

Meeting title:**The online 4th meeting on 598444-EPP-1-2018-1-HR-EPPKA2-CBHE-JP project "Harmonization and Innovation in PhD Study Programs for Plant Health in Sustainable Agriculture –HarISA"**

Meeting:	Work package 3 (DEVELOPMENT-Improving the scientific content)
Date of Meeting:	April, 27 th , 28 th , and 29 th 2020, Online meeting by Zoom.us*
Minutes Prepared By:	Martina Kadoić Balaško and Aleksandra Ignjatović Čupina

* Due to the global COVID – 19 pandemics, it was impossible to have a meeting in Mostar as it was planned. The conference was held online by Zoom platform.

1. Purpose of Meeting

- Improvement of the existing courses and development of new courses: adjustment of learning outcomes, identification of similar and new courses, discussion and proposals regarding development of joint teaching materials, teaching methods and tools, and action plan for developing joint learning material

2. Agenda**1. Joint WP3 Meeting- Introduction:**

- WP3 meeting program, WP3 participants and appointment of the Minute-taker Secretary of WP3 meeting;
- Resume of gained results at the 3rd meeting in Belgrade with acceptance of Minutes of The 3rd WP3 HarISA Meeting (Belgrade, October, 27-29,2019);
- updated activities and results during the period between the 3rd and 4th WP3 meeting and further tasks to accomplish;
- Distribution of tasks for SG parallel workshops and discussion

2. Parallel and joint workshops of subgroups (SGs):

- Identification of similar courses and groups of similar courses and their improvement
- Development of new courses
- Appointment of Task Leaders
- Members involvement - assignment of duties to SG members
- Allocation of teachers in development of new courses
- Action plan

3. Joint WP3 Meeting: Analysis of results achieved during parallel SG workshops and discussion on further WP3 activities; closure of WP3 meeting**3. Meeting Notes, Decisions, Issues**

- Considering the global COVID – 19 pandemics, 4thHarISA meeting was held online by Zoom platform.
- The Joint meeting of WP3 started at 14:10 on April 27th 2020 with the Introduction, Discussion and distribution of the tasks, as scheduled in the The 4th HarISA Meeting Program.
Next day, on April 28th, activities of WP3 were conducted in Parallel workshops of scientific subgroups (SGs), starting with SG1 and SG2 at 08:00, SG3 and SG4 at 10:30 and SG5, SG6 and SG7 at 13:30, according The 4th HarISA Meeting Program.
Last day, on April 29th, as agreed between WP3 members, the second Joint WP3 meeting started at 09:00, instead at 08:00, in order to get enough time to prepare properly the SGs reports. Each Subgroup Leader presented the achieved results and progress of its related SG and participants of the Joint meeting discussed on next activities in WP3.
In addition, WP3 Leaders participated the Joint Final meeting of WP8, WP2 and WP3 on April 29th (start at 11:40) and presented the activities and achieved results of WP3 during the 4th HarISA meeting.

- The WP3 joint meetings were chaired by the WP3 Leaders Aleksandra Ignjatović Čupina and Eustachio



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Tarasco, while parallel SG workshops were chaired by each SG Leader.

- Martina Kadoić Balaško (FAZ) was unanimously appointed as Minute-taker Secretary of the WP3 meeting.
- Detailed overview of the 4th meeting results of each SG are given apart in form of SG Reports, prepared by each SG leader with participation of the belonging SG members. SGs reports along with the present Minutes document represent integral part of the 4th meeting report of WP3. Additional documents deriving from the 4th meeting also include the Introduction presentation and the updated Mailing List of WP3 members (teachers and students, sorted by each SG), which were delivered to WP3 participants during the 4th meeting.

1. **WP3 Joint meeting on 27th of April, 2020.** Activities of WP3 at the The 4thHarISA – online meeting started with the WP3 Joint meeting, hosted by Eustachi Tarasco, WP3 Leader. After welcoming all WP3 participants of the meeting, WP3 Leaders (Aleksandra Ignjatović Čupina and Eustachio Tarasco) gave the Introduction presentation, which contained the most important information about the meeting program, participants, state of art of WP3 activities, further tasks and instructions to WP3 members during the 4th HarI Sa online meeting, which was focused to improvement of scientific contents.

At the beginning, the 4th Meeting Program was presented to the participants, with special attention to the timetable of WP3 joint meetings and parallel workshops.

The updated mailing list of WP3 members/participants (teachers and students) per each subgroup (SG) was composed before and during the meeting according personally declared preferences and the list was presented to the participants. The list consisted of 79 WP3 members with 91 personal engagements in total (61 teachers and 30 students), some of them involved in two or three SGs at the same time. The detailed list with all names of WP3 members and e-mail addresses, sorted by SGs was provided to all WP3 participants in form of Word document. Summarizing data regarding the numbers of members per each SG is given in Tab.1.

Tab. 1. Distribution of WP3 members (teachers and students) in scientific subgroups (SG1-Diagnosis in plant health and IPM; SG2-Sustainable use of pesticides; SG3- Plant feeders; SG4- Plant Pathology; SG5- Weed science; SG6- Mycotoxins and food safety; SG7- General contents of transversal interest)

	SG1	SG2	SG3	SG4	SG5	SG6	SG7	TOTAL
Members	9	14	14	15	14	10	15	91
Teachers	7	8	8	6	10	8	14	61
Students	2	6	6	9	4	2	1	30

Apart participation to the belonging SG workshop, WP3 members were encouraged to actively participate in additional parallel SG workshops up to their interests and availability.

As in previously held HarISA meetings, MSc Martina Kadoić Balaško was unanimously appointed as the Minute Taker of the 4th HarISA-WP3 meeting.

The Agenda of the 4th WP3 meetings was presented, discussed and accepted by the participants. In continuation, each task was elaborated and instructions for work in parallel workshops were given.

According the Agenda the first task implied the acceptance of the “Minutes of the 3rd WP3 Meeting in Belgrade (October, 27-29, 2019). The related document was sent to all participants after the 3rd WP3 meeting (on 4th February, 2020), but only few participants (9 WP3 members) replied by e-mail accepting the Minutes. Therefore WP3 leaders asked the members who participated the 3rd WP3 meeting to declare the acceptance of the document. Minutes of the 3rd HarISA-WP3 Meeting in Belgrade were unanimously accepted by the WP3 members who participated the previous event.

In continuation, the Leaders of WP3, Aleksandra Ignjatović Čupina and Eustachio Tarasco, presented the chronological overview of completed results, ongoing and future tasks and activities of WP3, with

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special attention to the achievements of the previous meetings in Podgorica and Belgrade. During the last, 3rd meeting in Belgrade each subgroup had the task to propose and discuss Joint research topics/Joint mentorship and scientific cooperation - Mobility of students and teachers among PIs and available sources for mobility to WP5; to identify learning outcomes in each scientific subgroup (SG); to identify similar courses taught at different PI and propose new courses; to make proposals regarding joint learning materials and propose the action plan for developing joint learning material. Results of the 3rd meeting in Belgrade represented the basics for next WP3 activities.

Aleksandra Ignjatović Čupina also gave the brief report on the conducted activities and updated results between the 3rd and 4th meeting, which regarded: preliminary Zoom meetings held before the beginning of The 4th HarISA online meeting (SG1 and SG2), e-mail communication and discussion on topics of further interest (SG3, SG4, SG6), amendment of results related to the 3rd meeting tasks (SG4, SG6, see Tab.2). Furthermore, SG6 provided minor change in learning outcomes previously defined at the 3rd Belgrade meeting (the fifth outcome was modified as following: *Define and demonstrate the methodology of classical, molecular and chemical identification of mycotoxigenic fungi*). SG6 also provided in advance the draft of course syllabus of the new course Mycotoxins and food safety (contents of theoretical classes and laboratory exercises). The results of all those previous preliminary activities represented a good basis for further planned tasks and activities planned for the 4th HarISA-WP3 meeting.

Table 2. Overview Identification of similar courses, proposals of new courses, appointment of teachers in development of joint learning materials and action plan for the activity (Amendment of **Table 4.** in Minutes of The 3rd HarISA-WP3 meeting, October, 28th and 29th, 2019, Belgrade, Serbia; Data provided before the 4th HarISA online meeting).

SG	SIMILAR COURSES	NEW COURSES	TEACHERS INVOLVED*	APPOINTED LEADER	ACTION PLAN
4	<ul style="list-style-type: none"> Advanced Mycology Advanced Bacteriology Advanced Virology Molecular Detection of Plant Pathogens Integrated Disease Management Statistics in Plant Pathology 	Plant Microbe Interactions	AUA: Epimenondas Paplomatas, Dimitrios Tsitsigiannis, Sotiris Tjamos. UNSA: to be identified (Okić Arnela) SG4 members	Sotiris Tjamos	to be discussed and defined
6	<ul style="list-style-type: none"> Mycotoxins Mycotoxigenic fungi Phytotoxins Analytics of residues and contaminants in food and environment Food Toxicology Toxicogenic Fungi and Mycotoxins 	Mycotoxins and food safety	AUA: Dimitrios Tsitsigiannis AUT: Magdalena Cara SG6 members	Dimitrios Tsitsigiannis	Production of course syllabus Production of joint teaching material

* teachers declared before the 4th HarISA meeting

The main tasks of WP3 during The 4th online meeting were related to the improvement of scientific contents (*Project Task 3.2. Improvement of the existing courses and development of new courses*). In this context, it was emphasized that the improvement of the existing/recognized similar courses should be conducted by providing teaching/learning materials, improvement of teaching methods and tools, while development of new courses should imply production of course syllabus, with special attention to learning outcomes (specific, and in accordance with the group of outcomes for each particular SG), providing joint teaching/learning materials and appointment of teachers for each new course (one main



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Further instructions regarding the particular above mentioned tasks were given and discussed among WP3 members, with additional useful suggestions given by the Project Coordinator, Renata Bažok.

First, each SG should appoint a Task Leader who will be responsible for coordination of activities in the related SG regarding the task improvement of scientific contents. As a convenient option, especially in SG with several new courses proposed, it was suggested to appoint more than one (few) task leaders, if found appropriate by SG members. This suggestion was unanimously accepted by WP3 members.

Regarding the SG members involvement, it was recommended to assign duties among SG members (teachers and students), related to the following activities: providing teaching materials in both existing and new courses, active participation in creation of course syllabus for new courses, appointment of teachers interested to take part in the development of a new course. It was agreed that the list of courses for each focus area will be accompanied with the list of the teachers interested to take part in the development the course.

Regarding the collection of teaching/learning materials (i.e.instructors) of different types (presentations, protocols, guidelines, scientific papers, useful links etc), it was recommended to prepare the list with specific titles of the materials (e.g. concrete title of a publication) for each course.

While collecting and preparing materials, it was also emphasized to take in mind the needs of PhD students, especially of those who were selected and will be involved in Joint Scientific Research (with Joint Mentorship/Membership in Committees for thesis defense assigned). Both teachers and students should be involved in providing the materials. WP3 members were requested to regularly declare the already existing material or other project results (e.g. thesis defended).

Aleksandra Ignjatović Čupina suggested the Project Leader to create a Repository of the teaching materials at the project web page, where all of the collected teaching materials, sorted in appropriate folders and subfolders (by SG and particular course) could be stored and used by both students and teachers from each PI in the next future.

Regarding the appointment of teachers (main teachers and other teachers involved for each course), it was recommended to respect the international approach, by including teachers from different PIs in the list. Following the suggestion of Renata Bažok, the Project Coordinator, each course may have more than one teacher involved and actually it will be great to develop a course taught by different teachers, ensuring that students will be able to get the same skills while enrolling the same course at different PI. For each new course, one Main-Expert Teacher should be proposed and appointed by SG members, and additionally up to one teacher per each PI could be involved as teacher in creation and realization of the course. Up on the request of Renata Bažok, it was also recommended that for each new course only one teacher from the same PI should be included in the list of teachers.

If lacking sufficient number of SG members or experts to fulfill the activity, Aleksandra Ignjatović Čupina suggested to motivate additional teaching staff from PIs (experts in a specific scientific field but not directly involved in HarISA project team), or external experts (from institutions that are not involved in HarISA) to contribute the course creation and help in providing teaching/learning materials.

Aleksandra Ignjatović Čupina also recommended to take attention while defining the course titles and course contents in order to avoid overlapping among different SGs. Also, she emphasized that in case of both similar and new courses, the number of courses should be in equilibrium among SGs. For example, so far both SG4 and SG6 declared one new course, while SG3 proposed 15 new courses. It was suggested to reduce the number of courses up to 3 or 4 making a balance between the SGs. Similar situation has been observed in similar courses. In some SGs, the number of similar courses is high, such as in SG1, where 41 similar courses that already exist in different PIs were recognized and those were sorted in 6 entitled groups. It was suggested to prepare teaching material for selected groups of similar courses, not for each particular similar course, and wherever possible to reduce the number of groups of by merging logically connected groups.

Regarding the Action Plan, Aleksandra Ignjatović Čupina suggested planning the number and type of activities in a way that the action plan could be successfully fulfilled within the deadline dates. It was

emphasized that, according the project the deadline for improvement of similar courses is November 15th 2020, and deadline for improvement of new courses is October 15th 2021. WP3 members were strongly requested to start providing the already existing results.



In order to facilitate the proper fulfillment of specific tasks planned for the 4th online meeting, and in order to enable the creation of SG Reports in a unique form, three different templates (in form of tables) were created and suggested to use during Parallel workshops of SGs. The templates, contained in the ppt Presentation document were delivered to SG Leaders.

The first template, entitled Allocation of teachers in development of courses, contained the following fields: SG number (1-7); Name of Task Leader/Leaders; Course Titles (similar, new); and Names of suggested teachers with related PI to be listed for each particular course.

The second template entitled Production of teaching material contained the following fields: SG number; Course title and status (similar/new); Teaching material ready (titles of those ready to use), with the name of the provider (teacher/student and PI); Teaching material to be prepared, with the name of the provider (teacher/student and PI) to whom the duty is assigned.

The third Template regarded the Course Syllabus form (example form used in Book of courses for PhD study programs at UNS) contained the required fields: Course title (i.e. name of the course); Professors (i.e. names of teachers); Education goals (i.e. Learning outcomes); Acquirable skills (i.e. student's competencies); Course contents (theoretical classes and practical training). During the creation of the Course syllabus, it was suggested to take in mind the overall outcomes, as defined in each SG. The course particular outcomes should be in accordance with the related SG outcomes.

All WP3 participants were encouraged to discuss actively on ideas, commitments and duties during parallel SG workshops in order to get effective results of the meetings.

Finally, all SG-Leaders were strongly requested to provide the Report on the achieved results during the parallel SG sessions to WP3 Leaders by e-mail, before the beginning of the next Joint meeting scheduled for April 29th 2020 at 9:00.

2. Parallel workshops of subgroups (SGs)

The second day, on April 28th, each SG Leader hosted the Zoom meeting of the related SG workshop according timetable given the Meeting Program. SG1 meeting was hosted by Maja Čačija (FAZ), SG2 by Matteo Spagnuolo (UNIBA), SG3 by Ivana Majić (FAZOS), SG4 by Sotiris Tjamos (AUA), SG5 by Maja Šćepanović (FAZ), SG6 by Dimitrios Tsitsigiannis (AUA) and SG7 by Ana Mandić (SVEMO).

At the end of the day, all SG Leaders sent the Reports of the SG workshops with all relevant data to WP3 Leaders. Here, all SG Reports are given in Addendum of the Minute documents, sorted by SGs (SG1-SG7).

Briefly, the results of the SGs extensive activities are reflected in fulfillment of the following: each SG appointed their Task Leaders; discussed on appropriate teaching materials, teaching methods and tools, learning outcomes; redefined the new courses and learning outcomes for the group of the courses; collected the interest of the teachers for specific courses; proposed conditions for the nomination of expert teachers and teachers involved in the courses; proposed teaching/learning material that is already available or will be created and shared, with special attention to the development of joint learning materials; designated duties in an action plan; made adaptations to the proposed syllabus template; and started to work on syllabus of different courses.

3. WP3 Joint meeting on 29th of April, 2020. During the second WP3 Joint meeting, hosted by Eustachio Tarasco, each Subgroup Leader presented the Report of the related SG in form of ppt presentations which contained the achieved results of workshop. Each presentation was followed by productive discussion. WP3 Leaders strongly suggested to continue accurately all of the activities defined within the SG action plans in the next future .

4. Final conclusions

- Members of WP3 successfully conducted the main tasks planned for the 4thHarISA project meeting.
- Depending on objective circumstances, eventual changes/additions will be enabled in the next project steps with previous mutual consent of WP3 members, and with respecting the project rules.
- Learning outcomes were properly identified and formulated for each SG.

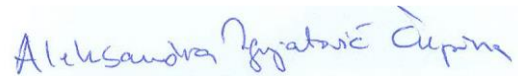


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- Teaching needs and plan for improvement of the existing and development of new courses/scientific contents were identified, duties personally allocated and the action plan for production of learning material defined.

The meeting was concluded on 29/04 at 12:15 pm.

WP3 Leaders



Aleksandra Ignjatović Čupina, Associate Professor



Eustachio Tarasco, Associate Professor

Minute-taker Secretary:



Martina Kadoić Balaško, MSc

ADDENDUM: WP3 REPORT ON SUBGROUPS MEETING RESULTS (SG1-SG7)

SG1 - Diagnosis in plant health and IPM

Date and Place of Meeting: April, 28th 2020 8.00 -10.30 Zoom meeting

Minutes Prepared By: Maja Čačija

Participants (6): Enrico de Lillo (UNIBA), Epimenondas Paplomatas (AUA), Teofil Gavrić (UNSA), Frans Kokojka (UNIKO), Aleksandra Ignjatović Čupina (UNS), Maja Čačija (FAZ)

- SG1 defined 41 similar courses, divided into 6 groups – we agreed this 6 groups will now become **2 groups of similar courses**:
 1. Diagnosis in Plant Health
 2. Quarantine Pests and Pest Management
(these are working titles, propose change if needed)
- SG1 proposed a **modification in titles of 3 new courses**:
 1. Advanced diagnostic methods and techniques for detection of prejudicial **and beneficial** organisms
 2. Integrated approach to surveillance of prejudicial organisms affecting plant health
 3. Control of quarantine prejudicial organisms, **managing of non-native beneficial** organisms and evaluation of risk assessment based on EU protocols
- SG1 **proposed teachers/instructors** for 3 new courses and Aleksandra proposed the same professors for the similar courses (the list is not final):

SG	Incharged task leader	Course title	Teachers involved /PI
1	Epameinondas Paplomatas (AUA)	1. Advanced diagnostic methods and techniques for detection of prejudicial and beneficial organisms NEW	1. Maja Čačija (FAZ) 2. Dimitrios Tsitsigiannis (AUA) 3. Sotiris Tjamos (AUA) 4. Elisavet Chatzivassileiou** (AUA) 5. Aliko Tzima** (AUA) 6. Dionysios Perdikis** (AUA) 7. Ioannis Giannakou (AUA) 8. Ivana Majić (FAZOS) 9. Magdalena Cara (AUT)
	Aleksandra Ignjatović Čupina (UNS)	2. Integrated approach to surveillance of prejudicial organisms affecting plant health NEW	1. Ivan Juran (FAZ) 2. Karolina Vrandečić (FAZOS) 3. Anita Liška (FAZOS) 4. Aleksandra Konjević (UNS) 5. Teofil Gavrić (UNSA) 6. Franco Nigro (UNIBA) 7. Igor Pajović (UoM)
	Enrico de Lillo (UNIBA)	3. Control of quarantine prejudicial organisms, managing of non-native beneficial organisms and evaluation of risk assessment based on EU protocols NEW	1. Aleksandra Konjević (UNS) 2. Ivana Pajač Živković (FAZ) 3. Francesco Porcelli (UNIBA) 4. Ferenc Bagi (UNS) 5. Jasenka Čosić (FAZOS)
	Epameinondas Paplomatas (AUA)	4. Diagnosis in plant health SIMILAR	
	Enrico de Lillo (UNIBA)	5. Quarantine Pests and Pest Management SIMILAR	1. Francesco Porcelli (UNIBA)

- SG1 will send a **request to all other teachers/instructors** to contribute to courses with their **available material**; These materials listed in table below should be and collected / prepared for



the repository later:

SG	Course title- status (new or similar course)	Teaching material ready	Material provided by (name of teacher, student-PI)	Teaching material to be prepared	Duty assigned to Name of student, teachers (PI)
1	1. Advanced diagnostic methods and techniques for detection of prejudicial and beneficial organisms NEW	- research papers - paper/protocol for molecular identification of Trichogramma - molecular detection on soil borne fungal pathogens	- SG1 members + contributors - A. Ivezić i A. Ignjatović Čupina - Paplomas/Tzima	- research papers - protocols - links	duties will be assigned to 4 PhD students
	2. Integrated approach to surveillance of prejudicial organisms affecting plant health NEW	- research papers	- SG1 members + contributors	- guidelines for Drosophilla - guidelines for surveillance of phytopathogenic nematodes	- A. Ignjatović/Boško Jezerkić (student) - Igor Pajović (UoM)
	3. Control of quarantine prejudicial and beneficial organisms and evaluation of risk assessment based on EU protocols NEW	- list of EU quarantine pests - guidelines for surveillance of invasive species	- SG1 members - Ivana Pajač Živković (FAZ)	- list of quarantine organisms of Serbia - list of quarantine organisms of Montenegro	- Ferenc Bagí (UNS) - Igor Pajović (UoM)
	4. Diagnosis in plant health SIMILAR				
	5. Quarantine and integrated pest management SIMILAR				

- SG1 discussed the **learning outcomes (LO)**, made minor **modification** of the previously defined LO (1-6) and **added** two more LO (7-8), so that the final list of outcomes for SG1 is the following:
 - Apply various advanced diagnostic methods in plant prejudicial organism detection in relation to their reliability, cost and ease use.
 - Select, develop, set up and validate the appropriate methods of monitoring of prejudicial organisms in plant cultivations, plant materials and soil as well as definemethods in order to determine the relevance of plant prejudicial organisms.
 - Analyze and identify the reasons for the appearance of plant pathogens and plant feeders.
 - Design and compare plant protection measures in conventional, integrated and organic agricultural production for their efficiency with regard to environmental impact, and operator and consumer safety.
 - Explain the principles and evaluate the potentiality of application of precision agriculture in IPM.
 - Create/design and conduct field and laboratory research in the area of IPM.
 - Evaluate the risks of introduction and spreading of quarantine organisms, design and apply protocols for prevention of introduction, early detection and surveillance of quarantine organisms.
 - Evaluate the risks of release of non-native beneficial organisms, design and apply protocols for preventing negative side effects of their introduction.
- LO of new courses are the following (the numbers correspond to the SG outcomes listed above)

New courses	Learning outcomes (LO)
1. Advanced diagnostic methods and techniques for detection of prejudicial and beneficial organisms	1, 2, 6
2. Integrated approach to surveillance of prejudicial organisms affecting plant health	2, 3, 4, 5, 6
3. Control of quarantine prejudicial organisms, managing of non-native beneficial organisms and evaluation of risk assessment based on EU protocols	3, 4, 7, 8

- In order to finish the discussion and start the work with Syllabus of new courses, SG1 organized an additional Zoom meeting the same day (April, 28th 2020) from 18:00-19:20.
 Participants (7): Enrico de Lillo (UNIBA), Epimenondas Paplomatas (AUA), Teofil Gavrić (UNSA), Frans Kokojka (UNIKO), Aleksandra Ignjatović Čupina (UNS), Maja Čačija (FAZ), Karolina Vrandečić (FAZOS)

The first drafts of syllabus for new course are the following:

Course title	Advanced diagnostic methods and techniques for detection of prejudicial and beneficial organisms
Professors for theoretical lectures	prof. Epameinondas Paplomatas
Education goals /Outcomes	1. Apply various advanced diagnostic methods in plant prejudicial organism detection in relation to their reliability, cost and ease use. 2. Select, develop, set up and validate the appropriate methods of monitoring of plant materials and soil as well as define methods in order to determine the relevance of plant prejudicial organisms. 3. Create/design and conduct field and laboratory research in the area of IPM.
Acquirable skills /student competencies	Possession/Advanced of knowledge and skills of selecting adequate application of advanced diagnostic methods and techniques of detection of prejudicial and beneficial organisms. Possession of skills in laboratory and field conditions for applied/professional and research work.
Course content (description)	
Theoretical classes	Introduction to the most common and the most advanced/modern diagnostic methods and techniques in detection of prejudicial and beneficial organisms. Their pros and cons in respect to the classical methods and techniques . Molecular methods, LAMP, MALDI-TOF, NGS, DNA barcoding, MLSTs, microarrays, Taqman arrays. Case studies on selected objectives of research/organisms.
Practical training (exercises, student's research work, other types of activities)	Applied research work on detection on selected/targeted prejudicial and/or beneficial organisms with appropriate advanced diagnostic methods, depending on the objective. Molecular methods, LAMP, MALDI-TOF (?), NGS (?), DNA barcoding (?), MLSTs (?), arrays.

Course title	Integrated approach to surveillance of prejudicial organisms affecting plant health
Professors for theoretical lectures	Prof. Aleksandra Ignjatović Čupina
Education goals /Outcomes	1. Select, develop, set up and validate the appropriate methods of monitoring of plant materials and soil as well as define methods in order to determine the relevance of plant prejudicial organisms. 2. Analyze and identify the reasons for the appearance of certain pathogens and plant feeders. 3. Design and compare plant protection measures in conventional, integrated and organic agricultural production for their efficiency with regard to environmental impact, and operator and consumer safety. 4. Explain the principles and evaluate the potentiality of application of precision agriculture in IPM. 5. Create/design and conduct field and laboratory research in the area of IPM.
Acquirable skills /student competencies	Acquired knowledge and skills in application of IPM in sustainable agriculture, with respect to plant and environmental health; competences of integral approach to plant protection, decision making, selection and application of adequate methods of surveillance of prejudicial organisms.
Course content	
Theoretical classes	Integrated pest management approach in sustainable agriculture; protocols for surveillance of pests and pathogenic organisms; techniques and methods of monitoring; signalization for outbreak prevention and control of prejudicial organisms; alternative control techniques in sustainable agriculture; case studies on actual topics.
Practical training (exercises, student's research work, other types of activities)	Training and application of different monitoring and control methods and techniques; field and laboratory exercises on targeted organisms.

Course name	Control of quarantine prejudicial organisms, managing of non-native beneficial organisms and evaluation of risk assessment based on EU protocols
Professors for theoretical lectures	Prof. Enrico de Lillo/ Prof. Francesco Porcelli
Education goals /Outcomes	1. Analyze and identify the reasons for the appearance of plant pathogens and plant feeders. 2. Design and compare plant protection measures in conventional, integrated and organic agricultural production for their efficiency with regard to environmental impact, and operator and consumer safety. 3. Evaluate the risks of introduction and spreading of quarantine organisms, design and apply protocols for prevention of introduction, early detection and surveillance of quarantine organisms. 4. Evaluate the risks of release of non-native beneficial organisms, design and apply protocols for preventing negative side effects of their introduction.
Acquirable skills /student competences	Advanced knowledge and skills for setting up and developing a control plan of quarantine/alien prejudicial organisms. Advanced knowledge and skills for setting up and developing a release plan of non-native beneficial organisms. Advanced knowledge and skills for provide a risk assessment analysis.
Course content	
Theoretical classes	Introduction to the European rules regulating quarantine prejudicial organisms and the introduction of non-native biological control agents . Bionomics needed for developing and applying a control/eradication plan. Bionomics needed for developing a release plan of beneficial organism. Principles of risk assessment analysis.
Practical training (exercises, student's research work, other types of activities)	Critical evaluation of a case study of the accidental introduction of a quarantine/alien species and how it was controlled (positive and negative cases). Application of a risk assessment analysis with case studies on selected organisms.

SG2 – Sustainable Use Of Pesticides

Date and Place of Meeting: April, 28th 2020 8.00 -10.30 Zoom meeting

Minutes Prepared By: Matteo Spagnuolo

- Discussion about what we decided in the last meeting in Belgrade (New courses and learning outcomes)
- Discussion on developing common learning materials, teaching methods and tools

2. Agenda

1. Resume of results of Belgrade meeting
2. Definitions of new courses that will be developed as courses within the new curriculum and the teachers involved for the new courses and in charge for developing the joint material
3. Action Plan to propose Course Syllabus and developing joint learning materials
4. Definition of final learning outcomes



3. Meeting Notes, Decisions, Issues

- The zoom meeting of SG2 WP3 started on 28/05/2020 at 8:00 and ended at 10:40. After illustrating the agenda of the meeting, the presence at the meeting was reported in the chat. There were present 12 people out of 14 components (Aleksandar Mešić and Balša Bajagić were not present) plus the presence of Renata Bazok as reported in the following table.

1. Dragica Brkić	dragica.brkic@agrif.bg.ac.rs	P
2. Magdalena Cara	magdacara@ubt.edu.al	P
3. Nedeljko Latinović	nlatin@ucg.ac.me	P
4. Zorica Leka	zorica@ucg.ac.me	P
5. Aleksandar Mešić	amesic@agr.hr	A
6. Matteo Spagnuolo SG2 leader	matteo.spagnuolo@uniba.it	P
7. Miroslav Tityanov	miroslav.tityanov@sab.bg	P
8. Slavica Vuković	vukovic@polj.uns.ac.rs	P
9. Balša Bajagić	balsab@ucg.ac.me	A
10. Milica Dudić	milicadudic92@gmail.com	P
11. Dragan Jurković	dragan.jurkovic@aptf.sum.ba	P
12. Emi Panariti	emipanmariti@yahoo.com	P
13. Helena Virić Gašparić	hvirić@agr.hr	P
14. Uroš Vojinović	vojjin1993ar@gmail.com	P
15. Renata Bažok	rbazok@agr.hr	P

- Matteo Spagnuolo reported the results of the preliminary zoom meeting held on April 22nd from 16:30 to 17:30 where the following people were present: Matteo Spagnuolo, Miroslav Tityanov, Magdalena Cara, Dragica Brkić, Slavica Vuković, Uroš Vojinović, Milica Dudić, Helena Virić Gašparić and Aleksandra Ignjatović Čupina.
- The zoom meeting was hosted and chaired by Matteo Spagnuolo, leader of SG2.
- Results of the meeting is given in the pdf document (Pdf file: SG 2 meeting April 28th and chat), which along with the Minutes represents the integral part of the SG2 report.
- At the beginning of meeting the results proposed in Belgrade regarding our subgroup were illustrated with the following table reported in the minutes of the WP3 meeting in Belgrade.

SG	SIMILAR COURSES	NEW COURSES	TEACHERS INVOLVED	APPOINTED LEADER	ACTION PLAN
2	<ul style="list-style-type: none"> Phytopharmacy Mode of Action of pesticides Advanced phytopharmacy Target resistance to pesticides Pesticide chemistry Physicochemical properties and fate in the environment Ecotoxicology Toxicology of pesticides Food toxicology Chemical analysis of residues 	<ul style="list-style-type: none"> Phytopharmacy (scientific field) Environmental fate of pesticides (including mitigation and remediation) Toxicology of pesticides 	Slavica Vuković Nedeljko Latinović Matteo Spagnuolo Miroslav Tityanov Renata Bažok Dragica Brkić Matteo Spagnuolo Ivan Ostojić Sanja Lazić Zorica Leka Dragica Brkić Matteo Spagnuolo Ivan Ostojić Sanja Lazić	Slavica Vuković (UNS) Matteo Spagnuolo (UN IBA) Dragica Brkić (UB)	Guidelines for self-directed learning, Scientific papers, PowerPoint Presentations

- After ample discussion the decisions taken in Belgrade were approved. However it was decided to have two appointed leaders for each new course that will be proposed in the new joint curriculum.

SIMILAR COURSES	NEW COURSES	APPOINTED LEADERS
<ul style="list-style-type: none"> • Phytopharmacy • Mode of Action of pesticides • Advanced phytopharmacy • Target resistance to pesticides 	Plant Protection Products in Sustainable Agriculture	<u>Slavica Vuković (UNS)</u> <u>Miroslav Tityanov (UA)</u>
<ul style="list-style-type: none"> • Pesticide chemistry • Physicochemical properties and fate in the environment 	Environmental fate of pesticides	<u>Magdalena Cara (AUT)</u> <u>Matteo Spagnuolo (UNIBA)</u>
<ul style="list-style-type: none"> • Ecotoxicology • Toxicology of pesticides • Food toxicology • Chemical analysis of residues 	Toxicology and Ecotoxicology of pesticides	<u>Dragica Brkić (UB)</u> <u>Ivan Ostojčić (SVEMO)</u>
	<i>Molecular biology in phytopharmacy and toxicology</i>	Propose to SG7 Advanced Molecular Biology in plant protection

- Moreover from the discussion in the meeting in Podgorica and Belgrade Uroš Vojinović highlighted to improve the competences of students relating to the molecular biology in phytopharmacy and toxicology. After discussion it was decided to propose this course to the SG7.
- A list of teachers and students will be involved in producing and developing the learning joint materials as reported in the following table

NEW COURSES	APPOINTED LEADER	TEACHERS	STUDENTS
Plant Protection Products in Sustainable Agriculture	Slavica Vuković (UNS)	Slavica Vuković UNS	Uroš Vojinović UB
	Miroslav Tityanov (AU)	Nedeljko Latinović UoM	Helena Virić Gašparić FAZ
		Matteo Spagnuolo UNIBA	Milica Dudić UB
		Miroslav Tityanov AU	
		Renata Bažok FAZ Magdalena Cara AUT	
Environmental fate of pesticides	Magdalena Cara (AUT)	Dragica Brkić UB	Emi Panariti AUT
	Matteo Spagnuolo (UNIBA)	Matteo Spagnuolo UNIBA	
		Ivan Ostojčić SVEMO Sanja Lazić UNS Magdalena Cara AUT	
Toxicology and Ecotoxicology of pesticides	Dragica Brkić (UB)	Zorica Leka UoM	Helena Virić Gašparić FAZ
	Ivan Ostojčić (SVEMO)	Dragica Brkić UB	Uroš Vojinović UB
		Matteo Spagnuolo UNIBA	
		Ivan Ostojčić SVEMO	
		Sanja Lazić UNS Magdalena Cara AUT	

- The discussion continued about the developments didactic material that will consists of :
 - a) Guidelines for self- directed learning
 - b) Scientific papers
 - c) Power Point Presentations (pdf)
 - d) PhD Thesis
 - e) Books
 - f) Protocols

- Lastly a revision of the Learning Outcomes has been proposed as reported in the old and new table

SG	DESCRIPTION OF LEARNING OUTCOMES
2	<ul style="list-style-type: none"> • Appraise and revise the most important pesticide properties, efficiency, safety of application, phytotoxicity, resistance, and environmental impact; • Develop innovative methods in accordance with the comprehensive methods in phytopharmacy • Predict of pests and disease appearance and assess of their harmfulness, as well as recommend of IPM strategy • Compare and rate potential impacts and consequences of application of different group of PPPs on agro-ecosystem • Generate and evaluate new ideas or tactics in system of sustainable use of pesticides.

Learning outcomes revision – SG2

• **Appraise and revise** the most important pesticide properties, efficiency, safety of application, phytotoxicity, resistance, and environmental impact;

• **Develop** innovative methods in accordance with the comprehensive methods in sustainable use of pesticide.

• **Plan** and **recommend** the pesticide risk assessment

• **Compare** and **rate** potential impacts and consequences of application of different group of PPPs on agro-ecosystem

• **Generate** and **evaluate** new ideas or strategies for action plans in the sustainable use of pesticides.

The meeting was concluded on 28/05/2020 at 10:40 am.

SG2 Leader



Matteo Spagnuo

SG3 – Plant Feeders

Date and Place of Meeting: April, 28th 2020 10:30 – 12:00 Zoom meeting

Minutes Prepared By: Ivana Majić

1. Purpose of Meeting

- Discussion about what we decided in the last meeting in Belgrade (New courses and learning outcomes)
- Discussion on developing common learning materials, teaching methods and tools

2. Agenda

1. Redefinition of the new courses
2. Declaration of interest of the teachers for specific courses
 - 2.1 Proposal of the conditions for the nomination of the expert teacher and the teachers involved in the courses
3. Redefinition of the learning outcomes for the group of the courses
4. Teaching/learning material that will be created or shared by our group
5. An action plans
6. Adaptations to the syllabus template

3. Meeting Notes, Decisions, Issues

- The zoom meeting of SG3 WP3 started on 28/04/2020 at 10:30 and ended at 13:55. After illustrating the agenda of the meeting, the presence at the meeting was reported in the chat. There were present 13 people plus the presence of Renata Bazok as reported in the following list.

Participants:

1. Ivana Majić, Fazos, SG leader
2. Aleksandra Konjevic, UNS
3. Ivana PajačŽivković, FAZ
4. Ilaria Laterza, UNIBA (PhD Student)
5. Martina Kadoić Balaško, FAZ (PhD Student)
6. Biljana Vidović, UB
7. Nedžad Karic UNSA
8. Vili Harizanova, AU
9. Atanaska Stoeva, AU
10. Enrico de Lillo, UNIBA
11. Mariya Hristozova AU (PhD Student)
12. Eustachio Tarasco, UNIBA
13. Sanja Radonjić, UOM
14. Renata Bažok, FAZ

1. Redefinition of the new courses

According to the suggestions of the consortium, the courses were redefined. Group members proposed titles of 6 new courses (List 2), instead of 13 (List 1).

List 1. The courses proposed during the workshop in Belgrade, 2019

1. Advanced morphology, physiology, and biology of arthropod pest
2. Advanced morphology and biology of nematodes and other zoological groups
3. Advanced zoosystematic
4. Postharvest Integrated Pest and Resistance Management
5. Insect-nematode-plant interactions
6. Biological Control Agents
7. Integrated Management of urban pests
8. Frontiers in pest and resistance management
9. Nematology
10. Acarology
11. Alien and Quarantine pests
12. Plant feeders phenology modeling in changing environment
13. Biosecurity surveillance and arthropod pest risk analysis

List 2. Proposal of redefined courses of the SG 3

1. Advanced techniques in plant feeders
2. Frontiers in invertebrate pest and resistance management
3. Advanced invertebrate pathology
4. Invasive alien pests
5. Vectors of plant pathogens
6. Integrated Management of urban pests

2. Declaration of interest of the teachers for the courses

The SG3 group proposed 6 new courses.

All members of the Consortium are welcomed to express their interest to participate in teaching, and development of the syllabus for the specific course.

Deadline:12/5/2020

Instructions: open the document on this link and find the table with the course of your interest. Write down your name and put asterix if you would like to be an expert teacher.

https://docs.google.com/document/d/10cZL_X5XwflqD83tkTnC2bebTJodQD1qGbQP_vDBxS0/edit#heading=h.se564wxsl6bh

The expert teacher (the coordinator) is the teacher responsible for the development of the new course, teaching tools and coordination with the other teachers involved

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! The teachers who would like to be nominated as the expert teacher of the course should put asterix * next to the name.

Partner Institutions from **Mostar (BiH) and Greece** were not included in this group, so they were not contacted and did not provide names of the teachers, so far. Members from **Albania** were not present at the meeting, so they did not express the interest for the courses.

2.1. Proposal of the procedure for the nomination of the expert teacher and teachers involved in the courses

The selection of the expert teacher (coordinator) of the course will be based on the tracking record of the teacher in the last 10 years (Scopus database: number of publications and h - index)

Proposed instructions to the expert teacher for the election of teachers involved:

- The selection of the teachers involved should be based on the the tracking record of the teacher in the last 10 years (Scopus database: number of publications and h - index)
- possibly select teachers whose competences are covering all groups of plant feeders (entomologist, nematologist, acarologist etc.)
- possibly include different partners Institutions

TABLE 1. Proposal of the new courses of SG 3 - Plant feeders, and teachers involved in the joint PhD study

1. Course title	Advanced techniques in plant feeders		
*Teachers, discipline, PI	1. Mirjana Brmež	Nematology	Fazos
	2. Nedžad Karić	Entomology	PPF-UNSA
	3. Ivana Pajač Živković	Entomology	FAZ
	4. Vili Harizanova	Entomology	AU
	5. Biljana Vidović Scopus - 23, H-7	Acarology	UB

2. Course title	Frontiers in invertebrate pest and resistance management		
*Teachers, discipline, PI	1. Ankica Sarajlić	Entomology	Fazos
	2. Vlatka Rozman	Post harvest technology - Entomology	Fazos
	3. Anita Liška	Post harvest technology - Entomology	Fazos
	4. Darija Lemić	Entomology	FAZ
	5. Vili Harizanova	Entomology	AU
	6. Anđa Radonjić Scopus - 16, H- 7	Entomology	UB



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3. Course title	Advanced invertebrate pathology		
*Teachers, discipline, PI	1. Ivana Majić	Nematology	FAZOS
	2. Eustachio Tarasco* Scopus 40, Hi - 11	Entomology/ Nematology	UNIBA
	3. Maja Čačija	Entomology	FAZ

4. Course title	Invasive Alien Species		
*Teachers, discipline, PI	1. Ivana Pajač Živković	Entomology	FAZ
	2. Ankica Sarajlić	Entomology	FAZOS
	3. Aleksandra Konjevic	Entomology	UNS
	4. Jerinić-Prodanović Dušanka Scopus - 3, H-2		UB
	5. Snježana Hrnčić, Scopus - 24, h-6	Entomology	UoM
	6. Francesco Porcelli* Scopus n 40, hi - 11		UNIBA

5. Course title	Integrated Management of urban pests		
*Teachers involved, discipline, PI	1. Nedžad Karić	Entomology	PPF-UNSA
	2. Aleksandar Mešić	Entomology	FAZ
	3. Draga Graora Scopus- 7, H-2	Entomology	UB
	4. Aleksandra Ignjatović Čupina	Entomology	UNS
	5. Igor Pajović	Entomology/Nematology	UoM
	6.		

6. Course title	Vectors of plant pathogens		
*Teachers involved, discipline, PI	1. Olivera Petrović-Obradović Scopus- 35, H- 11	Entomology	UB
	2. Tanja Gotlin Čuljak	Entomology	FAZ
	3. Sanja Radonjić Scopus - 17, h-6	Entomology	UoM



TEKNOLOŠKI INOVATIVNI AGENCIJA



3. Redefinition of the learning outcomes for the group of the courses

The group of the learning outcomes is revised and fit within the proposed new courses.

TABLE 2. The learning outcomes for the group of courses in SG3 - Plant feeders

After completing the courses, student will be able to:
<ul style="list-style-type: none">● Judge the importance and analyze morphological and physiological characteristics of plant feeders● Compare and assess the fundamental principles of plant feeders' phylogeny and systematics.● Discuss and distinguish the biological and ecological characteristics of plant feeders● Estimate invasive alien pest harmfulness in upcoming climate changing environment● Employ, test and design advanced methods of identification of plant feeders● Assess and develop an invertebrate pest and resistance management plan which implies sustainability and preservation of biodiversity● Argue the molecular mechanisms by which DNA controls development, growth or morphological characteristics of plant feeders, and the use of molecular data in pest and resistance management.● Interpret the principles of plant feeders' specific adaptations and evaluate hosts and plant resistance mechanisms.● Evaluate invertebrate host-pathogen interactions to understand the immunity of pests● Calculate major invertebrate pest damage thresholds

4. Didactic material that will be created or shared by our group

Teaching and learning material will be regarded as didactic material that can be used for both purposes. Our group is sharing valuable documents. Members of the group are members of IOBC and EPPO, and are offering to share the benefits of this membership (Bulletins, Protocols etc).

Table 3. Teaching and learning material shared by SG 3 group

SG	Course title- status (new or similar course)	Teaching material ready	Material provided by (name of teacher, student-PI)
3	1. Frontiers in invertebrate pest and resistance management - <u>NEW</u> course and <u>similar</u> courses related to entomology	Review paper <i>Kadoić Balaško, M., Bažok, R., Mikac, K. M., Lemic, D., & Pajač Živković, I. (2020). Pest Management Challenges and Control Practices in Codling Moth: A Review. Insects, 11(1), 38.</i>	Martina Kadoić Balaško (FAZ), PhD student
	2. Frontiers in invertebrate pest and resistance management - <u>NEW</u> course and <u>similar</u> courses related to entomology	Review paper <i>Mrganić, M., Bažok, R., Mikac, K. M., Benítez, H. A., & Lemic, D. (2018). Two decades of invasive Western corn rootworm population monitoring in Croatia. Insects, 9(4), 160.</i>	Martina Kadoić Balaško (FAZ), PhD student
	<i>The name of the New course and Similar courses related to acarology</i>	Title of the PPT given at EFSA meeting	Enrico De Lillo (UNIBA)

5. Action plan of SG3

TABLE 4. Action plan – Plant feeders SG3

Task	Duty assigned to	Due date
Deposited didactic material 1 and 2 in the repository of the project web page	Martina Kadoić Balaško, FAZ	29/5/2020
Deposited didactic material 3 in the repository of the project web page	Enrico De Lillo, UNIBA	29/5/2020
Collected declarations of interest of the expert teachers and the teachers involved for each course	all group members	12/5/2020
The expert teachers of the courses nominated	all group members	1/6/2020
The teachers involved in the courses nominated	the expert teacher incharge of the courses	30/6/2020
Syllabus created for the course Advanced techniques in plant feeders	the expert teacher incharge and all the teachers involved	15/10/2020
Syllabus created for the course Frontiers in invertebrate pest and resistance management	the expert teacher incharge and all the teachers involved	15/10/2020
Syllabus created for the course Advanced invertebrate pathology	the expert teacher incharge and all the teachers involved	15/10/2020
Syllabus created for the course Invasive alien pests	expert teacher incharge and all teacher involved	15/10/2020
Syllabus created for the course Integrated management of urban pests	the expert teacher incharge and all the teachers involved	15/10/2020
Syllabus created for the course Vectors of plant pathogens	the expert teacher incharge and all the teachers involved	15/10/2020



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6. Adaptations to the Syllabus Template			
Course Specification for PhD studies program			
Study program			
Course code			
Type and level of study			
Course name			
Coordinator			
Collaborators			
Number of ECTS or workload hours		Course status	elective
Preconditions necessary previous exam to pass			
The aim of the course			
The learning outcomes			
The students competences			
Course content			



Harmonization and Innovation in PhD Study Programs for Plant Health in Sustainable Agriculture –HarISA is a Erasmus+ project funded with the support of the European Union. Project Number: 598444-EPP-1-2018-1-HR-EPPKA2-CBHE-JP (2018-2472 / 001-001)

Thematic units	1. topics elaborated. 2. topics elaborated. 3. topics elaborated. ... 4. ...			
References (required and additional)				
Number of classes				
Lectures	Practical classes	Other	Student research work	Other classes
Teaching procedures				
Evaluation (max. 100 points)				
Pre-exam obligations	Points	Final exam	Points	
Activity during lectures		Written		
Practical classes		Oral		
Colloquium				
Seminar papers				

Final remarks of SG3 achievements:

- Members of the subgroup Plant feeders redefined the new courses and learning outcomes for the group of the courses, collected the interest of the teachers for specific courses, created proposal of the conditions for the nomination of the expert teacher and the teachers involved in the courses, proposed teaching/learning material that will be created and shared, designated duties in an action plan, and made adaptations to the proposed syllabus template.
- According to the suggestions of the Consortium, the courses were redefined. Group members proposed titles of 6 new courses, instead of 13 courses defined during the Belgrade meeting. The group of the learning outcomes was revised and it fits within the proposed new courses. Ivana Majić (FAZOS) created online document a week before the meeting, and collected to interest of teachers from the most of the PIs to be involved in the new joint PhD study. Group discussed the document and accepted the nominations. Proposal of the procedure for the nomination of the expert teacher and teachers involved in the courses was proposed and accepted by all members. The selection of the expert teacher (coordinator) of the course should be based on the tracking record of the teacher in the last 10 years (Scopus database: number of publications relevant to the course and h - index). Proposed instructions to the expert teacher for the election of teachers involved in the courses are: The selection of the teachers involved should be based on the tracking record of the teacher in the last 10 years (Scopus database: number of publications and h - index); possibly select teachers whose competences are covering all groups of plant feeders (entomologist, nematologist, acarologist etc.); possibly include different PIs. Invitation to all members of the Consortium is extended until 30/5/2020 to express their interest to participate in teaching, and development of the syllabus for the specific course proposed by SG3. The document was sent to all PIs.
- Teaching and learning material created and shared will be regarded as didactic material that can be used for both purposes. Members of the group who are also members of IOBC and EPPO, and are offering to share the benefits of these memberships (Bulletins, Protocols etc). Enrico de Lillo (UNIBA) will share valuable document that can be used as a didactic material, and it is relevant to the new courses related to Acarology, while Martina Kadoić Balaško (FAZ, student) will also share new and interesting data for existing and new courses related to Entomology until 29/5/2020.

SG4– Plant pathology



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Date and Place of Meeting: April, 28th 2020 10:30 – 12:00 Zoom meeting

Minutes Prepared By: Sotirios Tjamos

- List of participants (10): Sotirios Tjamos; Mladen Zovko; Ferenc Bagi; Jelena Latinović; Claudia Greco Martin Marinov; Maria Iliadi, Arnela Okić, Magdalena Matić, Dragana Božić
- After revision of similar courses SG4 propose 1 course instead of four. New course **Advanced Plant Pathology** would cover four similar courses: Advanced Mycology, Advanced Bacteriology, Advanced Virology and Molecular detection of plant pathogens.

Proposal for New Course									
Study program									
Course code									
Type and level of study	PhD								
Course name	Molecular Plant Microbe Interactions								
Professors for theoretical lectures	AU: AUA: Paplomatas / Tsitsigiannis / Tjamos AUT: FAZ: FAZOS: SVEMO: UB: Natasa Duduk UNIBA: UNSA: Ferenc Bagi UNKO: UoM:								
Professors/collaborators for practical exercises									
Professors/collaborators for other type of activities									
Number of ECTS	Course status								
Preconditions necessary previous exam to pass	elective								
Education goals	<ul style="list-style-type: none"> - Knowledge on how fungi/oomycetes, bacteria, viruses invade plants - Knowledge on how plants defend against biotrophs and necrotrophs - Explain the role of defence signaling hormones upon pathogen attack - Compare and contrast SAR and ISR - Knowledge on cross-talk between defence signaling hormones - Improve knowledge of how to use plant immunity against plant pathogens 								
Acquirable skills	<ul style="list-style-type: none"> - Formulate scientific hypothesis on plant - microbe interaction - Design Experiments based on correct methodology - Collect Experimental data from in planta experiments - Analyze Experimental data - Compare and Conclude to scientific results 								
Student Competence	Improved skills for working in - Plant Breeding and Biotechnology companies - Academia								
Course content									
Theoretical classes	<ul style="list-style-type: none"> - Pathogenicity mechanisms: avr genes - effectors - type III secretory system - Quorum sensing (cell-cell signaling) - Plant Defense: zig-zag theory - R genes - Hypersensitive Reaction - Gene to Gene theory - Systemic Acquired Resistance - Induced Systemic Resistance 								
Practical training (exercises, student's research work, other types of activities)	1. Paper presentation 2. Case studies: handling and interpreting RNAseq and microarray results from free public data								
References (up to 10)	<ol style="list-style-type: none"> 1 Cook et al. 2015. Understanding Plant Immunity as a Surveillance System to Detect Invasion Annual Review of Phytopathology 53:1, 541-563 2 Fu et al. 2013. Systemic Acquired Resistance: Turning Local Infection into Global Defense. Annual Review of Plant Biology 64:1, 839-863 3 Hann et al. 2010. Bacterial virulence effectors and their activities. Current Opinion in Plant Biology 13:388-393 4 Mandadi et al. 2013. Plant Immune Responses Against Viruses: How Does a Virus Cause Disease? The Plant Cell 25 (5) 1489-1505 5 Melotto M. and Kunkel BN 2013. Virulence Strategies of Plant Pathogenic Bacteria. In: Rosenberg et al. (eds.), The Prokaryotes – Prokaryotic Physiology and Biochemistry, DOI 10.1007/978-3-642-30141-4_62, Springer-Verlag Berlin Heidelberg 6 Presti et al. 2015. Fungal Effectors and Plant Susceptibility. Annual Review of Plant Biology 66:1, 513-545 7 Pieterse et al. 2014. Induced Systemic Resistance by Beneficial Microbes. Annual Review of Phytopathology 52:1, 347-375 8 Singh, A. and Singh, I.K. eds., 2018. Molecular Aspects of Plant-Pathogen Interaction. Springer. 9 Stassen et al. 2011. How do oomycete effectors interfere with plant life? Current Opinion in Plant Biology 14: 407-414 								
Number of classes									
Lectures	<table border="1"> <thead> <tr> <th>Practical classes</th> <th>Other</th> <th>Student research work</th> <th>Other classes</th> </tr> </thead> <tbody> <tr> <td></td> <td>X</td> <td></td> <td></td> </tr> </tbody> </table>	Practical classes	Other	Student research work	Other classes		X		
Practical classes	Other	Student research work	Other classes						
	X								
Teaching procedures	Seminar presentations - Interactive learning								
Evaluation (max. 100 points)									
Pre-exam obligations	Points								
Activity during lectures	Written								
Practical classes	Oral								
Colloquium	25								
Seminar papers	25								
	50								



SG5 – Weed Science
Date and Place of Meeting: April, 28th 2020 13:30 – 17:00 Zoom meeting

Minutes Prepared By: Maja Ščepanović

1. Purpose of Meeting

1. Appointment of task leaders
2. Improving the scientific contents
 - a) similar courses
 - b) new courses
3. Members involvement

2. Meeting Notes, Decisions, Issues

List of participants

N ^o	Name	University	
1	MirhaĐikić	University of Sarajevo	Professor
2	FejzoBašić	University of Sarajevo	Phd student
3	TeofilGavrić	University of Sarajevo	Professor
4	Antonela Musa	Mostar University	Phd student
5	DanijelaPetrović	University of Mostar	Professor
6	Amadeo Kola		
7	MyroslavTytianov	Plovdiv University	Professor
8	Maja Ščepanović	University of Zagreb	Professor
9	Valentina Šoštarčić	University of Zagreb	Phd student
10	Zoran Jovović	University of Montenegro	Professor
11	IlirNicko	University of Korce	Professor
12	DraganaBožić	University of Belgrade	Professor

1. The meeting of SG5 group started on 28/10/2019 at 13:00, with the introduction of SG5 leader, Maja Ščepanović. Present participant of SG5 are listed in table 1. At this meeting, Professor MyroslavTytianov form Plovdiv University joined SG5 and he will be a member of this group till the end of the Project. There was no representative from University of Novi Sad (professor BojanKonstantinovic), but the presentation and minute from this meeting were delivered to him. Also, the material was sent to professor Renata Baličević form University of Osijek because she is will be representative from University of Osijek in issues regarding SG 5 group.
2. After the introduction, the participant of SG5 group started with the work. First task was to appoint the Task leader who will coordinate the activities regarding Task 3.3. (Scientific content improvement). Maja Ščepanović (FAZ) was unanimously appointed as Task leader and Minute-taker Secretary of the SG5 online meeting, 28th April 2020.
3. The main purpose of this meeting was **to improve the scientific contents**, started at Belgrade meeting, October, 27-29,2019 regardingSimilarandNewCourses.
4. Action plan from **SimilarCourses (AdvancedWeedManagementandWeedScience/Herbology)** is to:
 - a) PrepareLearningoutcomes (LO) andSyllabus
 - b) Harmonize LO ofSimilarCoursesbased on LO of SG5
 - c) PrepareteachingmaterialforthisCoursesand sent to Taksleader.

The SG5 group appointed Responsible persons for this activities as follows:



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*Maja Šćepanović (FAZ), Bojan Konstantinovic (UNS) and Myroslav Tytianov (AU) for Course Advanced weed management

*Dragana Božić (UB), Bojan Konstantinović (UNS), Renata Baličević (FAZOS), Mirha Đikić (UNSA), Miroslav Tityanov (AU), Danijela Petrović (SVEMO) and Ilir Nicko (UNKO)

It was decided that syllabus for Similar Courses will be sent to Task Leader till mid October 2020.

5. Action plan from New Courses is to:
- Create a LO and Syllabus for New Courses
 - Prepare teaching and didactic material for New Courses
 - SG5 group defined the deadlines for these duties: 1/2/2021 for a) and 15/6/2021 for b)
- Task leader is sending completed documentation for new courses: 15/10/2021

Initially (Belgrade meeting) two New Courses were proposed: Weed management in Precision Agriculture and Modelling in Weed Science. However, after discussion within SG5 and due to activities in other SG group regarding Invasive organism, we proposed to create a new course – **Invasive Plant Species** and appointed prof Sava Vrbničanin (UB) to be a main teacher.

New Courses for SG5 group are listed in Table 2.

Table 2. New Courses for joint PhD Study

Newcourse	Main teacher	Colaborators
Weed management in precision agriculture	Dragana Božić	Miroslav Tityanov Teofil Gavrić
Modelling in Weed Science	Maja Šćepanović	Sava Vrbničanin Zoran Jovović Jasmin Grahić Roberta Masin* Mostafa Oveisi*
Invasive plant species	Sava Vrbničanin	Maja Šćepanović

*expert in modelling, not included in Harissa project, to be in contact to participate in Course

The discussion continued about the development of teaching material for both, Similar and New Courses. The participant of SG5 agreed that teaching material will consist of:

- Protocols
- Scientific papers
- Power point presentations
- Books and
- Protocols

We already create an excel table and divided materials in: a) Ready teaching material and b) Material to be prepared. Mostly, within material to be prepared it will be **Protocols** (for example Protocol for weed seed bank analysis or Protocol for breaking *Ambrosia artemisiifolia* seed dormancy) as well as Review paper (for example Weed control using techniques of precision agriculture). We appointed teacher and student who will prepare teaching material for specific course (Similar or New)



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1. Lastly a Learning Outcomes of SG5 has been discussed (listed in Table 3).

Table 3 Learning outcomes for SG5

1.	Attach weed biology and ecology to sustainable weed management
2.	Explain weed crop interaction in agriculture
3.	Predict weed emergence and develop new methods for weed monitoring and mapping
4.	Categorize the advantages and disadvantages of each weed control method

However, Project leader, prof Renata Bazok suggested to slightly modified LO to be more connected with PhD study. A new version of LO will be delivered soon.

The meeting was concluded on 28/4/2020 at 17:00 pm

SG6 –Mycotoxins and food safety

Date and Place of Meeting: April, 28th 2020 13:30 – 17:00 Zoom meeting

Minutes Prepared By: DimitriosTsitsigiannis

Participants

1. DimitriosTsitsigiannis, Assoc. Prof, Agricultural University of Athens, Greece
2. Magdalena Cara, Prof., Agricultural University of Tirana, Albania
3. FerencBagi, Prof.University of Novi Sad, Serbia
4. Karolina Vrandecic, Prof., University of Osijek, Croatia
5. YordankaKartalska, Assoc. Prof., Agricultural University of Plovdiv, Bulgaria
6. Anita Jurić, Assist. Prof., University in Mostar, Bosnia and Herzegovina
7. FehmiXhemo, Assistant Professor, University of Korca, Albania
8. Christinalagogianni, PhD Student, Agricultural University of Athens, Greece

1. Meeting Notes, Decisions, Issues

SG6	Joint learning material production (similar courses ... and/or new contents)	
Similar Courses (titles)	<ul style="list-style-type: none"> • Mycotoxins • Mycotoxigenic fungi • Toxicogenic Fungi and Mycotoxins 	<ul style="list-style-type: none"> • Analytics of residues and contaminants in food and environment • Food Toxicology • Phytotoxins
New courses (titles)	Mycotoxins and food safety	Courses that offer similar learning outcomes : <ul style="list-style-type: none"> • Mycotoxigenic fungi and their associated mycotoxins • Epidemiology of mycotoxigenic fungi • Risk assessment of mycotoxins in field, storage, human and animal. • Prevention measures and post harvest strategies to manage mycotoxins • Rapid and analytical methods for mycotoxin assessment • Regulations and legislation about mycotoxins
Teachers involved /PI	Dimitris Tsitsigiannis (AUA), Ferenc Bagi (UNS), Magdalena Cara (AUT), Yordanka Kartalska (AU) Anita Jurić (SVEMO), Fehmi Xhemo (UNKO), Nataša Duduk (UB)	
Incharged leader	Dimitris Tsitsigiannis, AUA	
Action plan	Production of course syllabus Production of joint teaching material	

LEARNING OUTCOMES

Define the terms food safety, food poisoning, food hazard and mycotoxins





Erasmus+

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- **Identify** and **describe** the present worldwide status on mycotoxin contamination in food and feed
- **Identify** what might happen if mycotoxin hazards are not controlled
- **Recognise** the importance of reporting food safety hazards regarding mycotoxins and the importance of implementing procedures to control mycotoxins
- **Define and demonstrate** the methodology of classical, molecular and chemical identification of mycotoxigenic fungi
- **Define and describe** the mycotoxin risk assessment and the epidemiology of mycotoxigenic fungi at pre- and post-harvest level
- **Design** experiments based on the epidemiology of mycotoxigenic fungi
- **Describe** the classical and new methods on the identification of mycotoxins in food and feed
- **Describe and analyze** mycotoxin prediction modeling at pre- and post-harvest level of food production
- **Develop** smart integrated pest management approach to prevent mycotoxins
- **Collect and analyze** data from the experimentation on mycotoxins management strategies
- **Identify** the costs of poor food safety practices to a business

MYCOTOXINS AND FOOD SAFETY - SYLLABUS

Theory

- Introduction to food safety
- Introduction to mycotoxins and food safety biological hazards : Risks in plant, animal and human systems
- Mycotoxigenic fungi and their associated mycotoxins
 - Advanced molecular and chemotypic studies on identification of mycotoxigenic fungi
- Diseases of mycotoxigenic fungi in plants
- Epidemiology of mycotoxigenic fungi
 - Studies on epidemiology of mycotoxigenic fungi
- Risk assessment of mycotoxins in field, storage, human and animal
- Prevention and control measures and post harvest strategies to manage mycotoxins
- Experimentation on mycotoxins management strategies
- Sampling of mycotoxigenic fungi and mycotoxins
- Rapid and analytical methods for mycotoxin assessment in the Food Chain
- TLC, ELISA, Strip Tests, Biosensors, HPLC, LC-MS/MS
- Regulations and legislation about mycotoxins
- Current trends in mycotoxin research
- Mycotoxin prediction modeling at pre- and post-harvest level of food production
- Smart integrated mycotoxin management (robotics, smart sprayers)
- Decision Support Systems on mycotoxins

Laboratory exercises

- Diagnosis of diseases caused by mycotoxigenic fungi (symptoms, signs)
- Morphological, cultural and toxigenic characteristics of mycotoxigenic fungal species
- Molecular techniques of mycotoxigenic fungi identification
- Learning skills and techniques for detection of mycotoxins in food and feed

Student Acquirable skills

- **Advanced skills on detection of mycotoxigenic fungi and mycotoxins**



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- Advanced skills on molecular identification of mycotoxigenic fungi
- Skills on designing mycotoxin pre-harvest or post-harvest management strategies
- Skills on developing mycotoxin risk management strategies
- Capability to recognize and manage mycotoxin contamination
- Skills on rapid and analytical methods for mycotoxin assessment in the Food Chain
- Skills to preventing mycotoxin contamination on field
- Knowledge on mycotoxin prediction modeling and smart Decision Support Systems
- Opportunities to develop entrepreneurship skills create start-up companies
- Opportunities to find jobs in Research labs, Food Industry, Academia, Plant Protection Product Companies, Farmers' Advisor

Action plan

- PowerPoint Presentations
- Reference material
 - Books
 - Scientific papers
 - Review papers
 - Videos
- Include personal or group scientific papers or book chapters related to the course
- Create a dropbox folder “Harisa – Mycotoxins and Food Safety” to deposit all the course teaching material

SG7 – General contents of transversal interest**Date and Place of Meeting:** April, 28th 2020 13:30 – 16:00 Zoom meeting**Minutes Prepared By:** Ana Mandić

Participants

1. Mirjana Brmez, FAZOS
2. Renata Bažok University of Zagreb Faculty of Agriculture
3. Ana Mandić, University of Mostar, APTF
4. JosipaPuškarić, FAZOS
5. NedeljkoLatinovićUoM
6. Sava Vrbnicanin, University of Belgrade
7. Claudio de Giovanni, UNIBA
8. Enrico de Lillo, UNIBA
9. Antonio Ippolito UNIBA, ITALY
10. DrenaGadzo from UNSA had a problem with connection.
11. DušanPetrić (UNS)
12. Jelenalić (FAZOS)
13. ViliHarizanova (AU)

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Course title	Duty assigned to (name, role)	Remark
1. Principles of Scientific Work in Bioscience (including ethics and laboratory hazards) –old	Zrinka Knezović (SUM), Antonio Ippolito (UNIBA), Sava Vrbničani (UB)	
2. Biodiversity and bio-indicators in sustainable agriculture – new	Brmez Mirjana (FAZOS), Dinka Grubišić (UNIZG)	Lemic Darija - to check with
3. Knowledge and management of research funding systems - new	Renata Bažok (UNIZG), Nedjeljko Latinović (UoM)	We have changed title of subject
4. GIS and Spatial Data Analysis - old/new	Goran Topisirović (UB), Melisa Ljuša (UNSA)	Need to check available persons
		<i>We would like to ask everyone to appoint experts from their institutions</i>
We have proposed subject that was not previously included:		
5. Bioinformatics		Subject is taught at UNIBA we are interested to implement it on other universities as well.

Set dates for duties / Action plan	Activity	Participants
15.5.2020	Open dropbox and distribute	Ana Mandic (SUM APTF)
1.6.2020	Writing syllabus	Responsible (Duty signed to..)
15.6.2020	Discussion of proposed syllabus	All
31.8.2020	Put material in dropbox	Responsible
30.9.2020	Checking material	All
15.11.2020	Uploading material on web	All
Remark:	Ana Mandic to supervise implementation	ana.mandic@aptf.sum.ba

Teaching material remarks:
HARISA will open Researchgate profile, all profsors and students should link their names with HARISA project in their Researchgate profile. This is important for distribution of teaching material and also for project dissemination.
For the beginning everything will be on the dropbox. Material will be mostly in form of presentation in PDF or some published articles, links and useful data on searching and using already published materials
In dropbox we will upload even material that are not in English but in language of partners institutions

Learning outcomes SG 7 General contents of transversal interest
Remark: This are outcomes for this SG not for specific courses
1 Categorize basic concepts of scientific research: set-up explicable hypothesis, determine the measurable research goals and design original research in the field of plant health for sustainable agriculture
2 Critically analyse and evaluate the results of its own scientific research in sense of scientific writing
3 Create and actively participate in the preparation of studies and project proposals in the field of plant health in sustainable agriculture. Value and analyze project calls to find appropriate call to apply for research funding.
4 Organize and apply for patent protection at national and international level and manage the intellectual property rights
5 Evaluate best bio-indicators and ecological indices of soil health that can reflect soil biodiversity and organism interaction in sustainable agriculture
6 Interpret and argue the latest technical, technological and socio-economic knowledge related to plant health in the field of sustainable agriculture.
7 Applied bioinformatic tools for research

Questions and dilemmas
Template for writing syllabus should be unique on project level
Template should include outcomes and competences
We need feedback from other institutions, that were not present at meeting in appointing staff for courses.