



## PHENOAI<sup>XP</sup>PERT ES

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Enhanced sensitivity  
bioluminescence imaging

### LemnaTec Alxpert Product Family

Documentation, Phenotyping, Seed Testing and more

# PHENOAIxpert ES

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## High sensitivity bioluminescence imaging for plant applications

The PhenoAlxpert ES is an advanced imaging solution for detection of bioluminescence effects. Bioluminescence is a widely used reporter for gene activity, molecular interactions, or plant-microbe interactions.

### Features

- ▶ Bioluminescence imaging with 4 Megapixel industrialgrade enhanced sensitivity imaging sensor with active cooling
- ▶ Visible light imaging with 12 Megapixel industrial-grade RGB camera
- ▶ Integrated long lifetime LED-illumination for phenotyping applications
- ▶ Image acquisition, storage, and analysis
- ▶ Advanced image processing algorithms, optional machine learning, application-oriented analytical workflows
- ▶ Intuitive graphical user interface
- ▶ Metadata, annotation, and analysis directly linked to images
- ▶ Structured image file administration system
- ▶ Easy export of images and data
- ▶ Reliable technology
- ▶ Robust floor-stand imaging cabinet for perfect light shielding, all external light is kept out
- ▶ Sample height up to 20 cm

### Configuration and options

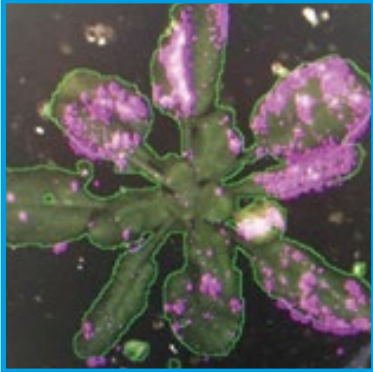
- ▶ Imaging of bioluminescence enables time- and space-resolved monitoring of presence, intensity, and localization of luminescence signals in the sample material.
- ▶ The bioluminescence imaging sensor is combined with high-resolution RGB imaging for standard phenotypic assessments of the analyzed plant material. Images from both sensor systems can be superimposed, thus allowing the analysis of bioluminescence in combination with classical phenotyping.
- ▶ The PhenoAlxpert ES has a high-sensitivity high-resolution imaging sensor with a deep-cooled vacuum CCD sensor. Being one of the most sensitive CCD cameras in the world, the system provides optimized photon collection properties and allows for precise recording of lowest light emissions. The camera is dedicated for long exposure times.
- ▶ The second camera mounted in the PhenoAlxpert ES is a >12 MPixel RGB industrial grade camera combined with optics and LED illumination optimized for top-view phenotyping of the plant material.
- ▶ More camera/sensor options will be available in future

## Applications

- Genetic reporters
- Luminescence-labelled metabolites
- Luminescence-labelled microbes
- Reliable luminescence imaging combined with phenotyping
- For any (luminescent) sample that fits into the field of view of the cameras, e.g.:
  - Single Plants in pots
  - Small trays or multi-pot pallets with seedlings
  - Microtiter plates or Petri-dishes, e.g. with leaf disks, seeds, fungi, insects, cell / tissue cultures
  - Plant parts, e.g. leaves, roots, fruits, blossoms

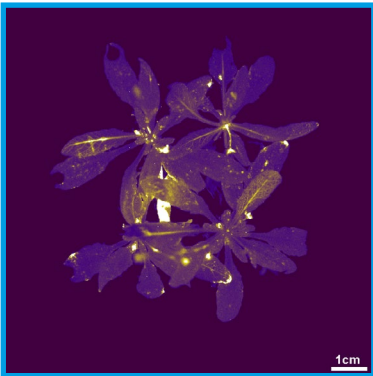


## Application examples



### Luminescence-labelled microbe assay

Bacteria transformed with a bioluminescence function invading plant tissue were imaged with PhenoAIxpert ES. Luminescence signals indicate the presence of labelled bacteria and allow spatial and temporal monitoring of the colonization process. Image provided by University of Amsterdam, Swammerdam Institute for Life Sciences (SILS), Molecular Plant Pathology, Dr. H.A van den Burg.



### Luminescent genetic reporter assay

Arabidopsis plants transformed with 35S-Luciferase construct for ubiquitous expression in all plant cell types and sprayed with Luciferin/DMSO mixture before imaging. Luminescence resulting from the reaction of luciferin and luciferase was recorded with PhenoAIxpert ES. Spatial distribution of luciferase intensity refers to luciferase presence in the tissue.



### Plant phenotyping assay

Trays with growing Arabidopsis plants were imaged with PhenoAIxpert ES and images were processed for plant growth, morphology and color. Individual plants were identified and phenotypic properties of their visible plant area were assessed. The phenotypic properties of the plants are combined with the luminescence information.

Manufactured by LemnaTec, distributed in the UK and Ireland by **analytik**.