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BOOK OF ABSTRACTS



MINISTRY OF AGRO-INDUSTRY AND FOOD SECURITY, REPUBLIC OF MAURITIUS

FOOD SECURITY-SECURING OUR FRUIT FOR HEALTHY CONSUMPTION

TEPHRITID WORKERS OF EUROPE , AFRICA AND THE MIDDLE EAST



Joint FAO/IAEA Centre
Nuclear Techniques in Food and Agriculture



Metabolic Profiling Of Tephritid Organs: A Novel Approach For Evaluating Male Quality Markers

Scolari, Francesca^{1*}, Moyano, Andrea¹, Bonanomi, Marcella², Aramini, Tecla², Cancio Martinez, Elena Isabel³, Pillwax, Gülizar³, Croce, Anna Cleta¹, Tsiamis, George⁴, Bourtzis, Kostas³, Gaglio, Daniela²

¹ Institute of Molecular Genetics (IGM), National Research Council (CNR), Italy

² Institute of Molecular Bioimaging and Physiology (IBFM), National Research Council (CNR), Italy

³ Insect Pest Control Subprogramme, Joint FAO/IAEA Programme of Nuclear Techniques in Food and Agriculture, Vienna, Austria

⁴Department of Sustainable Agriculture, University of Patras, Greece

*Corresponding email for first author: francesca.scolari@igm.cnr.it

ABSTRACT

The efficacy of the Sterile Insect Technique (SIT) hinges on the mating competitiveness of - reared sterilized males. However, improving established quality control tests for tephritid fruit flies is hindered by labor-intensive processes. To address this, our study aims to explore potentially novel biomarkers for mating ability. These biomarkers could play a crucial role in rapidly assessing the impact of production enhancements on the performance of sterile males and act as proxies for evaluating male quality in newly developed strains.

In this study, we exploited metabolomics, a systematic approach for identifying and quantifying low molecular weight compounds within a system. This method was utilized to generate metabolomic fingerprints for male reproductive organs and guts in the Mediterranean fruit fly, *Ceratitis capitata*, as well as in two invasive pests of EU priority, namely *Bactrocera dorsalis* and *B. zonata*. We adopted an untargeted metabolomics approach to investigate how external factors like irradiation, larval nutrition, and laboratory colonization may influence the metabolomes of these species and alter the behavior of mass-reared males. A metabolomics pipeline, utilizing Liquid Chromatography-Mass Spectrometry (LC-MS), was developed and is currently in use for analyzing 6,000 samples.

The collected biochemical information, cross-referenced with behavioral parameters, aims to pinpoint metabolites that could potentially serve as quality markers for male performance. The successful development of biochemical assays based on these markers has the potential to revolutionize quality control in mass-reared fruit fly colonies worldwide, ultimately benefiting tephritid pest management. This study is funded through the project REACT (Horizon Europe, 101059523).

KEYWORDS: testes, male accessory glands, gut, diet, sterile insect technique.