

Climatic ambitions of neglected underused legumes

Vaz Patto MC

cpatto@itqb.unl.pt

Instituto de Tecnologia Química e Biológica António Xavier (ITQB NOVA), Universidade Nova de Lisboa, Oeiras, Portugal

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The Mediterranean region, including Portugal, is expected to become a climate change hotspot, exacerbating existing vulnerabilities. Temperature rise will exceed global averages, along with reduced winter rainfall and more frequent, intense local rain events. This poses significant challenges, particularly for agriculture.

The improvement of plant responses to these challenges is therefore an important open field of research, namely in legumes, which have not kept pace with the advances made for cereals. However, selection for these abiotic stresses tolerance is complex due to its quantitative nature, with difficult-to-score phenotypes in large populations.

The success in future breeding strategies may reside on an integrated approach combining plant physiology, biochemistry, genetics and genomics at a whole-plant level to identify key phenotypic traits and develop cost-effective, accurate molecular selection tools.

This presentation will highlight the most significant findings from studying natural variation under water stress in underused grain legumes using different high and medium-throughput physiological phenotyping approaches such as gas exchange, thermal imaging, chlorophyll fluorescence and hyperspectral measurements. The discussed results come from national (Portuguese) and European legume projects with a particularly focus on outcomes from the H2020 DIVINFOOD project, relevant for understanding drought and flood tolerance genetics and mechanisms in grass pea (*Lathyrus sativus*).