

# The soil bacteriome of three traditional fruit trees in Algarve

Isabel Matos<sup>1,2</sup>, José Matos<sup>1,2</sup>, Alcinda Neves<sup>1</sup>, Luís Cabrita<sup>3</sup>, M. Leonor Faleiro<sup>1,2</sup>

<sup>1</sup> Faculdade de Ciências e Tecnologia, Universidade do Algarve, Campus de Gambelas, 8005-139 Faro, Portugal;

<sup>2</sup> Algarve Biomedical Center—Research Institute, 8005-139 Faro, Portugal

<sup>3</sup> Direção Regional de Agricultura e Pescas do Algarve, Apartado 282, Patação, 8001-904 Faro

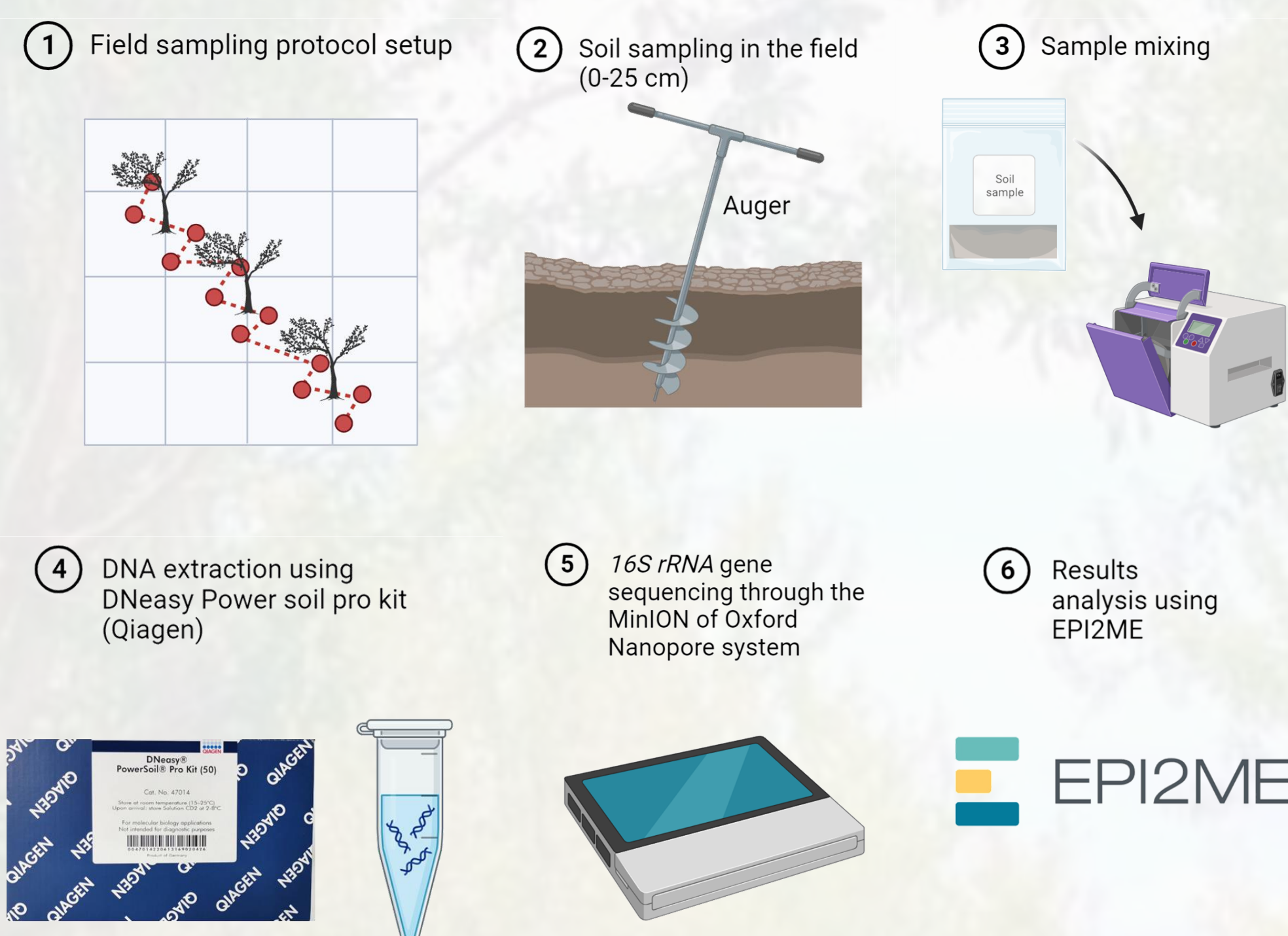
## Introduction

The traditional fruit trees, such as almond, carob tree and fig tree in the Algarve have been exploited on a dryland basis and are considered crops with potential to generate good economic profitability. The hydrological drought in the Algarve region tends to worsen with climate changes. The impact of climate change on the soil microbiota can be very significant. In the current study the soil bacteriome associated to the almond variety “Lourencinha” and “Boa Casta”, carob tree “Galhosa” and “Mulata do Espargal”, the fig tree “Lampa Preta” and “Bebera Preta” were analyzed by a metataxonomic approach using 16S rRNA gene sequencing.

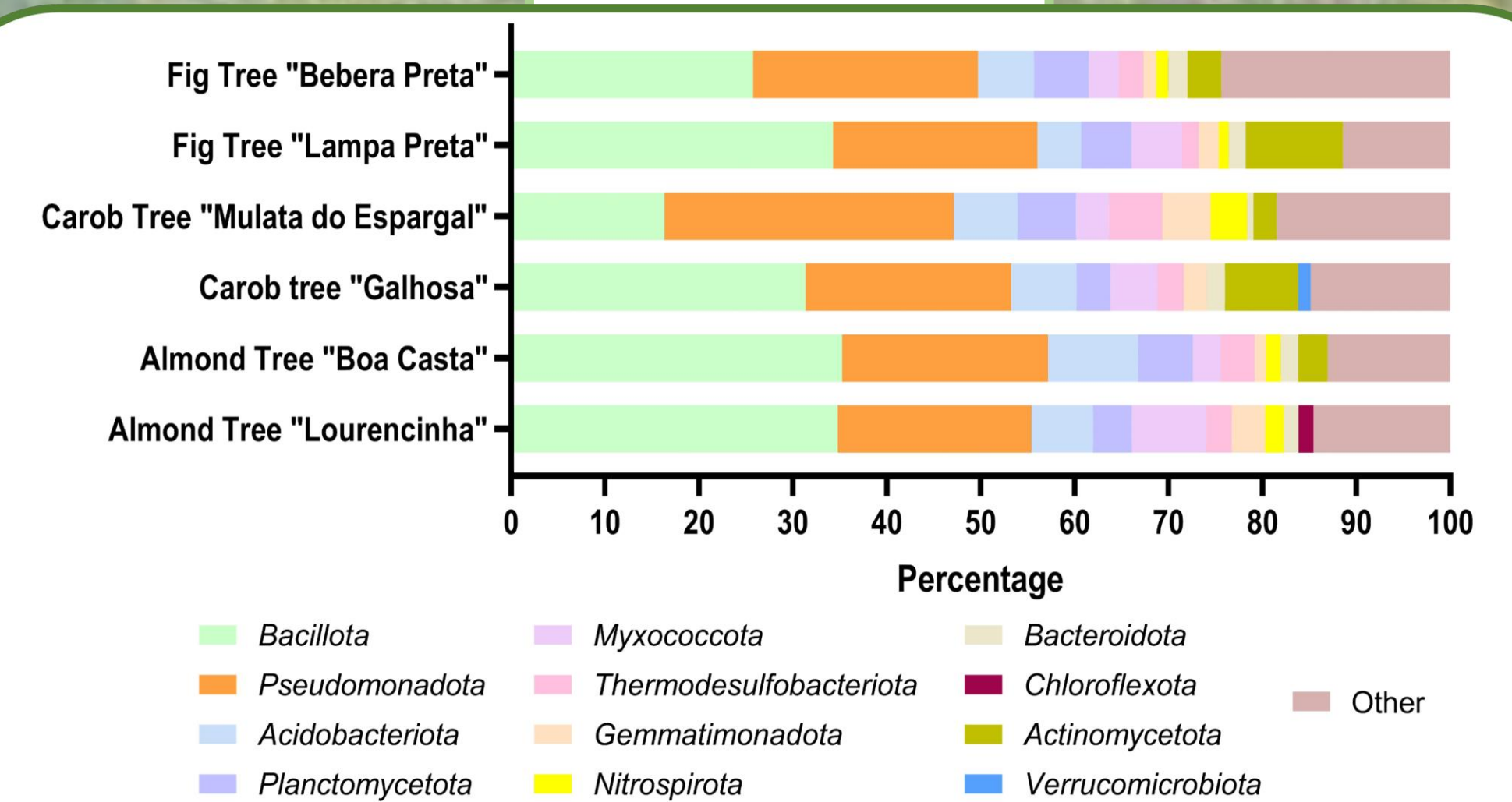
## Methodology



**Figure 1.** Sampling field in DRAP Algarve Experimental field Tavira, Portugal. A - Almond Tree “Lourencinha”, B – Almond Tree “Boa Casta”, C- Carob Tree “Galhosa”, D- Carob Tree “Mulata do Espargal”, E - Fig Tree “Lampa Preta”, F – Fig Tree “Bebera Preta”.



## Results



**Figure 2.** The 10 most abundant phyla in the analysed soil samples of established fields of Almond, Carob and Fig trees.

- The phylum **Bacillota** and the phylum **Pseudomonadota** are the two more abundant in all varieties of the three fruit trees, and the third phylum varies between **Acidobacteriota** and **Actinomycetota**.
- Planctomycetota** is the fourth more abundant phylum for some fruit tree varieties, such as almond “Boa Casta”, carob tree “Mulata do Espargal”, and fig tree “Bebera Preta”, in contrast the phylum **Myxococcota** is the fourth phylum just observed in the fig tree “Lampa Preta”.



**Figure 3.** Phylogenetic representation of the ten most abundant bacterial species identified in A) Almond Tree “Lourencinha”, B) Almond Tree “Boa Casta”, C) Carob Tree “Galhosa”, D) Carob Tree “Mulata do Espargal”, E) Fig Tree “Lampa Preta” and F) Fig Tree “Bebera Preta” soil samples. Relative abundance is represented by the thickness of each branch. Minimum abundance cut off 1%. Data obtained with the EPI2ME platform.

- Neobacillus niancini** is the most abundant species in all fruit tree varieties.
- Metabacillus litoralis** is the second most abundant species in the almond variety “Lourencinha” and fig tree “Lampa Preta” and “Bebera Preta”.
- Nitrospira moscoviensis** is the second most abundant species in the almond “Boa Casta” and carob tree “Mulata do Espargal”.
- Some bacterial species are only observed in a specific fruit tree or variety, such as **Niallia nealsonii** and **Tumebacillus soli** are only present in the soil from the two fig tree varieties

## Acknowledgements

The authors are grateful for the financial support through the Projects PRR-C05-i03-I-000010—“Valorização de Recursos Genéticos Tradicionais”, PRR-C05-i03-I-000010-LA4.1 “Conservação e fertilidade do solo”, PRR-C05-i03-I-000010-LA4.3 “Gestão dos recursos hídricos”, PRR-C05-i03-I000010-LA4.4 “Variedades adaptadas às alterações climáticas” and PRR-C05-i03-I-000010-LA4.7 “Promoção de ações de divulgação”.