NITROGEN AS A KEY NUTRIENT AMONG POPULATIONS OF *PHALARIS ARUNDINACEA*

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Currently bigger attention started to be paid to the quality of inland waters, which receive substantial nutrient inputs such as nitrogen (N). Although data regarding riparian species response to pollution by nutrients are very poor in Lithuania. Among water macrophytes of our country, reed canary grass (*Phalaris arundinacea* L.) is a common and frequently occurring species. Due to huge biomass much attention is paid to this plant for its use as biofuel, for bioremediation, for forage or ornamental purposes.

We investigated leaf N concentration differences and compared it among populations of *P. arundinacea* growing in different sites of Lithuanian rivers. Our study involved over 60 populations, sampled on Nemunas, Venta, Lielupė and coastal river catchments of Lithuania. Nitrogen concentrations were determined using Kjeldahl method and expressed as percentage of dry mass (d. m.) of the leaf tissue.

Mean leaf N concentration for all populations of *P. arundinacea* was 3.50 % d. m. The lowest N concentration (3.03 % d. m.) was documented in population sampled on the bank of the river Merkys, while the highest (3.69 % d. m.) was observed in population near the Neris river, the most contrasting ones differed by 1.32 times ($p < 0.05$). Leaf N concentrations of *P. arundinacea* were compared to the same parameter of some other riparian plant species: in respect to N concentrations, *P. arundinacea* was of intermediate position: higher than *Lythrum salicaria* or *Stuckenia pectinata, although lower compared to Bidens frondosa*. *Phragmites australis, Nuphar lutea or Echinocystis lobata*.

To determine the potential impact of the rivers and their environment on the N concentration in the plant, populations of *P. arundinacea* were classified into five groups according to: the land cover and use type of the areas neighboring riverbank (based on classification system of COoRdinate Information on the Environment; CORINE) [1].

Agricultural areas near the *P. arundinacea* sites were the most common type of the land use, accounting for 72 % (44 of all populations) cases. Mean leaf N concentration in populations near the riverbanks of the agricultural areas was 2.83 % d. m. Forestry areas near the *P. arundinacea* sites were the less common and constituted 11 % (7) of all populations, where mean leaf N concentration was 2.72 % d. m. Mean leaf N concentration in populations near the artificial areas was 3.17 % d. m.

According to the occurrence of populations in the river fragments of different state, defined by Water Framework Directive, *P. arundinacea* was described as very resistant species to pollution [2]. The biggest number (57 %) of populations, were collected in the South-East part of Lithuania representing the least polluted rivers (0.6–2.1 mg N L^{-1} in 1992–1996) [3]. In our case reed canary grass growing near the river segments of poor (14 % of populations) or bad (3 % of populations) condition, did not contain significantly higher leaf N concentrations.

The largest number (49 %) of populations were located along medium size (100-1000 km^2) rivers, the smallest number (13 %) – along extra-large size (>10000 km^2) rivers. Banks of the small size rivers were missing among sites of *P. arundinacea.* There was no significant leaf N concentration between the populations along the rivers of the different size.

The highest number (79 %) of populations for *P. arundinacea*, were located along the natural river segments, where mean value of leaf N concentration of populations was 2.91 % d. m., while N concentration of populations from regulated river parts was 2.73 % d. m. No significant differences of leaf N concentrations were found between populations in regulated and natural river segments. Overall, our results revealed that leaf N concentration of *P. arundinacea* populations of Lithuania were not stronger influenced by the river segments exposed to different anthropogenic effect.

[1] CORINE Land Cover Nomenclature Conversion to Land Cover Classification System (2006). http://www.igeo.pt/gdr/pdf/CLC2006_nomenclature_addendum.pdf

[2] Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy. The Official Journal of the European Communities, L 327/1–327/72 (2000).

[3] R. Tumas. Regularities of river water quality under the interactions of physical geography factors and farming intensity. Proceedings of Nordic Hydrological Conference. Helsinki, Finland, 100–108 (1998).