In 2008/09, Anastasija Chomic was awarded a New Zealand Plant Protection Research Scholarship. Anastasija is a second year PhD student from Lincoln University, studying under the supervision of Dr Karen Armstrong.

Anastasija’s research is in the important area of New Zealand biosecurity and is aligned with a range of projects aimed at developing molecular diagnostic tests for detection and identification of potentially invasive exotic pests including insects and plant pathogens. The work being undertaken by Anastasija is particularly focussed on plant viruses. The Luteoviridae plant virus family is one of the most ecologically successful biological groups. They are widespread throughout the world causing yield losses of economically important crops, such as cereals, potatoes, beet and numerous legumes. There are 26 species in the Luteoviridae family and nine of them are found in New Zealand. Reliable diagnostic tools are needed to prevent the spread of viruses already in the country as well as to stop the arrival of the other 15 Luteoviridae species.

PCR-based detection is often the method of choice for Luteoviridae, as it is more sensitive than serological methods, which frequently fail to detect infection due to the low concentration of Luteoviridae in plants. Since the currently available Luteoviridae primers are mostly species-specific and work under different PCR conditions, universal primers are desirable. The initial aim of Anastasija’s PhD research is to test the taxonomic range of seven primers designed to target the most conserved regions of the Luteoviridae genomes. These primers possess high homology to over 75% of Luteoviridae species.

Following PCR amplification, sequencing may be required to positively confirm virus identity, and this may take several days. A possible alternative method is the use of melt curve analysis (MCA), which requires less time than sequencing and can be performed in most real-time PCR equipment using fluorescent intercalating DNA dyes. MCA is already successfully used for identification of some animal and plant viruses. Thus, Anastasija intends to test the suitability of MCA for identification of Luteoviridae species.

Anastasija’s research heavily relies on overseas isolates, and so far she has managed to test primers on 15 Luteoviridae species. Thirteen species were successfully detected using the seven primers described above. Additional results have indicated that MCA might be a useful tool in identification of certain Luteoviridae species.

Taking into account the damage that Luteoviridae species create for economically-important crops, it is hoped that Anastasija’s study will develop a relevant, convenient and sensitive test to detect and identify an early Luteoviridae infection of plants. Such a test would greatly enhance New Zealand’s biosecurity diagnostic capability.