

Restoration and Recovery for Federally Endangered Harperella (*Ptilimnium nodosum*)

Elizabeth Fortson Wells
Department of Biological Sciences
The George Washington University

Harperella is known from only 14 sites, at the edge of small streams or ponds in the southeastern United States.



Harperella is a slender biennial plant with an ability, very unusual in its family, to produce plantlets instead of flower branches at the nodes, where leaves are attached to the main stem.



Harperella is a member of the carrot family that resembles a grass until it flowers, beginning in July.



Harperella in Sidling Hill Creek, 2001

Goals of this study were to determine

- The ecological requirements and life cycle details of Harperella in the wild
- The germination requirements of the seeds in the greenhouse or growth chamber
- The time of year when germination and seedling establishment occurred in the wild
- The role of the plantlets borne in the nodes in the life cycle
- Whether new populations of this plant could be established in the wild by re-introducing seedlings germinated in artificial conditions

Harperella's natural habitat is occasionally flooded gravel bars in full sun, like this site in Sidling Hill Creek, Maryland



One of 12 re-introduction sites on the Potomac River in western Maryland. Upper inset: week-old seedling
Lower inset: older seedlings planted into the wild



Germination observations

- Previously, nothing was known about the time of year when Harperella germinated or the conditions of temperature and daylength required for germination.
- Current experiments in the greenhouse and growth chamber have established that Harperella germinates in late summer and fall, as soon as the seeds mature on the plant and fall off.
- Seed germination has been observed in the wild to occur on soil and floating in water from August to October.

Life Cycle Observations

- Harperella plants require full day-long sun to survive.
- Major floods from August through October can prevent seedling establishment at their original gravel bars as seeds and seedlings are washed away.
- Seeds and young seedlings may temporarily establish populations downstream in high-velocity flood streams or in shade; plants may not long survive natural introductions to unsuitable sites.

Further Life Cycle Observations

- High water allows plantlets in nodes to develop more vigorously than during low water; these plantlets are clones which allow the genotype to survive through the winter and into the following year even when all the seeds are lost to floods.
- The plantlets produced in the nodes may be established as free-living clones of the parent plant under some circumstances.
- The parent plant dies each year.

Re-introduction efforts

- Attempts to establish new populations on the sunny gravel bars of the main stem of the Potomac River have failed.
- Attempts to establish new populations on the edge of ponds within the C&O Canal NHP have been successful, but suffer from trampling by deer.
- A population has been successfully established in an artificial pond in my back yard in Fairfax County.
- A population will be established at Kenilworth Aquatic Garden in NE Washington during the summer of 2007.

Acknowledgements

- Funded by National Park Service
- Diane Pavek, Research and T&E Coordinator, Botanist National Capital Region, NPS
- Assistants:
Catherine Oberfoell Mark Patridge
Karen Redden Avary Kent-Smith
Charlotte Marvil Susannah Leahy
Anne Truong