



Overdose kills specialist



The flowering rush, one of the plant species threatened with extinction

By reporter René Didde

Amsterdam – The steady increase of phosphate levels in the environment is threatening dozens of rare plants that are specialised in surviving in phosphate-poor soil. This is the finding of Dutch research on 491 plant species in nine European countries and in Siberia. The article on this research was published in *Nature* today.

Phosphate is a nutrient for plants. In phosphate-poor regions, such as wet grasslands, humid dune slacks, peat moors and bogs, plants have adapted to the lack of nutrients over time. “We discovered that they deal with the scarcity by being very frugal with their reproductive activity,” says Martin Wassen of the Copernicus Institute of Utrecht University.

Reproduction and cell division are very costly in terms of energy. These plants economise on their flowering and flowering duration, and produce few seeds. They also are only able to transport the seed over a short distance. “Out of necessity they give the seed a limited quantity of nutrients and so are giving their seedlings a rather less than promising start in life,” explains Wassen.



The increase of phosphate in the environment therefore poses a threat to these plants. The specialised plants have no modus to deal with the sudden overdose and are supplanted by other, opportunistic plants.

Excessive fertilisation

Farmers are the guilty party. Since the 1960s, as farming intensified and scale increased in the agriculture sector, much agricultural land has been loaded with phosphates. “Farmers in western Europe have been obliged to follow a fertilisation policy that did reduce outrageously excessive fertilisation,” says Wassen. Unlike nitrogen, the other trouble-making substance, phosphate forms a very strong bond, so that it is fixed in the soil. “It will take decades for polluted areas to be restored to normal values.”

The researchers from among others Utrecht University, VU University Amsterdam and Wageningen University looked at more than 491 plant species in 599 nutrient-poor nature reserves. In western European countries, 170 of these plants are on the “red list” of endangered species, says Yuki Fujita, first author of the *Nature* article. This includes species such as parnassia and flowering rush (photo), orchids like the lesser butterfly orchid and the marsh helleborine, and numerous sedge varieties, such as the lesser panicked sedge.

National Ecological Network

Researchers recommend taking measures such as further diminishing the use of fertiliser, especially in emerging agriculture nations like Poland and Russia. Wassen: “Our research shows that an interconnected nature infrastructure of connected nature reserves like the National Ecological Network (EHS) is not an unnecessary luxury. Many of these phosphate-poor regions are small to begin with and becoming increasingly fragmented because of spatial planning policy. The plants are trapped, as it were. By connecting them they can survive.”