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Quantification of biotic stresses on aerial parts of plants using Chlorophyll Fluorescence Imaging and Image Analysis

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Auteur	Boureau, Tristan [1], Rousseau, Céline [2], Méline, Valérian [3], Brin, Chrystelle [4], Rousseau, David [5], Sochard, Daniel [6], Anjuère, Michael [7], Gardet, Rémi [8], Belin, Etienne [9]
Résumé en anglais	Image analysis is increasingly used in plant phenotyping. Among the various imaging techniques available for plant phenotyping, Chlorophyll Fluorescence Imaging is particularly su itable for the imaging of biotic and abiotic stresses on the aerial parts of plants. Numerous chlorophyll fluorescence parameters may be measured or calculated, but only some of them may provide useful contrasts for the quantification of a given stress on leaves. In the perspective of high throughput phenotyping of biotic stresses on plants, we developed automated procedures to identify Chlorophyll Fluorescence parameters of interest for the quantification of a given biotic stress on large image datasets. The outputs of the automated procedures enable: - the visualization of the whole dataset, by providing contact sheets for each of the chlorophyll fluorescence parameter tested. - the visualization of basic statistics : radial - plot, box - plot and Mann - Whitney tests based on the mean intensity of each parameters are provided to compare the various treatments performed. - images are clustered based on histograms associated to each images, thereby enabling the clustering of images leaves displaying leaves of si milar phytosanitary status. - the objective quantification of disease incidence on each leaf tested. The quantification can discriminate varois stages of symptom development such as necrotic tissues, wilted and chlorotic tissues, and impacted tissues that do not display any symptoms visible to the eye.
URL de la notice	http://okina.univ-angers.fr/publications/ua17527 [10]
Lien vers le document en ligne	https://www.plant-phenotyping.org/eppn2020_workshop [11]

Liens

[1] http://okina.univ-angers.fr/t.boureau/publications
[2] http://okina.univ-angers.fr/publications?f%5Bauthor%5D=10329

[3] http://okina.univ-angers.fr/publications?f%5Bauthor%5D=24600
[4] http://okina.univ-angers.fr/publications?f%5Bauthor%5D=7509
[5] http://okina.univ-angers.fr/david-rousseau/publications
[6] http://okina.univ-angers.fr/publications?f%5Bauthor%5D=25289
[7] http://okina.univ-angers.fr/publications?f%5Bauthor%5D=29079
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