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Invasion Biology Meets Parasitology: A Case Study of Parasite Spill-Back with Egyptian *Fasciola gigantica* in the Invasive Snail *Pseudosuccinea columella* inhabiting *Eichhornia crassipes*.

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Abstract

The liver fluke *Fasciola gigantica* is a trematode parasite of ruminants and humans that occurs naturally in Africa and Asia. Cases of human fascioliasis, attributable at least in part to *F. gigantica*, are significantly increasing in the last decades. The invasive snail species *Galba truncatula* was already identified to be an important intermediate host for this parasite and the efficient invader *Pseudosuccinea columella* is another suspect in this case. Therefore, we investigated snail diversity and prevalence of trematodes in irrigation channels in Fayoum governorate in Egypt, with focus on *P. columella* and its role for the transmission of *F. gigantica*. Species were identified morphologically and by partial sequencing of the cytochrome oxidase subunit I gene (*COI*). Among all 689 snails found at the 21 sampling sites, *P. columella* was the most

abundant snail with 296 individuals (42.96%) and it was also the most dominant species at 10 sites. It was not found at 8 sites. Molecular detection by PCR and sequencing of the ITS1-5.8S-ITS2 region of the ribosomal DNA (rDNA) revealed infections with *F. gigantica* (3.38%), *Echinostoma caproni*(2.36%) and another Echinostome (7.09%) that could not be identified further according to its sequence. No dependency of snail size and trematode infection was found.

Both high abundance of *P. columella* in the Fayoum irrigation system and common infection with *F. gigantica* represents a case of parasite spill-back from the introduced *P. columella* to the human population, explaining at least partly the observed increase of reported fascioliasis-cases in Egypt. *Eichhornia crassipes*, the invasive water hyacinth, which covers huge areas of the irrigation canals offers safe refuges during molluscicide application for the amphibious *P. columella* which therefore is able to dominate snail communities and efficiently transmits *F. gigantica*.