



## REPORT

### ProSmallAgriMed PRIMA<sup>1</sup> workshop in ALGERIA

November 27-28, 2023

### New technology in agriculture: application to Barbary fig cactus

Meeting place: INRAA – Alger

**Organizers and speakers:** Hicham Messaoudi, Amel Meddad-Hamza, Silvio Gianinazzi, Vivienne Gianinazzi-Pearson and Nadhira Oulbsir



<sup>1</sup> EU project: Promoting soil fertility, yield and income in small holder Agriculture of semiarid and arid Mediterranean regions by management of beneficial soil microbiota, conservation agriculture and intercropping.

## REPORT

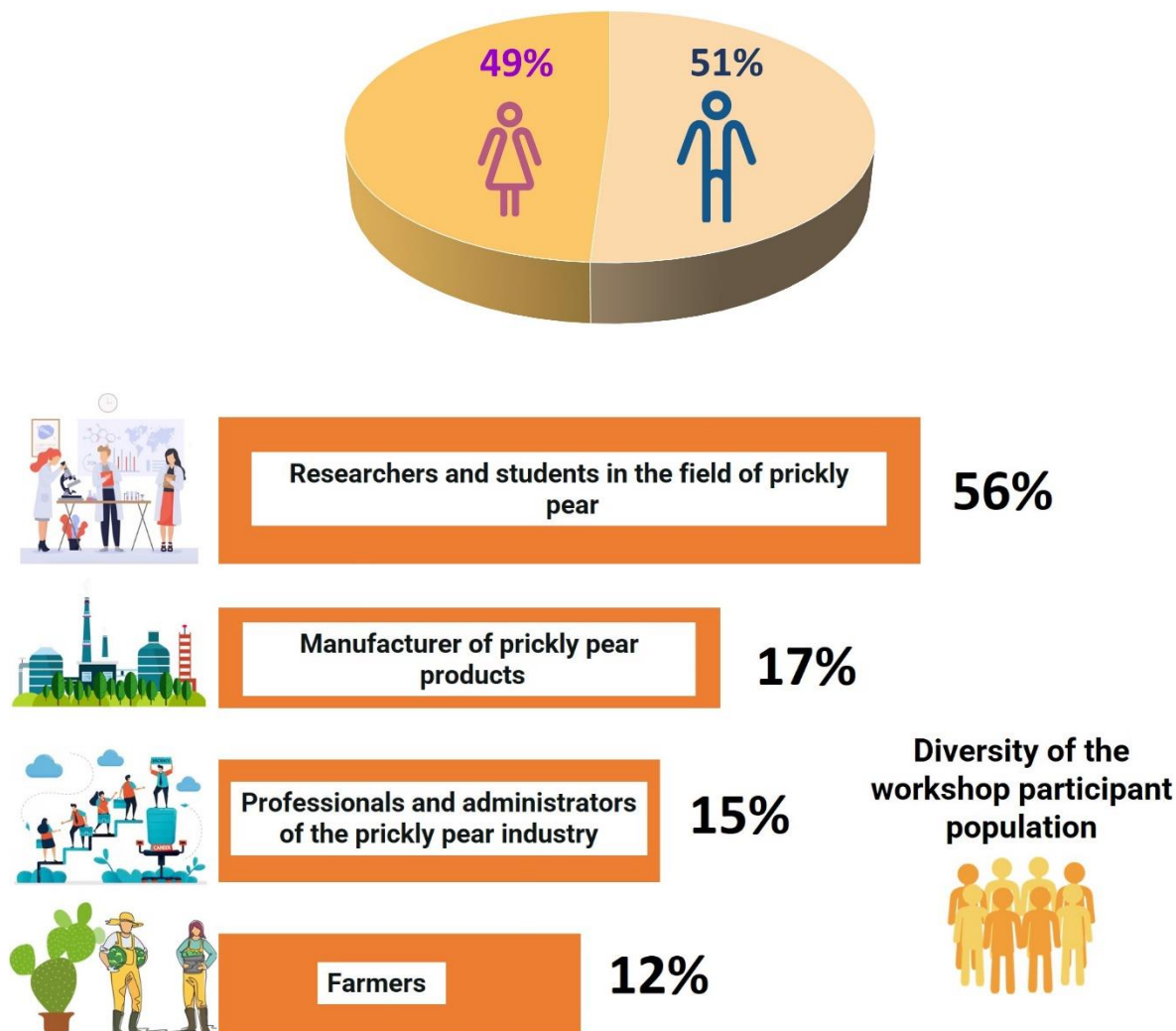
**The PRIMA training workshop in Algeria took place November 27-28, 2023, followed by a visit the day after of the facilities of our partner PlantaBiotek as well as the platform involving PlantaBiotek, in construction, for the production of bio-inputs in agriculture.**

### **1. WORKSHOP (27-28 November) (see enclosed the program)**

- The workshop took place at INRAA in Alger, organized by PlantaBiotek, a startup for beneficial microbial inoculant production, incubated by ANVREDET.
- 41 participants were present coming from different economic and academic backgrounds: farmers involved in the production of Barbary fig cactus and olive trees, engineers involved in training programs for farmers and popularization of new technology, and academics engaged in technological transfer. It is important to underline that the Director of ANVREDET and INRAA's vice president actively participated to the meeting, underlining the interest of the PRIMA technology for the durable development of plant production in Algeria.
- Oral presentations were implemented with practical demonstrations on how to isolate, identify and produce inoculants of beneficial soil microbes, and how to inoculate cactus plants and more widely other agricultural trees.
- Participants were very interested in the subject and asked many questions, particularly on how to produce and use inoculants targeted to Barbary fig cactus and the economic feasibility of the proposed biotechnology in Algeria.
- An important aspect of the discussion was devoted to the development of *Dactylopius opuntiae*, a cochineal pest that destroys plantations of Barbary fig cactus. Although the situation seems to be less serious than in Morocco, the pest's rapid spread is a major source of concern. We reported what is ongoing in Morocco, where a strain of *Pseudomonas* has been identified as being pathogenic towards *Dactylopius opuntiae* and therefore a potential biocontrol agent of the insect. For that it is important to evaluate the compatibility of this *Pseudomonas* strain with the use of the beneficial soil microbe inoculants developed by our project.
- Nadhira Oulbsir, vice-president of the national association for the development of cactus in Algeria, underlined how Barbary fig cactus plays an important role in generating income in rural regions, particularly for women. She also underlined that the objectives of PRIMA are very important for the development of a durable culture of this cactus and that this project matches with the national program PADSEL NOA, co-financed by the EU, for rural development and women empowerment. She also expressed her willingness to promote, in collaboration with our partner at the University of Annaba, the new technology proposed by our project in the north-east of Algeria.

## 1.1 Gender and different categories of the participating public

A small statistical analysis was carried out on the public who participated in the training workshop over the two days. The diagrams below represent the data on the workshop participant population.



## 1.2 Test QCM: verification of concept acquisition

### 1.2.1 Content of training workshop presentations

#### YES or NO survey questions

- Were you satisfied with the content of the presentations ?  
**100% YES**
- If this course was repeated, would you recommend it to one of your colleagues?  
**100% YES**
- Have you ever participated in activities similar to this training workshop?  
**88% NO**  
**12% YES**

### Open question

- **What did you find most useful about this training workshop?**
  - ✓ This new technology is exceptionally beneficial for agriculture in response to the consequences of climate change.
  - ✓ Research in the field of soil life and investment in this sector,
  - ✓ The interest of inoculation with beneficial soil microorganisms in strengthening the yield of agricultural crops.
  - ✓ New valuable information on arbuscular mycorrhizal fungi in prickly pear cultivation
  - ✓ Interesting popularization of new technology and techniques.,

In general, the workshop participants appreciated:

- (i) The interesting content of the ProSmallAgriMed project.
- (ii) The practical and original aspects.
- (iii) The technological overview of applications from neighboring countries.
- (iv) PlantaBiotek as a practical project to highlight this new technology.
- (v) The high quality and skills of the speakers.
- (vi) The rich content and promising results.
- (vii) Meeting professionals from different levels of action, i.e. researchers, industrialists, farmers, administrators etc. around the theme of prickly pear.

### **What other information or communication activities would you have liked?**

- ✓ More technical and experimental details,
- ✓ More explanation on the metabolic and genetic mechanisms of the bioavailability of mineral and organic elements in the soil through mycorrhization,

### **1.2.2 Organisation of workshop**

#### YES or NO survey questions

- Were you satisfied with the overall organization of the training workshop ?  
**100% YES**
- Were you satisfied with the resources and materials provided in training workshop ?  
**95% YES**  
**05% NO**
- Were you satisfied with the time allocated to the different topics ?  
**79% YES**  
**21% NO**

#### Open question

- Other comments or feedback
  - ✓ Launch of a large-scale experimentation process not only on prickly pear but on other crops that concern food safety,
  - ✓ More time for discussion.

## 2. VISIT OF THE FACILITIES OF PlantaBiotek (November 29)

### 2.1 The platform for the PRIMA project

- The facilities of PlantaBiotek are located in the Wilaya Bouira and consist of a laboratory equipped with basic tools for practical soil microbiology, a small greenhouse and experimental plots.

### 2.2 The industrial site, in construction, for the production of beneficial soil microbes

- PlantaBiotek is involved in the construction in the Wilaya Bordj Bou Arreridj of a large platform for the development of new products (eg bio-inputs) for plant production and more largely for the industry of agro-nutrition. The facilities and potential productivity of this platform will ensure provision of microbial inoculants on the Algerian market and open the way for the extensive use of the new biotechnology promoted by our PRIMA project.

## **WORKSHOP PROGRAMME**



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## WORKSHOP ProSmallAgriMed<sup>1</sup>-PRIMA Algérie

En Partenariat

27-28 Novembre 2023 - INRAA – Siege El Harrach Alger

### « Une nouvelle technologie en agriculture : Application au Figuier de barbarie »

**Intervenants-Organisateurs** : Hicham Messaoudi (HM), Amel Meddad-Hamza (AM), Silvio Gianinazzi (SG), Vivienne Gianinazzi- Pearson (VGP), Nadhira Oulbsir (NO).

#### PROGRAMME

27 Novembre 2023

##### **Matinée 9H00-12H00**

- ☐ Mot d'ouverture
- ☐ Introduction sur le projet ProSmallAgriMed-PRIMA (AM)
- ☐ Qu'entendons-nous avec nouvelle technologie en agriculture ? (SG)
- ☐ Connaissances de base concernant les microorganismes du sol impliqués dans cette nouvelle technologie (VGP)
- ☐ A quoi ressemblent-ils ces microorganismes bénéfiques du sol ? (SG), (AM)

##### **Pause-café**

- ☐ Comment pouvons-nous démontrer l'efficacité en production végétale de ces microorganismes bénéfiques du sol ? (SG), (AM), (VGP)
- ☐ Ces microorganismes peuvent-ils protéger les plantes vis-à-vis de pathogènes des racines et des parties aériennes ? (SG), (AM), (VGP)

<sup>1</sup> Promoting soil fertility, yield and income in Smallholder Agriculture of semiarid and arid Mediterranean regions by management of beneficial soil microbiota, conservation agriculture and intercropping.



### **Après-midi 13H00-14H30**

- ☐ Atelier de démonstration et d'observation des différentes formes de microorganismes bénéfiques du sol (Bactéries et CMA<sup>2</sup>) (AM) (HM)
- ☐ Perspectives d'utilisation des microorganismes bénéfiques du sol dans la culture du figuier de barbarie (NO) (SG) (HM)
- ☐ Clôture de la première journée

**28 Novembre 2023**

### **Matinée 9H00-12H00**

- ☐ Comment trouver des inocula basés sur des microorganismes du sol. Aspects sécuritaires ? (SG)
- ☐ Guide pour la production d'inocula autochtones (SG)
- ☐ Aspect technico-économique d'une industrie de biointrants en Algérie (Bactéries et CMA<sup>3</sup>) (HM)

### **Pause-café**

- ☐ Comment inoculer les plantes avec des microorganismes bénéfiques du sol ? (AM)
- ☐ Comment maintenir actifs les microorganismes bénéfiques du sol dans les sols agricoles (SG)

### **Après-midi 13H00-14H30**

- ☐ Atelier de démonstration sur l'aspect et l'application des inocula sur le figuier de barbarie et sur différentes plantes (HM) (AM)
- ☐ Conclusions et plans futures (HM)
- ☐ Vérification des connaissances acquises (test QCM) (HM) (AM)
- ☐ Mot de clôture du workshop

**29 Novembre 2023**

### **Matinée**

- ☐ Visite de la plateforme du projet ProSmallAgriMed du partenaire algérien ANPBIO- Wilaya de Bouira.

### **Après-midi**

- ☐ Visite des installations industrielles du projet PlantaBiotek -village section 31 GP 34 Medjana Wilaya de Bordj Bou Arreridj.



<sup>2</sup> Champignons Mycorhizogènes à arbuscules.

<sup>3</sup> Champignons Mycorhizogènes à arbuscules.





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## WORKSHOP ProSmallAgriMed<sup>4</sup>-PRIMA in Algeria

In partnership

November 27-28, 2023 - INRAA – El Harrach Headquarters Algiers

### “A new technology in agriculture: Application to Prickly Pear »

**Speakers- Organizers:** Hicham Messaoudi (HM), Amel Meddad-Hamza (AM), Silvio Gianinazzi (SG), Vivienne Gianinazzi-Pearson (VGP), Nadhira Oulbsir (NO).

#### PROGRAM

*November 27, 2023*

##### Morning 9 :00 a.m.-12 :00 p.m.

- ☐ Opening remarks
- ☐ Introduction to the ProSmallAgriMed-PRIMA project (AM)
- ☐ What do we mean by new technology in agriculture? (SG)
- ☐ Basic knowledge regarding the soil microorganisms involved in this new technology (VGP)
- ☐ What do these beneficial soil microorganisms look like? (SG), (AM)

##### Coffee break

- ☐ How can we demonstrate the effectiveness of these beneficial soil microorganisms in plant production? (SG), (AM), (VGP)
- ☐ Can these microorganisms protect plants against root and aerial pathogens? (SG), (AM), (VGP)

<sup>4</sup> Promoting soil fertility, yield and income in Smallholder Agriculture of semiarid and arid Mediterranean regions by management of beneficial soil microbiota, conservation agriculture and intercropping.

### **Afternoon 1 :00 p.m.-2 :30 p.m.**

- ☐ Demonstration and observation workshop of the different forms of beneficial soil microorganisms (Bacteria and CMA) (AM) (HM)
- ☐ Prospects for the use of beneficial soil microorganisms in prickly pear cultivation (NO) (SG) (HM)
- ☐ Closing of the first day

**November 28, 2023**

### **Morning 9:00 a.m.-12:00 p.m.**

- ☐ How to find inocula based on soil microorganisms. Security aspects? (SG)
- ☐ Guide for the production of indigenous inocula (SG)
- ☐ Technical-economic aspect of a bioinput industry in Algeria (Bacteria and CMA) (HM)

### **Coffee break**

- ☐ How to inoculate plants with beneficial soil microorganisms? (AM)
- ☐ How to keep beneficial soil microorganisms active in agricultural soils (SG)

### **Afternoon 1:00 p.m.-2:30 p.m.**

- ☐ Demonstration workshop on the appearance and application of inocula on prickly pear and on different plants (HM) (AM)
- ☐ Conclusions and future plans (HM)
- ☐ Verification of acquired knowledge (MCQ test) (HM) (AM)
- ☐ Closing remarks of the workshop

**November 29, 2023**

### **Morning**

- ☐ Visit to the ProSmallAgriMed project platform of the Algerian partner ANPBIO- Wilaya de Bouira (central department of Algeria).

### **Afternoon**

- ☐ Visit to the industrial installations of the PlantaBiotek project - village section 31 GP 34 Medjana Wilaya of Bordj Bou Arreridj (Eastern Department of Algeria).



**Workshop photos**

Group photos of organizers and participants



Demonstration workshops



Demonstration workshops



