

PHEN-ITALY INFRASTRUCTURES/INSTALLATIONS

Installation name	ALSIA PhenoLab 4.0
Installation Location	Metaponto di Bernalda (MT)
Installation Location (GPS coord.)	40.392115466950045, 16.787614235114425
Installation Category	<ul style="list-style-type: none"> – High Throughput Phenotyping – Controlled Conditions, – Open Field, – Growth Chamber
Traits analysed	<ul style="list-style-type: none"> – Above ground – Below ground
Environmental Manipulation applicable	<ul style="list-style-type: none"> – Water – Fitonutrients concentration
Stress applicable	<ul style="list-style-type: none"> – Drought – Salt – Biotic stress – Viruses – Bacteria
Max Capacity	494 pots for plant imaging under greenhouse conditions
Status	Operational
Trait measurements	<ul style="list-style-type: none"> – Growth – Structure and architecture – Root properties – WUE – Root architecture – Stress indices – Colout indexes
Equipment and sensors	<ul style="list-style-type: none"> – RGB camera – IR – Multispectral – Fluorescence – LiCOR – Porometer
References	<p>Donatella Danzi, et al., 2019. Can High Throughput Phenotyping Help Food Security in the Mediterranean Area? Front. Plant Sci.,25 https://doi.org/10.3389/fpls.2019.00015</p> <p>Briglia N et al.,2019. Drought phenotyping in Vitis vinifera using</p>

	<p>RGB and NIR imaging. <i>Scientia Horticulturae</i> DOI: 10.1016/j.scienta.2019.108555</p> <p>Janni M, et al. In Vivo Phenotyping for the Early Detection of Drought Stress in Tomato. <i>Plant Phenomics</i>. 2019 Nov 27;2019:6168209. doi: 10.34133/2019/6168209.</p> <p>Briglia N, et al. Image-Based Assessment of Drought Response in Grapevines. <i>Front Plant Sci</i>. 2020 May 15;11:595. doi: 10.3389/fpls.2020.00595.</p> <p>González Guzmán M, et al. New approaches to improve crop tolerance to biotic and abiotic stresses. <i>Physiol Plant</i>. 2022 Jan;174(1):e13547. doi: 10.1111/ppl.13547.</p> <p>Cardellicchio A, et al. Detection of tomato plant phenotyping traits using YOLOv5-based single stage detectors, Computers and Electronics in Agriculture. https://doi.org/10.1016/j.compag.2023.107757</p>
Description of the infrastructure/installation	<p>The core of platform is based on a plant-to-sensor Lemnatech Scanalyzer 3D system equipped with a conveyor system accommodating 494 pots (2,5 l) carried by RFID-tagged carts, 4 imaging sensor chambers (NIR, RGB, Flu, NIR Roots), an automatic (fert)-irrigation station with a scale for evapotranspiration measurement of single pots. The platform is located in a glasshouse for semi controlled conditions, and environmental variable are measured via a network of nine sensor nodes (PAR, T, RH, CO₂). Experimental open fields with agro-meteo stations are available in a network of seven experimental farms located in the most important agricultural areas of Basilicata Region.</p>
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