

For Immediate Release



## **AUB agricultural researchers develop new plant virus detection kits**

Beirut, Lebanon- 10/12/2010 - Research conducted by the Faculty of Agricultural and Food Sciences (FAFS) of the American University of Beirut (AUB) has successfully resulted in the development of detection kits for two important plant viruses. The kits, now commercialized by a Swiss company, promise to decrease virus detection costs while contributing to the improvement of agricultural yield.

*Cucurbit yellow stunting disorder virus* (CYSDV) is known for infecting cucumber, melon, squash and watermelon. First discovered in the Middle East and later in Mediterranean Europe and North America, the virus causes significant economic losses throughout the region. In Lebanon it is estimated that severe CYSDV infections of greenhouse grown cucumbers result in approximately 50 percent yield loss. The *Prune dwarf virus* (PDV), which occurs world-wide, also causes significant damage to stone fruits like peach, almond, nectarine, and others. All imported stone fruit seedlings should be certified to be free from this and other viruses.

In the absence of commonly used detection methods for these viruses, a research team headed by Yusuf Abou-Jawdah, professor of plant pathology, reverted to advanced molecular techniques which were more expensive and more demanding in terms of experience and laboratory equipment.

Professor Abou-Jawdah started the research back in 2001 upon complaints from farmers in Lebanon about severe losses induced by plant diseases. His survey of various regions in Lebanon revealed several viruses that infected cucurbit crops in the country. The research team then used ELISA (Enzyme-linked immunosorbant assays), the most commonly used technique for virus detection based on specific antibodies, to recognize these viruses. However, some of the studied samples, which showed clear symptoms of virus infection, did not test positive in the ELISA tests. This was the clue that at hand was a new virus for which there were no serological tests.

Using molecular techniques, the research team identified the virus to be CYSDV. There were no serological detection kits for this virus. Experts in the field, including colleagues in the United States, believed it was very difficult to purify the virus in sufficient quantity to prepare antibodies, explained Abou-Jawdah. His research team reverted to molecular biology tools to solve this problem. They amplified the gene responsible for the protein coat of the virus, put it into a bacterium (cloning and transformation), expressed it to become a protein, purified the protein and injected it into a rabbit. The rabbit's serum was then used to purify antibodies.

The complex process led to the development of serological virus detection methods for CYSDV, including the commonly used ELISA test. The same principles were then used on two common viruses that attack stone fruits in Lebanon. The results were successful for PDV and led to the development of antibodies that gave better selectivity and sensitivity than those that were commercially available.

ELISA detection kits for both viruses are now being marketed by a Swiss commercial company. Detection kits are generally used by research institutes, governments, and universities for legislation and control purposes, to advise farmers and to ensure that imported and exported seeds and seedlings are certified virus free. "It is easier for developing countries, which have to survey for a large number of samples, to use the ELISA technique, because it is simple and less expensive," observed Professor Abou-Jawdah, adding that while molecular techniques cost between six and 10 US Dollars per sample, ELISA techniques cost about 50 cents per sample.

"We were always importers of kits. Now we are at the stage of producing kits and exporting them," said Professor Abou-Jawdah. "I never saw this project as a commercial one; the commercial aspect of it just happened as a result of the research. My objectives were purely educational," he observed, highlighting the importance of such projects to teach new and advanced technologies to students of agriculture.

Professor Abou-Jawdah is also overseeing several other research projects at FAFS that, if marketed by appropriate bodies, could be quite beneficial to farmers in Lebanon. One project enabled developing the techniques for the local production of virus free or certified seed potatoes that would help decrease the dangers from importing annually about 20,000 tons of seed potatoes that may harbor dangerous pests. Another project focused on developing Lebanese tomato varieties that are resistant to the most devastating virus disease in the region and tolerant to three soilborne pathogens. A third example is the discovery of a fungus in the Tannourine cedar forest which can, according to preliminary research, control insects belonging to three orders and may thus replace some toxic pesticides used by Lebanese farmers.

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Note to Editors

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