Water has been identified as the major environmental issue of the 21st century. Many parts of the world will experience increasing fresh water shortage, while other parts will have a higher incidence of flooding. Poor water quality is a threat for human society as well as for natural ecosystems. The research focus of the Institute for Water and Wetland Research (IWWR) is the natural environment, in particular aquatic ecosystems and wetlands. Many of these environments have been substantially altered by human impact. The changes have resulted in stress responses of all living biota and impose major challenges to individuals, populations and the ecosystem as a whole. The IWWR studies the mechanisms of adaptation to these changes of microorganisms, plants and animals at the level of the molecule, the cell, the organism and the ecosystem. The light coupling of fundamental scientific research to application, distinguishes the IWWR from other national and international institutes on water research. The novel applications for current water problems are developed from innovative fundamental insights in molecular, physiological and ecological processes.

This PhD will be a joint project of the Ecogenomics department which is embedded within the Institute for Water and Wetland Research (IWWR) and the Life Science Trace Gas Facility embedded in the Institute of Materials and Molecules (IMM). Both institutes are in the Faculty of Natural Sciences, Mathematics and Informatics (FNWI) and housed in the Huygens Building on the campus of the Radboud University.

Volatile organic compounds (VOCs) emitted by plants play an important role in the interactions among plants and insects. Insect herbivores, parasitoids and pollinators use VOCs to locate vital resources such as hosts and floral nectar. In each specific ecosystem many different organisms are associated with a particular plant species and it can be expected that they have each evolved to optimally exploit the plant produced VOCs. With the ongoing climate change and ever-increasing global human activities, the risk of introducing invasive herbivores is on the rise. This ESF-funded collaborative project with Switzerland, Sweden, Italy and the Czech Republic will test the hypothesis that these fine-tuned plant-mediated interactions will be disrupted if novel herbivores are introduced into an ecosystem.

The PhD candidate in this sub-project will specifically focus on assessing the temporal dynamics in VOC emissions from roots, shoots and flowers of plants infested with a native root herbivore, a native shoot herbivore, or both. Both Proton Transfer Reaction Mass Spectrometry (PTR-MS) as well as Gas Chromatography – Mass Spectrometry (GC-MS) will be used to analyse induced VOC emissions from Brassica plants. Moreover, the candidate will experimentally assess if plants infested with native herbivores AND an invasive shoot or root herbivore emit different VOC from leaves, roots and flowers. The regulatory mechanisms underlying shifts and interactions between herbivore induced VOC emissions will be identified using ecogenomic tools (e.g. microarrays and EST analyses). A PDF with the full proposal is available on request.

Expected qualifications of the position of PhD Student:
The candidate should hold a M.Sc. degree in Biology, Plant Sciences, Biochemistry or Chemical Ecology. Hands-on experience with GC-MS analyses is strongly preferred, experience with molecular techniques and/or transcriptomic analyses are a plus. Because of the different techniques and approaches that will be applied in this project, we are looking for a candidate that is able to perform well in a multidisciplinary and international research environment. The candidate must be proficient in the English language, both orally and in writing. We explicitly look for a candidate with an open and communicative personality as this project is part of a larger collaborative research effort between research groups in five different countries.

You will be appointed as a PhD student for a period of four years. Your performance will be evaluated after 18 months. If the evaluation is positive, the contract will be extended by 2.5 years. The starting salary is €2,042 per month on a full-time basis and will increase to €2,612 per month in the fourth year.

Please merge your motivation letter, CV and the names and addresses of two references into one Word or PDF document, with Vacancy number: 62.30.11, and send it, until 18 March 2011 to the following address, vacatures@science.ru.nl or Radboud University, Personnel Department, PO Box 9010, 6500 GL Nijmegen, The Netherlands

More information:
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Additional information:
Ecogenomics: http://www.ru.nl/ecogen/
Life Science Trace Gas Facility: http://www.ru.nl/tracegasfacility/