Iris pseudacorus germination resilience to high salinity exposure supports risk of invasive spread in tidal wetlands

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Context

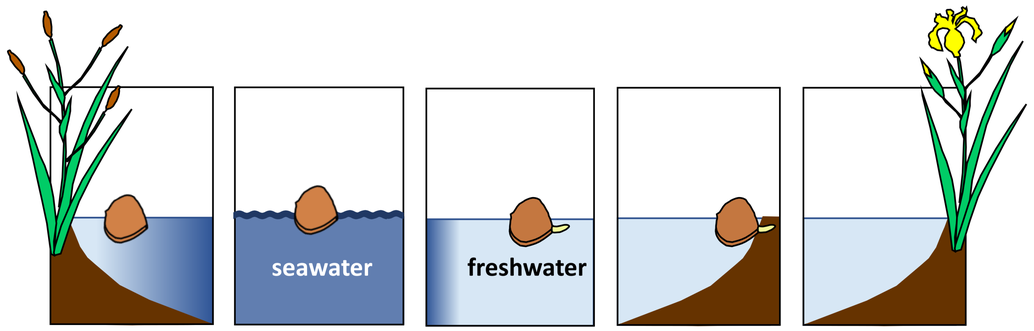
- Estuarine systems are threatened by biological invasions and climate change
- Sea-level rise alters salinity and inundation regimes
- Wide range of aqueous salinity concentrations in estuaries: affects the establishment of plants through their germination responses

► Understanding recruitment processes is central to plant conservation strategies and invasive plant management

- *Iris pseudacorus* (yellow flag iris), native to Eurasia:
  - Invades and spreads in California wetlands
  - Reproduces mostly from seed
  - Seeds are very buoyant

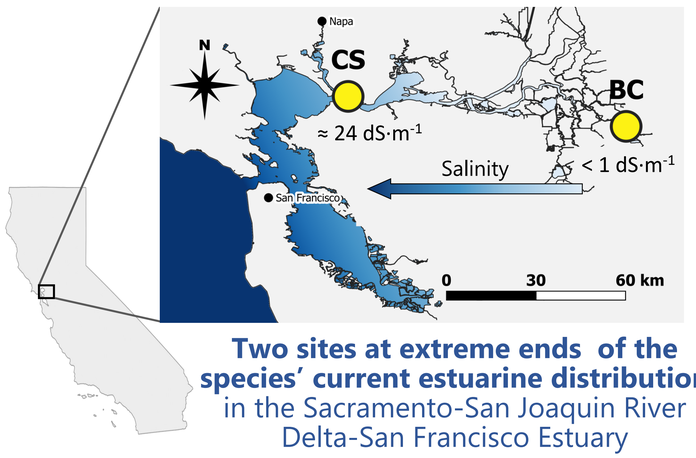
Aim — Determine effects of salinity and water levels on the germination of *I. pseudacorus* seeds from invasive populations at extreme ends of an estuarine gradient

- Salinity levels >12.5 dS·m^{-1} inhibited germination
- Seeds exposed to seawater for 55 days germinated once exposed to freshwater



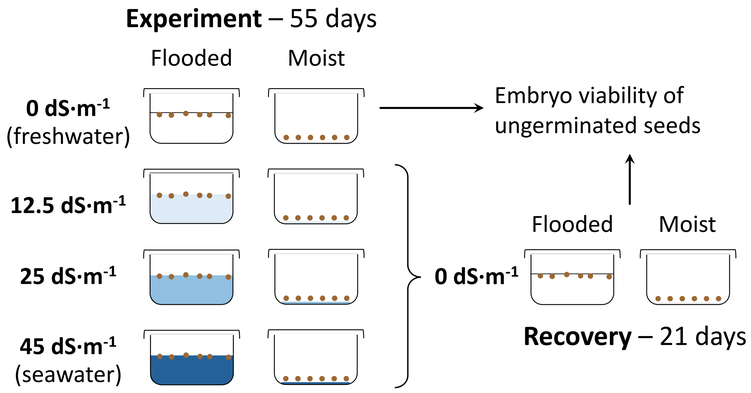
High aqueous salinity exposure does not preclude germination of invasive *Iris pseudacorus*

Materials and Methods



Two sites at extreme ends of the species' current estuarine distribution in the Sacramento-San Joaquin River Delta-San Francisco Estuary

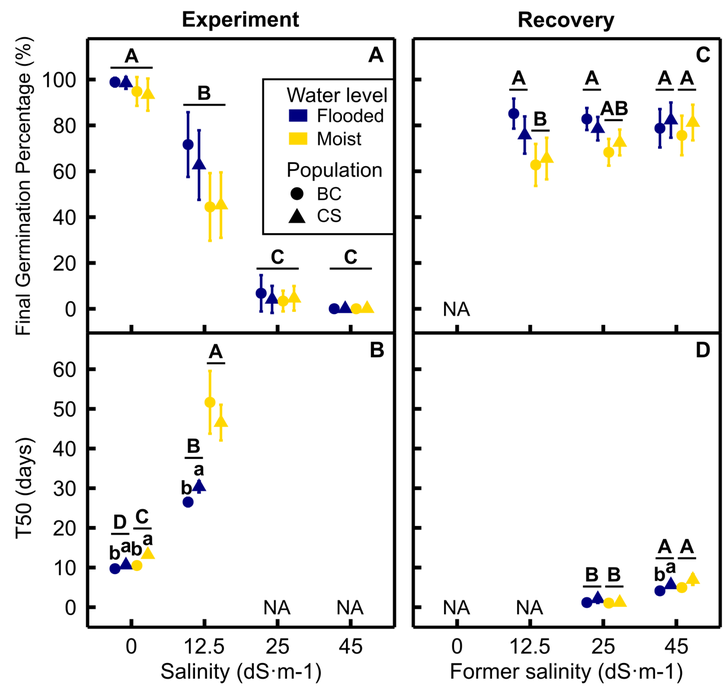
2 populations x 4 salinities x 2 water levels x 6 replicates tested in greenhouse conditions



Results

Experiment

- Greatest germination in freshwater
- Very few seeds (1-3) germinated at 20 and 35 dS·m^{-1}
- The lower the salinity and the greater the water level, the faster the germination
- In some conditions, seeds from BC reached 50% of germination sooner than those from CS.



Recovery

- Good germination recovery from exposure to the highest salinity levels
- Germination percentages still significantly lower than those of seeds initially exposed to 0 dS·m^{-1}
- Seeds initially exposed to 45 dS·m^{-1} recovered faster than those initially exposed to 25 dS·m^{-1} (2 vs 5 days).

Thicker seed coats in the maternal environmental with higher salinity (CS 6% thicker than BC) may explain the slower germination of this population

Invasive populations of *I. pseudacorus* can colonize new sites following potentially long-distance dispersal of buoyant seeds with currents