show the S-haplotype of the mtDNA. This is probably in consequence of androgenesis and egg-capture between the different morphotypes, resulting in several distinct androgenetic species with distantly related mtDNA genomes and divergent morphologies (Hedtke et al. 2008; Pigneur et al. 2011). The cytonuclear mismatches were detected at some of the locations where different lineages occur in sympatry (Pigneur et al. 2014).

Consequently, the presence of cryptic hybrids between the R, Rlc and S lineages can be assumed. The possibility of a peculiar hybridization through androgenesis between forms suggests that invasive lineages of Corbicula may represent a polymorphic species complex (Glaubrecht et al. 2003; Pigneur et al. 2011). Future studies will include checking of distribution of the Corbicula species in the basin of the River Northern Dvina and estimating of possible ecological effects of these invaders on native biodiversity and ecosystem functioning. Additionally, the molecular genetic features of these clams need further investigations.

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THE IMPACT OF INVASIVE *ACER NEGUNDO* LEAF LITTER ON MICROBIAL CHARACTERISTICS IN THE COASTAL ZONE OF THE RIVER NERIS

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The invasive to Lithuania boxelder maple (*Acer negundo* L.) has become commonly distributed after its escape from cultivation in 1963 (Gudzinskas, 1998) and rapidly colonizes the rivers coasts, which are dominated by native black alder (*Alnus glutinosa* (L.) Gaertn.). The leaf fall of trees occur in different ways. *A. glutinosa* leaves fall gradually within approximately one–two month, while *A. negundo* almost at once with the occurrence of early autumnal frosts (our observation), forming a thick layer of leaf litter, which creates particularly favourable conditions for biodestruction. In this connection, the study of the impact of *A. negundo* habitats on the ecotones of rivers becomes relevant in terms of enrichment of the coastal zone by the substances from decomposing leaves of this tree.

During the ice-free seasons in 2013–2014, the physicochemical and microbial investigations were carried out in different coastal zones of the River

Neris: without trees (open zone), *A. negundo* leaf litter and deciduous trees, mostly *A. glutinosa*, leaf litter buffer zones, respectively.

The coastal area of boxelder maple habitat was swampy, without grass cover and riparian bottom sediments were covered with gray silt. The bottom sediments of autochthonous trees habitat zone were composed of gray sand with impurities of silt, while bottom sediments without biomass remains were in open, without trees coastal zone. It was noticed that in spring boxelder maple leaf litter was almost decomposed, contrary to little disintegrated from last season leaf litter of black alder. In bottom sediments of these zones, different concentrations of total phosphorus, nitrogen and organic carbon were determined with higher content of nutrients in trees leaf litter buffer zone, mostly in boxelder maple.

The total amount of bacteria, heterotrophic and cellulose-degrading bacteria colony numbers were on average 1.5–2.0 times higher in bottom sediments of tree leaf buffer zones than in open section of the river. During spring leaf litter decomposition (in March) and leaf fall time (in October), the higher amount of bacteria were determined in bottom sediments of boxelder maple leaf litter accumulation zone than in black alder habitat. Despite the water aeration near the bottom, where O_2 concentration was at least 8.0 mg/l, during all seasons the intensive development of anaerobic sulfate reducing bacteria (SRB) in bottom sediments took place, what indicates the lack of aeration in deeper layers of sediments due to accumulation of organic detritus. The highest SRB number was determined in autochthonous trees and especially *A. negundo* leaf litter buffer zones, where in organic matter mineralization anaerobic processes dominated – from 66 % to 96 % of the total destruction, respectively. According to the rates of CO_2 emission from silt cores into the water, the benthic microflora was most active in autumn: the rates of OM decomposition varied from 1060 mg (open zone) to 2520 mg of inorganic $C/m^2 \cdot day^{-1}$ (*A. negundo* leaf litter buffer zone). Under the concentration of sulfates 22–37 mg $S/SO_4/dm^3$, the amount of OM stimulate its terminal anaerobic destruction process – sulfate reduction (SR). The most intensive this anaerobic process was determined in bottom sediments in autumn after leaf fall. The intensity of SR in bottom sediments of boxelder maple habitat amounted to 0.86 $mgS^{2-}/dm^3 \cdot day^{-1}$. In autochthonous trees habitat zone, this process was weaker (0.60 $mgS^{2-}/dm^3 \cdot d^{-1}$.), while in the open littoral zone it amounted only by 0.10–0.15 $mgS^{2-}/dm^3 \cdot d^{-1}$. The amounts of the terminal products of sulfate reduction (hydrogen sulfide and acid soluble sulfides) varied from 32 mg (open zone) to 212 mg (deciduous trees leaf litter buffer zone) and to 268 mg/dm^3 (*A. negundo* leaf litter buffer zone). Though significant oxygen levels were assessed near the bottom, high enough amount of hydro-

gen sulfide accumulated in bottom sediments of leaf litter buffer zones during autumn, especially in *A. negundo* leaf litter zone.

Generally, differences in the amount of microorganisms and intensity of organic matter mineralization processes in *A. negundo* and autochthonous trees leaf litter buffer zone suggest that the replacement of riparian native species by invasive may cause changes in organic matter processing and bioproductivity in the littoral zone of the water body. Eutrophication and siltation processes in *A. negundo* leaf litter buffer zone may occur faster than in other river coastal areas due to the peculiarities of leaf fall and more intensive OM mineralization processes.

Gudzinskas, Z. Conspectus of alien plant species of Lithuania. 8. *Aceraceae, Balsaminaceae, Elaeagnaceae, Geraniaceae, Hippocastanaceae, Linaceae, Lythraceae, Onagraceae, Oxalidaceae, Rutaceae*, and *Vitaceae*. Botanica Lithuanica? 1998. 4 (4). P. 363–377.

GENETIC STRUCTURE OF THE INVASIVE MUSSEL *DREISSENA POLYMORPHA* (PALLAS) FROM LATVIAN LAKES

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Zebra mussels are alien invaders that have rapidly become established in European waterbodies. *Dreissena polymorpha* is first recorded in Latvia since 1942 (Pilāte et al., 2014). Mussels are significantly impacting aquatic ecosystems, altering nutrient flow, decimating native mussel populations.

Mollusc *Dreissena polymorpha* is characterised by a wide genetic variation which enables it to spread over large areas and occupy a variety of habitats.

Mussels were investigated from 4 Latvian lakes, namely Svente, Riču, Drīdzis, and Rāzna. This study examined the invasions genetic diversity among different populations of zebra mussels using DNA microsatellite analysis. 6 polymorphic microsatellite loci for dreissenid mussels were developed and tested (DpolA6, DpolB9, Dpo101, Dpo221, Dpo260 and Dpo272). The within population genetic variation indices; number of alleles (NA), frequencies of alleles per locus, expected (He) and observed (Ho) heterozygosity, and the fixation index (Fst) were estimated in GenAlEx 6.41.

Allelic diversity was high at all described loci, ranging from 10 to 15 alleles per locus. As ideal populations do not exist in nature, some deviations from the expected heterozygosity level are considered normal for a stable natural population. Such deviation from the expected level of heterozygosity