

## CLONAL VARIABILITY OF THE COMMON REED, *Phragmites australis*

C. Lambertini (°), H. Brix (\*), M. Speranza (°)

(°) *Dipartimento di Scienze e Tecnologie Agroambientali, Università degli Studi di Bologna*

(\* *Department of Plant Ecology, University of Aarhus (Denmark)*

*Phragmites australis* (Cav.) Trin ex Steudel is a cosmopolitan big grass species, present in a wide climate range (from the tropics to the latitude of 70° N) and potentially of great economic and ecological value. *P. australis* is a typical competitor: thanks to its efficient carbon assimilation metabolism and agamic spread by rhizomes, it can constitute virtually monospecific stands that often dominate wetland ecosystems. *Phragmites*-dominated wetlands are among the most productive ecosystems in the world and host many animal species, in particular birds. Some of the largest *P. australis*-dominated ecosystems occur in Europe (the Danube Delta, Lake Fertò) where there is a long tradition of reed-based economical activities, such as roofing, fencing, insulation and thatching material, cardboard and paper manufacturing. In recent years the exploitation of *P. australis* in the context of sustainable economic development has given rise to considerable interest. Wetlands dominated by *P. australis* have a great economic value for tourism (bird-watching and hunting). The practices of planting reed stands along rivers to protect the banks from erosion and the use of reeds in phytodepuration systems (natural and constructed wetlands) are spreading from Northern Europe to all over Europe. Also the use of reeds as energy crops is exploited at an experimental scale. Treatment wetlands have proven to remove biodegradable and refractory organics, nutrients, metals, pesticides, suspended solids and pathogens from polluted water and have been widely applied to treat municipal and industrial wastewater. Many projects are investigating the phytoremediation performance of this plant species also in nonpoint sources of discharges, especially from agricultural lands, urban areas and mines. In addition to water pollution control, the positive results provided by the first experimental stands for biomass purposes open a new research field in the alternative energy sources.

Studies on the morphological and genetical variability of *Phragmites australis* are important to identify suitable local clones and/or ecotypes to be implemented in various environmental applications. In the Bologna Po Plain there is a large number of wetlands dominated by *P. australis*. The morphologic and genetic variability of the populations in eight wetlands of the Bologna Po Plain were studied. Sample of 100 shoots, in groups of 10 specimens, were collected from 10 different and distant points of the same wetland area. The following biometric parameters were measured for each shoot: height, diameter, number of nodes, total weight of the leaves, weight of the stem, total leaf area and, on the basis of these data, other “indirect” characters were estimated.

The interpopulation morphologic variability did not in general differ significantly from the intrapopulation variability of the most variable populations. A small number of morphotypes common to all the areas and a few more differentiated and less frequent morphotypes were identified. Samples of each morphotype were then analysed for genetic variability using RAPD (Random Amplified Polymorphic DNA) to investigate the clonal structure of the population and the relationship between the morphologic and genetic variability. The intrapopulation genetic variability was quite small, whereas the interpopulation genetic variability was greater. The genetic approach detected a higher variability than revealed by the morphological parameters. The Lei and Li’ genetic similarity coefficient identified clones for each population that could be related to the intrapopulation morphotypes. The results achieved so far indicate that the *P. australis* populations present in the investigated area show a certain variability that is worthy of further study in order to identify clones of environmental interest and particularly applicable to the various applied sectors (phytodepuration, biomass production, ecological engineering).