

Norwegian title - Effekt av gammastråling på ekspresjon av gener relatert til DNA-reparasjon, celledelingskontroll og epigenetikk i furuplanter fra frø utviklet under forskjellige strålingsnivåer i Tsjernobyl-området

English title - Effect of gamma radiation on expression of genes related to DNA repair, cell division control and epigenetics in Scots pine seedlings grown from seeds developed under different levels of ionising radiation in the Chernobyl area

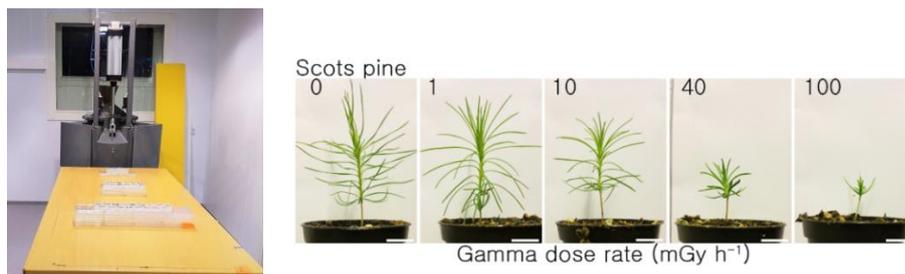


Figure 1 a) Set-up for exposure of seedlings in Petri dishes to gamma radiation from a ^{60}Co source under controlled conditions. b) Scots pine seedlings exposed to different gamma radiation dose rates

Summary - The main hypothesis for this MSc thesis work is that seedlings grown from seeds developed under different levels of ionising radiation show different sensitivity to ionising radiation due to rapid adaptation to radiation through epigenetic mechanisms. In preliminary studies we have found that Scots pine seedlings grown from seeds developed under high and intermediate levels of ionising radiation in the Chernobyl region show less DNA damage (DNA strand breaks) after exposure to gamma radiation than seedlings grown from seeds from low, background level radiation. The specific aim of the MSc thesis work is to try to explain this difference in DNA damage by investigating whether this could be due to differential expression of genes involved in DNA repair and cell division control (interlinked processes). To study epigenetics-related genes will also be highly interesting since an epigenetic memory of the radiation conditions during seed development may be hypothesised. The idea is that the hypothesised difference in expression of DNA repair genes may be due to epigenetic modifications of gene expression, enabling rapid adaptation to radiation. The MSc thesis work will include lab work, including isolation of RNA and analyses of gene expression using quantitative real-time PCR and possibly digital PCR. Additional analysis of DNA damage in gamma irradiated Scots pine seedlings should also be performed for verification of the former analyses.

Subject area - Biology, plant biology, plant science, plant biotechnology, molecular biology

Language thesis - English

Bachelor or Master thesis - MSc thesis

Credits - 30 or 60 credits (the work will be scaled accordingly)

Project - Plant subproject in the center of excellence "Center of environmental radiation" (CERAD)

Please contact - Main supervisor: Professor Jorunn E. Olsen (jorunn.olsen@nmbu.no), Faculty of Biosciences (BIOVIT), Department of plant sciences. Co-supervisors: CERAD collaborators