**COST Action FA0807 Integrated Management of Phytoplasma Epidemics in Different Crop Systems**
**Short-term Scientific Mission (STSM) Report**

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**STSM Topic:** Survey of Stolbur phytoplasma insect vectors in Azerbaijan
**Reference codes**: STSM: COST-STSM-FA0807-10941
Grant letter: COST-STSM-ECOST-STSM-FA0807-010712-019493
**STSM dates**: 1 July 2012 to 6 July 2012

## Purpose of the visit

After the detection of stolbur phytoplasma in Azerbaijan, the topic of this visit was to investigate the presence of *Cixid* planthoppers which could act vectors of stolbur and other phytoplasmas.

## Description of the work

On July the 2nd we visited two institutes in Absharon peninsula near Baku.
No *cixids* were collected in tomato and pepper fields of the Institute of Vegetable. Six specimen of *Dyctiophara europea* were captured on mint in addition to various xylem feeding *Cercopidae*. In the surroundings of the Azerbaijan Research Institute of Crop Husbandry in Pirshagi (Absharon Peninsula), one *Cixiid* female that could be *Hyalesthes obsoletus* was collected on bindweed. About hundred and twenty *Cixids* were collected on *Ulmus sp.* These insect, possibly *Hyalesthes luteipes* (dissections of male genitalia are on-going). Two batches of 30 insects were stored in alcool. One batch was send to The Institute of Plant Protection and Environment in Belgrade for confirmation. The second batch will be submitted to DNA extraction and phytoplasma detection. Finally, transmission assays to *Catharanthus roseus* periwinkles were set-up. Five insects were caged on periwinkle seedlings. Insect survival was monitored:

| plant number | Survival at 2.5 days | Survival at 7 days |
|---|---|---|
| EC1 | 3 | 0 |
| EC 2 | 0 | 0 |
| EC 3 | 1 | 0 |
| EC 4 | 2 | 0 |
| EC 5 | 3 | 1 |
| EC 6 | 1 | 0 |
| EC 7 | 1 | 0 |
| EC 8 | 0 | 0 |
| EC 9 | 3 | 0 |
| EC 10 | 0 | 0 |
| EC 11 | 3 | 1 |
| EC 12 | 1 | 0 |
| EC 13 | 1 | 1 |
| EC 13 | 3 | 0 |
| TOTAL | 22 (31 %) | 3 (4%) |

Periwinkles issued from transmission assays will be surveyed for symptoms expression.

On July the 3rd, *Prunus* orchards of the Guba Institute for fruit crop were visited. Several *Prunus domestica* exhibiting yellows were sampled for phytoplasma detection. As stolbur phytoplasmas had been detected on a cherry tree, on eggplant and peppers in the vinicity of the institute in 2003 and 2007 respectively, we intended to capture cixids on bindweed and nettle spots. Three large *Cixids* (under identification, possibly *Reptalus* sp.) were collected in addition to psyllids and numerous xylem-feeding *Cercopidae on* two spots with mixed binweeds and stinging nettles. No *cixids* was collected on 9 of them. Out of 10 bindweed spots, cixids were collected on a single spot. Numerous specimen of *Anaceratagalia* leafhoppers and 56 *Cixids* resembling *Hyalesthes obsoletus* were captured Six *Cixids* were kept in alcool for further identification by dissection of male genitalia. Three bindweed exhibiting small yellowing leaves were sampled for DNA extraction and phytoplasma detection.

On July the 4th, transmission assays to periwinkle and tomato seedlings were set-up with the *Cixids* collected on binweed in Guba. Five insects were caged on periwinkle seedlings and six insects were caged on tomato seelings. Periwinkles and tomato plants issued from transmission assays will be surveyed for symptoms expression.

| plant number | Survival at 1 day | Survival at 2 days | Survival at 5 days |
|---|---|---|---|
| THO 1 | 3 | 3 | 1 |
| THO 2 | 2 | 2 | 0 |
| THO 3 | 4 | 4 | 1 |
| THO 4 | 6 | 4 | 0 |
| THO 5 | 1 | 0 | 0 |
| PHO 1 | 5 | 5 | 1 |
| PHO 2 | 5 | 4 | 0 |
| PHO 3 | 4 | 4 | 0 |
| PHO 4 | 2 | 1 | 0 |
| TOTAL | 32 (64 %) | 27 (54 %) | 3 (6%) |

THO: tomato seedling, PHO: periwinkle seedling

Survey of *Cixids* was also carried out in the botanical garden nearby the Institute of Botany (Baku). Four specimen of *Dyctiophara europea* and few *Deltocephalinae* could be collected on two spots of Mint and on *Asteraceae*. No cixids were collected.

On July the 5th, *Gulnara Balakishiyeva* phD defence took place in the presence of all senior scientists of the Institute of Botany (NAS). Following her presentation, various aspects of phytoplasma-plant interactions were discussed. During the discussion, I summarized recent findings that came out of phytoplasma genome sequencing such as the poor metabolic pathways regarding to energy production, use of carbon and nitrogen sources, and the small peptidic effectors manipulating plant development that were recently identified by Namba's Hogenhout's groups. Finally, the necessity to identify the insect vectors and plant reservoirs of phytoplasmas in Azerbaijan have been pointed out.

**Conclusion and future collaboration**

Partners have agreed to collaborate on the identification of stolbur phytoplasma insect vectors in Azerbaijan. Efforts will be made to perform transmission assays. INRA Bordeaux will help the colleagues in Azerbaijan in the identification of insects and the molecular characterization of stolbur phytoplasmas detected in insects and plants.