

The study addressed the ecology and life cycle of two charophyte species, which are both at risk of extinction and on several Red Lists in Europe. Populations of *Nitella opaca* and *N. gracilis*, sometimes occurring together in three wetland ponds, were monitored for several years, and environmental data were also recorded. The pattern and timing of emergence (new shoots) and maturation of the sexual organs (antheridia, oogonia, and ripe oospores) were determined on plant samples collected regularly. The species phenophases were related to the environmental data. The results showed that species distribution can be linked to the water calcium content, a parameter that most differed in the three ponds. *N. gracilis* developed population only in ponds with very low calcium concentrations, whereas *N. opaca* had a wider tolerance. Following a pond bed air exposure in previous year, dense populations of *N. opaca* and *N. gracilis* were observed. None, or only a few individuals, were found when the waterbodies remained flooded the whole preceding year. Light and temperature affect differently the emergence of sex organs and the maturation of oospores. Both species differed in the timing of their phenophases. *N. opaca* appeared in March, reproduced and disappeared in July. *N. gracilis* was generally observed later in spring, and after full reproduction, the plants started a second cycle in late summer, while new oospore germination occurred. *N. gracilis* was perennial and reproduced all year long. Taking these results into account will help to design conservation plans for *N. opaca* and *N. gracilis*.

