USDA's Foreign Agricultural Service (FAS) is seeking to identify U.S. universities willing to host English speaking agricultural scientists from **Algeria, Egypt, Morocco and Tunisia** under the Norman E. Borlaug International Agricultural Science and Technology Fellowship Program (Borlaug Fellowship Program). These Fellows have been selected competitively based on research priorities, academic and work accomplishments, commitment to Borlaug Fellowship goals and leadership qualities. It is recommended that the program begin in **September 2011,** however, priority should be given to a time that is appropriate for the Fellow's proposed topic of research. The program should last for a period of 8-12 weeks.

Each Fellow has specific research topic interests. Please find below a brief description of the Fellows' research/fellowship interest, educational and research background, and program goals. Click on the hyperlink for more details regarding each Fellow's expressed interest as indicated in his/her proposed action plan.

1. Fellow #1 (male-Egypt)
    - Background: MSc. in Food Safety; BSc in Horticulture and animal production.
    - Main Objective: To understand the international context of Pest Risk Analysis.
    - Wishes to gain comprehensive knowledge n pest risk analysis so that it can be incorporated into the daily work of plant quarantine officers.
2. Fellow #2 (male-Egypt)
    - Background: PhD in Environmental Soil Science; Msc. and BSc in Soil and Water Science. Currently works as an Assistant Professor in the Soil and Plant Nutrition Lab at the Agricultural Research Center in Egypt.
    - Main Objective: Evaluation of biological nitrification inhibition (BNI) function and development of new nitrogen fertilization guideline for sweet sorghum and rice.
    - Wishes to make a quantitative analysis of nitrogen dynamics in sorghum and rice and clarify how BNI affects these dynamics.
3. Fellow #3 (male-Morocco)
    - Background: PhD in Plant Protection; MSc in Plant Biotechnology; BSc. in Biology. Currently works as a researcher in plant protection for the National Institute of Agronomic Research in Morocco.
    - Main Objective: Detection and identification of the greening disease in citrus- Couple Psyllids/Candidatus liberibacter.
    - Wishes to improve knowledge as it relates to the detection of vectors of greening disease.
4. Fellow #4 (male-Tunisia)
    - Background: PhD in Plant Pathology; MSc in Environment. Currently works as a researcher in specialized plant pathology for The Olive Tree Institute of Tunisia.
    - Main Objective: Detection of olive tree diseases and identification of genes implied in the resistance of olive trees to pathogens.
    - Wishes to learn new techniques, methods and recent scientific development in plant pathology as it relates to olive trees.

5. Fellow #5 (female-Algeria)
    - Background: Post graduate diploma in Biology.
    - Main Objective: Design integrated pest management systems.
    - Wishes to enrich knowledge in various aspects of integrated pest management systems particularly the use of natural enemies.

Institutions may submit proposals to host more than one Fellow. Institutions interested in hosting one or more Fellows should submit a proposal following the guidelines below:

- Indicate the name of the institution and mentor applying to host the Fellow(s);
- Indicate the country, research interests and reference number of each Fellow;
- Provide a tentative action plan based on the Fellow's research proposal and action plan, including topics covered, field visits and other activities;
- Provide a summary of relevant institutional capabilities for hosting international scientists and policymakers in the proposed field;
- Briefly describe the research expertise and international experience of the mentor in the Fellow's field of interest;
- A 1-2 page curriculum vitae should be provided for mentors and other collaborating researchers involved in the proposed program. This is not included in the page count provided maximum noted below.
- Identify the expected skills or knowledge to be acquired by the Fellow at the end of the program;
- Complete a budget based on the attached template with budget notes justifying the budget. If attendance at the World Food Prize in Des Moines, Iowa in October, 2011 is feasible, the budget should include time and funding for the Fellow to attend;
- Complete the following checklist on university administrative policies;
- **Include all components of the proposal in a single PDF document, and;**
- **Proposal, excluding the budget, should not exceed 3-4 pages. If more than one Fellow is requested, an additional two pages per fellow is permitted.**

Please submit the proposal, university administrative checklist and estimated budget via email to: Karen Uetrecht at Karen.Uetrecht@fas.usda.gov or Tacarra Birmingham at Tacarra.Birmingham@fas.usda.gov. **FAS would like to receive all expressions of interest by June 6, 2011.**

Funding support will be provided through USDA as part of the Borlaug Fellowship Program. For more information on the Borlaug Program, please visit our website at: http://www.fas.usda.gov/icd/borlaug/Borlaug.asp.

The Norman E. Borlaug International Agricultural Science and Technology Fellowship Program aims to promote food security and economic growth by increasing scientific knowledge and collaborative research to improve agricultural productivity. This program targets promising young scientists and policymakers from developing or middle income countries. The Fellows spend 8-12 weeks in the United States and work one-on-one with a U.S. scientist in their field. The mentor coordinates the Fellow's training and in order to continue collaborative efforts, visits the Fellow's host country for 7-10 days within 6-12 months after completion of the training in the U.S.

During the program, the Fellows learn new research techniques, gain exposure to the latest scientific developments in various fields of agriculture, access fully-equipped laboratories and libraries, and learn about unique public-private partnerships that help fund agricultural research and science. Equally important, this program provides international scientists and policymakers with opportunities to establish long-term contacts with U.S. scientists and apply newly gained knowledge from U.S. institutions to their country's research and development programs.

The World Food Prize is awarded annually during the **NORMAN E. BORLAUG INTERNATIONAL SYMPOSIUM** in Des Moines, Iowa. This year the World Food Prize is scheduled for October 12-14, 2011. The USDA Borlaug Fellowship Program organizes a side-event each year which includes activities for Borlaug Fellows that provide important networking opportunities for Fellows and international agricultural researchers, policy makers and the non-profit sector. The following link provides more information about the World Food Prize Borlaug Dialogue: http://www.worldfoodprize.org/index.cfm?nodeID=25286.

Host University Administrative Checklist

Please fill out the following checklist concerning the university's policies on the administrative aspects of hosting a fellowship.

Host University Policies	YES	NO
Will all mentors listed in the proposal be present for the majority of the fellowship?		
Will the university be able to provide per diem within the first week of the Fellow's arrival?		
Will the university be able to provide fully furnished lodging with kitchen facilities?		
Does the university tax participants' per diem and housing (if so, please include in the budget)?		

ANNEX

Fellow #1 (male- Egypt)

My background is bachelor degree with a major specialty in Horticultural sciences and a minor specialty animal production. I have received many training programmes in the different plant quarantine fields like Pest Risk Analysis, Plant Health Inspection, Phytosanitary Control Evaluation.

My research interests are very much related to my day to day work activities like how to harmonize the Egyptian phytosanitary control procedures, including the conduct of pest risk analysis, with the internationally recognized standards and guidelines.

Pest Risk Analysis Case Study
Importation of Seed Potatoes from United States to Egypt

Introduction

Pest risk analysis (PRA) is a science-based process that provides the rationale for determining appropriate phytosanitary measures for a specified PRA area. It is a process that evaluates technical, scientific and economic evidence to determine whether an organism is a potential pest of plants and, if so, how it should be managed. Under the IPPC, the term plant pest refers to all organisms harmful to plants or plant products including other plants, bacteria, fungi, insects and other animals, mites, molluscs, nematodes, and viruses. Pests can be either regulated or not, and the IppC recognizes and defines two categories of regulated pests of plants: quarantine pests and regulated, non-quarantine pests. PRA assists with determining whether a pest fits either of these two categories and the strength of phytosanitary measures, if any, that should be taken in response to it.

If it is determined that the organism is a potential quarantine pest of plants, probability of introduction and spread and the magnitude of potential consequences evaluated using scientific, technical and economic evidence if the pest risk is deemed unacceptable, the analysis may continue by suggesting management options that will reduce the pest risk to an acceptable level. These pest risk management options may be used to establish phytosanitary regulations.

A PRA may also consider the pest risks posed by the introduction of organisms associated with a particular pathway, such as a traded commodity. In most cases the commodity itself does not pose a pest risk but it might carry organisms that are pests of plants.

A Qualitative Pathway-Initiated pest Risk Analysis

In Egypt, the implementation of plant quarantine is placed under the responsibility of the central Administration of Plant Quarantine (CAPQ) of the Egyptian Ministry of Agriculture' CAPQ is about to prepare a Pest Risk Analysis study for the plant pest risks that might be associated with the potential importation of seed potatoes from United States to Egypt. Currently this commodity is approved for importation into Egypt from origins other than United States.

The PRA study will list the quarantine pests likely to follow this pathway "seed potatoes" and focus on the major quarantine pests like potato brown rot disease *Ralstonia solanacearum*, potato ring rot disease *Clavibacter michiganensis subsp. sepedonicus*, potato spindle tuber viroid and the new threat to potato Dickeya solani.

That PRA study shall come up with the phytosanitary measures that shall be taken to eliminate any potential pest risks und secure the importation of seed potatoes from United States to Egypt.

Objectives of this case study:

- To get familiar with the background knowledge to understand the purpose of PRA and how PRA fits into the IPPC,
- Develop the skills required to conduct PRAs within the context of the IPPC,
- Receive hands-on experience in conducting PRAs,
- Receive examples of how PRA is performed in the United States

Proposed Action Plan

Research Action Plan (for a six week training program)

1st Week

IPPC, SPS, NPPOs, RPPOs
Primary Phytosanitary Principles
International Standards for Phytosanitary Measures
ISPMs Specifically Related to Pest Risk Analysis
Other ISPMs Applicable to PRA: National Application of ISPMs
Pest Risk Analysis: Purpose of Pest Risk Analysis
Risk, Probability, Impacts, Pest-initiated vs. Pathway-initiated PRAs
Communication: Information Gathering, Sources of Information
Pest records, Pest reports, Transparency in PRA -Documentation of the PRA

2nd Week

Stage 1: Pest Risk Initiation
Initiation points: Identification of a Pathway - Identification of a Pest
Review of Phytosanitary Policies
Identification of an Organism not Previously Known to be a Pest
Determination of an Organism as a Pest, Plants as Pests
Biological Control Agents and Other Beneficial Organisms
Organisms Difficult to Identify or New to Science
Living Modified Organisms (LMOs), Intentional Import of Other Organisms
Definition of the PRA Area - Previous PRAs, Conclusion of the Initiation Stage

3rd Week

Stage 2: Pest Risk Assessment
Approaches to Pest Risk Assessment
Pest Categorisation: Identity, Presence or absence in the PRA area , Regulatory status
Potential for establishment and spread in the PRA area
Potential for economic and environmental consequences in the PRA area
Organising Pest Categorisation Data
Conclusion of Pest Categorisation
Assessment of the Probability of Introduction

4th Week

Probability of Entry
Probability of being associated with pathway at origin
Probability of survival during transport
Probability of pest surviving existing pest management procedures
Probability of transfer to suitable host
Probability of Establishment: Availability of suitable hosts, alternate hosts and vectors
Suitability of environment
Cultural practices and control measures
Other pest characteristics affecting probability of establishment
Final estimate of probability of establishment
Probability of Spread after Establishment, Including Estimation of Spread Rate
Conclusion on the Probability of Introduction and Spread
Assessment of Potential Impacts of Introduction and Spread (step 3)
Assessment of Potential Economic Consequences
Identifying Pest Effects (Direct pest effects - Indirect pest effects)
Analysis of Economic Consequences
Time and place factors
Analysis of commercial consequences: Analytical techniques
Environmental and social consequences
Conclusion of Assessment of Potential Impacts
Overall Assessment of Pest Risk
Uncertainty, Identification of Uncertainty

5th Week

Stage 3 - Pest Risk Management
Level of Pest Risk
Acceptability of Pest Risk
Identification of Possible Risk Management Options
Options for Phytosanitary Measures for Consignments
Options for Preventing or Reducing Infestation in the Crop
Options Ensuring that the Area, Place or Site of Production is Free from the Pest
Options for Other Types of Pathways
Options Within the Importing Country for Preventing or Reducing Crop Infestation
Prohibition of Commodities
Phytosanitary Certification
Evaluation of Options, Selection of Options
Conclusion of Pest Risk Management

6th Week: Practical exercises

Fellow #2 (male - Egypt)

Research Description

The ability to release inhibitory compounds from roots to regulate/control soil nitrification is termed as 'biological nitrification inhibition (BNI). The existence of such a phenomenon in sorghum (Sorghum bicolor) has been established and characterized. The ongoing research at JIRCAS, Japan further provides evidence that the root exudates of sorghum show substantial inhibitory effect on nitrification process in the bioassay system that determines BNI activity. Thus, sorghum is considered as a potential target crop for BNI characterization under controlled plant growth environments in a growth chamber and glass house supplemented with field studies to establish and confirm this novel attribute. The BNI attribute will have a multi-functional role in protecting nitrogen from nitrification and associated nitrogen losses, thus can potentially have dramatic effects on improvement of N uptake, N use efficiency in sorghum and sorghum-based cropping systems. Sweet sorghum developed by ICRISAT, India has an ability to produce a considerable amount of carbohydrates and can be used for multiple purposed such as human foods, animal feeds and bio-fuel. Although production of sweet sorghum may provide poor farmers in the semi-arid tropics with more income, it is expected to require more fertilizer input than traditional grain sorghums. In order to establish more efficient use of nitrogen fertilizer that is still costly for those poor farmers and propose sustainable cropping system that has low impact on environment, BNI should be considered when the guideline of soil fertility management is developed for sweet sorghum. It is expected that fertilizer use efficiency and environmental impact will be greatly reduced through appropriate management of BNI.

Objectives

1. To obtain evidence of the existence of BNI function under field conditions
2. To make quantitative evaluation of nitrogen dynamics in sorghum and sweet sorghum field sand clarify how and how much BNI affects the dynamics
3. To develop a new nitrogen fertilization guideline for sweet sorghum and rice through adequate management of BNI

Strategies of implementation

1) Clarification of biological nitrification inhibition in sorghum and rice field

Sorghum and rice will be cultivated in pots and field. The rhizosphere soil sampled from the pots and experimental fields will be used for a soil incubation experiment to measure nitrification potential through monitoring of ammonium-N and nitrate-N in soil. Development of a quick and simple bioassay system will be attempted to detect and evaluate BNI by using a luminometer or an oxygen electrode. The BNI compounds will be collected from roots of sorghum and sweet sorghum and then their chemical properties will be characterized. Major compounds responsible for BNI will be isolated and identified. The soil properties that affect BNI will be quantitatively evaluated especially focusing on soil pH

2) Quantitative evaluation of nitrogen dynamics in sorghum and rice fields and clarify how and how much BNI affects the dynamics

The nitrogen dynamics in the field will be clarified through monitoring of nitrogen in the plant-soil-atmosphere system. Measurement of nitrogen recovery rate and composition of nitrifying bacteria in soil will be carried out. Contribution of BNI in N dynamics in the system will be estimated. Based on the quantitative evaluation of BNI within N dynamics in the field, the guideline on soil fertility management will be developed for sorghum and rice under drought condition.

Expected Output

(1) BNI function of sorghum and rice under drought condition clarified.
(2) Contribution of BNI to N dynamics in plant-soil-atmosphere system quantitatively evaluated.
(3) A new fertilizer recommendation for sweet sorghum and rice established.
(4) A manual on soil fertility management that considers beneficial effects of BNI on N dynamics in the field developed

After coming back, I will be having a new knowledge and technology for management of soil and crop that are applicable to the limited water conditions and establishment of a fertilizer application method to reduce the loss of nitrogen under water-saving conditions. In addition, I will be familiar with modern protocols for biological nitrification inhibitors.

If so, I will work even through rice research program and national rice technology transfer to

1. Improve recommendations for farmers to save chemical fertilizers
2. Increase farm profitability by optimizing inputs (fertilizer and water)
3. Reduce environment impact through low input agriculture and enhance of intensive sustainable production.

Expected Outcome

In order to establish more efficient use of nitrogen fertilizer that is still costly for those poor farmers and propose sustainable cropping system that has low impact on environment, biological nitrification inhibition (BNI) should be considered when the guideline of soil fertility management is developed for sweet sorghum. It is expected that fertilizer use efficiency and environmental impact will be greatly reduced through appropriate management of BNI.

Proposed Action Plan

Requirements needed for research

1. Chemicals for soil and plant analysis
2. Auto Ion Analyzer
3. Growth chamber

. Time planning.

1st Day	Arrival and communicate with the host researcher.
1st Week	Discussion with host researcher about the research plan, watching all the devices and materials used in research
2nd, 3rd and 4th Week	Collecting soil samples, analysis and cultivation the experiment
5th Week	Soil incubation test for nitrification inhibition and plant analysis.
6th and 7th Week	Training on techniques for nitrite and nitrate measurement.
8th and 9th Week	Training to simulate nitrification inhibition rate
10th and 11th Week	Statistical analysis, comparing its results with the previous ones
12th Week	Visit the library and collect the data about my grant activities and prepare a seminar. Go back to Egypt

Fellow #3 (male- Morocco)

Morocco is one of important world producers of citrus. During the last season (2009 – 2010), Morocco exported more than 489 171 Tons of mixed varieties. More than 71 % of citrus was exported from the Souss valley (South of Morocco). The ministry of agriculture in Morocco has planned to produce 3 767 Million Tons in 2020. To reach this objective, we must improve productions (varieties, fertilizers and cultural practices) and reduce all risks due to pathogens and pests. The important pest of Moroccan citrus orchards is the Mediterranean fruit fly: Ceratitis capitata. To control this pest, two major methods were adopted in Morocco (especially in the Souss valley):
• Sterile Insect technique (SIT)
• Chemical control

The monitoring of population was done with bait and traps. In packing house and during transportation, the fruits were stored at a temperature ranged between 0 and 2 °C for all produces destined to country where C. capitata was quarantine pest (example: USA) My aims during this training are:
- To be able to detect and identify both species Diaphorina citri and Trioza erytreae : psyllid vectors of greening citrus disease
- To be able to detect and identify Candidatus liberibacter : A bacterium causal of greening citrus disease

After my Bachelor of Science in Biology, I start my Master in Plant Biotechnology with attempt to find antagonist bacteria to causal disease of tomato bacterial canker (Clavibacter michiganensis subsp. michiganensis). We isolated many strains of bacteria which were very antagonistic to CMM. We observed in this study that all strains were the fluorescents Pseudomonas. This statement will be very useful in the biocontrol of tomato bacterial canker. Within the framework of my PhD supervised by Pr. Abdelhaq HANAFI (integrated pest management unit, Plant Protection Department of Agronomic and Veterinary Institute HASSAN II), I studied the three aspects of whiteflies control as a pest in vegetables (see list of publications):
- Evaluation of resistance of Bemisia tabaci to six commonly used pesticides
- Physical control by insect nets as a barrier to adults of whiteflies
- Evaluation of non toxic pesticide used to control whiteflies

The whiteflies, especially Bemisia tabaci, haven't any importance in the vegetable crops in Morocco. But after 1998, this pest caused important damages by transmission of TYLCV (Tomato Yellow Leaf Curl Virus) to tomato crops. Perhaps, the same scenario can take place with the couples Toxoptera citricida/Citrus Tristeza Virus and Diaphorina citri/Huanglongbing or Trioza erytreae/Huanglongbing.

My experience as a quality manager at the first agricultural cooperative in Morocco (export of 90 000 tons of citrus fruits each season) allowed me to have good skills and knowledge of plant protection in citrus orchards. My experience in Plant Biotechnology (Master of Science) and Entomology (PhD) combined with professional skills in citrus production and protection will be successful keys of this training in the USA. My first accomplished mission at INRA (National Institute of Agronomic Research) was a diagnostic which aims

to update the status of plant protection in the Souss valley of Morocco. The results of this work will be published soon. Even if C. capitata is the most important pest in the Souss valley, we must be able at first to detect other diseases like Huanglongbing (greening citrus disease) and its vectors Diaphorina citri and Trioza erytreae. Consequently, we will be able to prevent the greening disease in our citrus orchards once detected. The techniques acquired will be used in other systems.

The management of Huanglongbing is dependent on prevention and reduction of inoculum in the orchard, control of psyllid population in the groves, and timely removal of infected trees (Halbert and Manjunath 2004). So the symptoms expression of the citrus greening is considered very late for management. Halbert, S. E., and Manjunath, K. L. 2004. Asian citrus psyllids (Sternorrhyncha: Psyllidae) and greening disease of citrus: A literature review and assessment of risk in Florida. Florida Entomologist 87 (3):330 – 353.

Proposed Action Plan:

Week 1 and 2:
• Field trip to symptomatic citrus orchard:
• Identification of Psyllids (Diaphorina citri and Trioza erytreae)
• Collect of samples: Psyllids and citrus leaves (with and without symptoms)

Week 2 and 3:
1- Training in detection of HLB in Psyllids and plant host (Theory):
• DNA extraction
• Conventional PCR
• Sequencing
• Real time quantitative PCR
• Nested PCR
• Electron Microscopy
2- Preparation of materials and solutions

Week 4 and 5:
• DNA extraction

Week 6 to 10:
• Conventional PCR
• Sequencing
• RT-Quantitative PCR
• Nested PCR

Week 11 and 12:
• Data analysis

Special materials and/or requirements needed for research: It depends on laboratory and researchers methodology. The solutions are usual in molecular biology labs. So to accomplish this training we need:
• Authorization to access orchard, citrus industry and nursery.

• Psyllids collection: aspirator, paintbrush, Eppendorf tubes, Ethanol 95%
• Freezer (- 20 °C)
• Thermocycler
• Electron microscopy
• Extraction and PCR buffer:
- Tris (pH 8.0),
- EDTA
- SDS (Sodium Dodecyl Sulfate)
- Proteinase K
- Phenol
- Chloroform
- Isoamyl Alcohol
- NaCl
- Primers: OI1, OI2c, HLBas, HLBr, DCF and DCR
- Probes HLBp and DCP
- (NH4)2SO4 and MgSO4
- Taq DNA polymerase
- dNTPs
• Sequencer
• Program of analyze and comparison of sequences (ex: Treeview)

Fellow #4 (male - Tunisia)

1. Scientific background and research interests

During my integration to the olive tree institute (July 2000) I have integrated the Research Unit Protection of cultivated plants and environment. In this unit I am affiliated to the group of plant pathology. The main axes that I have developed are as below:

- Epidemiology of Bacterial diseases :
This research has been performed in the framework of international projects :
  - Project INCO-DC IC18CT970198 : Integrated control of crown gall in Mediterranean countries .
  - Project A/022193/08 : Biological bases for the preventive control of tumorigenic bacteria
  - Project CMCU 09G 0923 : ecological specificity of Agrobacterium of tunisian soils

Two bacterial diseases are considered in ours investigations olive knot and crown gall diseases. Epidemiological studies revealed that the genetic structure of bacterial isolates are structured according the geographic sites. In order to achieve our research activities, our interests is to study the host-plant interaction in order to identify the parameters involved in the resistance of cultivars or rootstocks to the bacterial diseases. The training will be of interest to help me to study the compounds involved in the resistance or tolerance.

- Susceptibility of olive trees to fungal diseases

In our investigations, we have studied foliar diseases in the framework of a bilateral project in collaboration with University of Cordoba (Spain): Project A/018552/08 (Integrated control of main foliar diseases of olive tree). In this work we found a variable of resistance of hybrids of olive tree towards olive leaf disease (Fusicladium oleaginum). Our results revealed that some factors such as the number of trichomes and the cuticula thin are responsible of resistance. This research need to be deepen in order to identify the genes implied in this resistance or tolerance. The training may give me this opportunity to study the genetic bases of the resistance or tolerance of olive tree hybrids towards olive leaf spot.

- Research of the bioactives compounds to control olive tree diseases

We have carried out several research activities in order to find new molecules or compounds or microorganisms or plant extracts to control olive tree diseases as alternatives to pesticides. We have published several papers in this context in different national and international journals. The very interesting biological products are :

- Olive mill waster water : we discovered a very interesting effect of olive mill waster water against plant pathogenic fungi and bacteria. We found that phenolic compounds like hydroxytyrosol and tyrosol are the main compounds effective against bacteria and fungi,
- Some antagonistic bacteria isolated from the rhizosphere were proved efficient both against olive tree pathogens and as plant growth promising bacteria (PGPR)

2. Impact of the program on the agricultural productivity of Tunisia

Within " The Norman E. Borlaug International Agricultural Science and Technology Fellow program" we will have the following impacts:

- Providing me new knowledge on methods and technics for the detection of olive tree diseases. This is important to control the sanitary quality of imported plants
- Contribution of the program to control fungal and bacterial diseases and therefore improve the productivity and production
- Establishing a long-term contacts and consolidated collaboration with U. S. scientists in the field of plant pathology.

Proposed Action Plan:

Three months duration of research activities is enough to learn about new technologies and the recent scientific development in plant pathology. The proposed plant action can be accomplished during the period as below :

- First month

During this first month, we aimed to learn about new technics and methods used in United States to detect, characterize and control plant pathogens. This month can be divided as below:

- First and second week : theoretical aspects related to plant pathogens: new methods used in U. S. in different laboratories for the identification, detection and characterization of plant pathogenic fungi and bacteria. A fucus on the effect of climatic changes on the diversity and structure of plant pathogens will be of interest

- Third and forth week : laboratories visits in order to have an idea about the research activities performed in U. S. and contact researchers

- Second month : Study of the genetic resistance of olive tree

During this second month, I propose that I perform some experiments in the laboratory related to the following aspects :

- First week :
  - Quantification of DNA extracted in Tunisia from samples (leaves, shoots) obtained from different varieties and hybrids of olive trees
  - Verification of DNA quality
  - Preparation of primers and dilution of DNA

- Second week

- Using ISSR (Inter simple sequenced repeated) for the characterization of hybrids and clones of olive tree. Several primers were published nowadays for the characterization of olive trees (Martin-Lopez et al., 2006)
- Data analysis

- Third Month : Protein analysis and report redaction

- First week : In order to study the role of protein in the resistance of olive tree to pathogens, we will extract proteins from leaves using special extraction kits.

- Second week : After extraction of proteins, a bi-dimentionnel electrophoresis will be conducted on extracted proteins This electrophoresis will enable to separate proteins according to their weight and their loads. I had a training in proteomics in Centre of Biotechnology of Sfax (Tunisia), this will help me to carry out the necessary work in U.S. I propose to apply this method to resistant and susceptible hybrids.

- Third week : Data analysis

- Last week : Discussion of results and report redaction.

Fellow #5 (female- Algeria)

Engineer at the National Institute of plant protection and responsible for administration and monitoring preventive alert plant crops, especially my attachment to it encourages me to seek training in this area.

Diseases and pests annually destroy thousands of hectares of production, thus seriously compromising yields. To fight against bio aggressors, farmers use pesticides, such use is often abusive and anarchic, and presents a risk to human health and the environment. Much research and work has been done to explore the possibilities for improving control methods against pest and make systems less dependent on agricultural pesticide use. The adoption of IPM, which is a system that combines different forms of biological control, cultural and chemical means to bring fruit and contributes to the preservation and respect for the environment. IPM is a system of management of pest populations that implements all the techniques appropriate to maintain their populations below levels that cause damage of economic importance, focusing on preventing the installation of bio aggressors. It aims to reduce the amount of chemicals used and to minimize their environmental impact by using it selectively.

IPM also has advantages for determining the economic threshold

and take the steps necesary to control the pest, the use of resistant varieties that are less attacked by insects.
An IPM system is designed around six basic components:

- Acceptable pest levels.
- Preventive cultural practices
- Monitoring
- Mechanical controls
- Biological controls
- Responsible Pesticide use.

An IPM regime can be quite simple or sophisticated,
It is based on specific and appropiate farming methods which are: Rotation, intercropping, crop rotation maintenance (weeding, getting rid of plant debris after harvest ...)
The use of sex pheromones as bait a method to attract males in the traps and avoid mating, it helps prevent the development of populations and follow its dynamics. This method is used for tree fruit, citrus, olive, to control codling moth, the fruit fly, moth, the olive fly. The use of poisoned baits as for rodents.
The sterile insect technique, used with success. The use of a natural enemy to control the population of pests in fields, such as the use of beetles to fight against aphids.
In this perspective and to enrich my knowledge, I would be grateful for giving me the opportunity of training in this field.