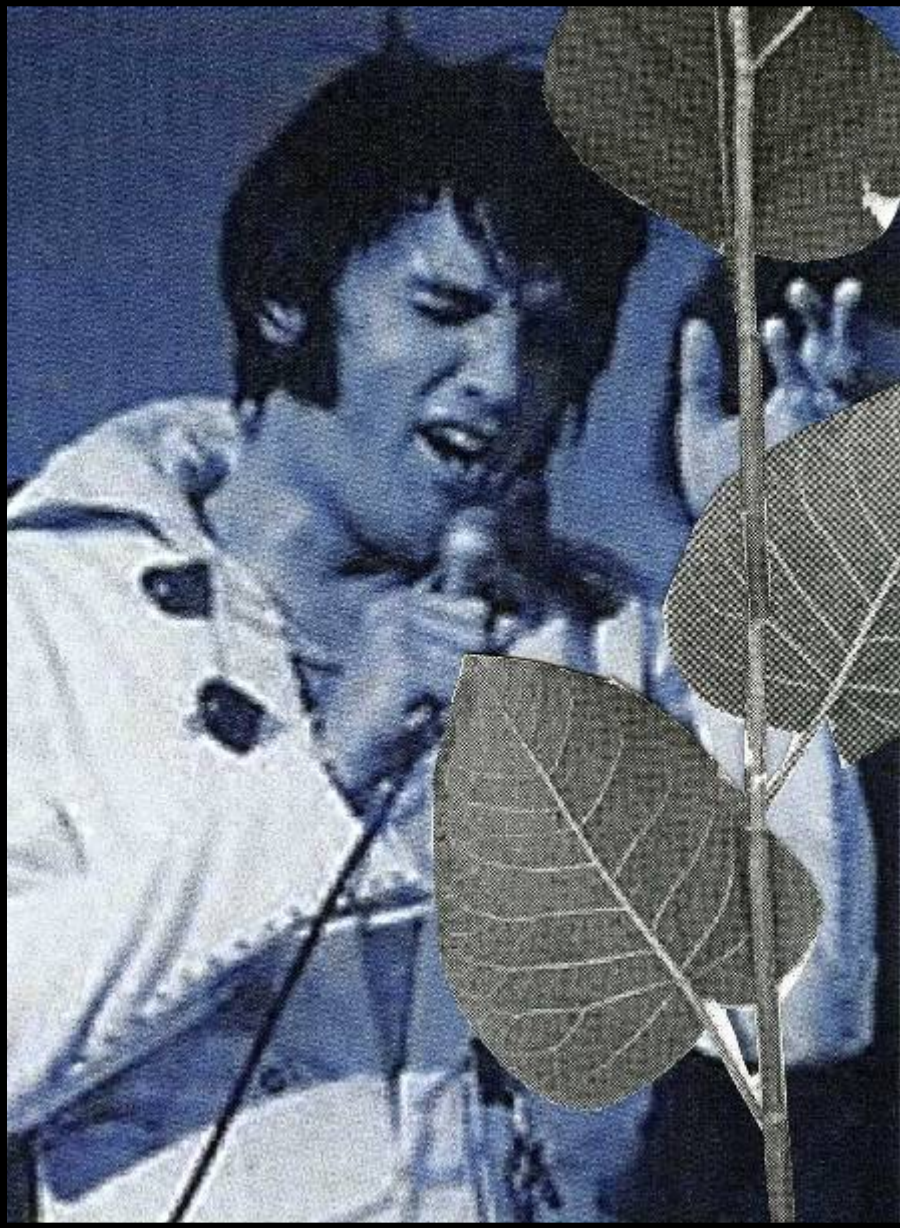
- A few giant knotweed seedlings (?) found on a gravel bar on the Big Quilcene River
 - Two- to three-inch tall plants did not appear to come from a rhizome, although cotyledons were not present
 - Most small plants were attached to rhizomes from scattered plants on the bar or rhizome fragments from who knows where

- 2004:

- Bohemian (?) knotweed seedlings in Whatcom County, WA (intentional planting in nursery from seed collected in fall of 2003 on the Nooksack River near Bellingham)

What Is The Threat From Seed?

- We know **some seed is produced**: giant and Bohemian; other hybrids (?)
- Seed germination ranges from **0% to 60%** (as high as 100% has been reported)
- Resultant seedlings appear to be **poor competitors** with other vegetation and **have high seedling mortality**
 - In MA, first-year seedlings needed to achieve **five leaves** for winter survival
 - Hybridization may result in plants with **greater vegetative reproductive vigor or greater aggressivity**
- If seed is likely to be produced, control of parent plants should be done **prior to flowering**



At the reception tonight, please enjoy the cinemagraphic excitement of the 1964 "B" movie adaptation of the classic fairy tale *Elvis Climbs the Giant Knotweed*



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