Alien impact 3. Impact of HIPS on ecosystem functioning: productivity, nutrient cycling and soil biota

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We studied the impacts of invasive plant species on soil chemical properties, productivity and nutrient uptake. We applied a comparative approach (invaded vs. adjacent uninvaded plots) in 36 sites invaded by one of the seven most invasive alien plants in Belgium (*Fallopia japonica, Heracleum mantegazzianum, Impatiens glandulifera, Prunus serotina, Rosa rugosa, Senecio inaequidens, Solidago gigantea*). Invasive plants systematically enhanced nutrient uptake and productivity. Their impact on soil properties strongly varied depending on site but in a predictable way (increased nutrient availability in sites with low initial nutrient availability and the opposite pattern in initially rich soils). This suggests that exotic plant invasion could lead to the homogenization of soil properties across invaded landscapes. More recently, with the project ALIEN IMPACT, we focused on the impact of *Fallopia* on nitrogen cycle and on implicated soil biota. *Fallopia* tends to conserve nitrogen in the ecosystem. The decomposition of its litter is slow and immobilizes a large amount of inorganic N, reducing its availability in soil. The internal cycling of N in *Fallopia* was found exceptionally efficient (80 % of the N present in aboveground biomass in summer is translocated to the rhizomes before leaves abscission). This process makes the plant relatively independent from soil N mineralization and contributes to the high productivity of the species. *Fallopia* is also able to decrease N losses from the ecosystem by decreasing nitrification and denitrification intensity in sites with high nitrification potential. Finally, *Fallopia* also impacts soil fauna (lower invertebrate density and altered composition of the community). These changes are mainly explained by a reduction of food diversity and a change in soil microclimate. –

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