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Linking the gene regulatory network with the functional physical structure of whole-genome engineered Arabidopsis mutants : an HR-MAS NMR-based metabolomics approach

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Linking the gene regulatory network with the functional physical structure of whole-genome engineered *Arabidopsis* mutants

An HR-MAS NMR-based metabolomics approach

Dieuwertje Augustijn

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Linking the gene regulatory network with the functional physical structure of whole-genome engineered *Arabidopsis* mutants

An HR-MAS NMR-based metabolomics approach

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*Read first the best books. The important thing for you is not
how much you know, but the quality of what you know*

Erasmus

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Abbreviations

2DS	2 °C scenario
3F	Three zinc fingers
ATFs	Artificial transcription factors
BMRB	Biological magnetic resonance bank
CCA1	CIRCADIAN CLOCK ASSOCIATED 1
CEA	Controlled-environmental agriculture
Chl	Chlorophyll
Col-0	Colombia O
COSY	Correlation spectroscopy
CPMAS	Cross polarization transfer
CPMG	Carr-Purcell-Meiboom- Gill
CRISPR/Cas9	Clustered regularly interspaced short palindromic repeats/Cas9
CSI	Chemical shift imaging
d0	Increment delay
d1	Relaxation delay
d20	Spin echo delay
DDS	4-4-dimethyl-4-silapentane-1-sulfonic acid
DMF	N,N'-dimethylformamide
dpg	Days post germination
EC	Evening complex
ELF3	EARLY FLOWERING 3
ELF4	EARLY FLOWERING 4
FID	Free induction decay
FUM2	Fumerase 2
GABA	γ -aminobutyric acid
GC	Gas chromatography
HMBC	Heteronuclear multiple-bond correlation
HR-MAS	High-resolution magic angle spinning
HSQC	Heteronuclear single-quantum correlation
IEA	International Energy Agency
LC	Liquid chromatography

LCF1	Low Chlorophyll Fluorescence 1
LHY	LATE ELONGATED HYPOCOTYL
LUX	LUX ARRITHMO
MAS	Magic angle spinning
mMDH1	Mitochondrial malate dehydrogenase 1
MORC2	Microrchidia family 2
MS	Mass spectrometry
MSH1	MutS HOMOLOGUE 1
MVA	Multivariate analysis
NMR	Nuclear magnetic resonance
NOESY	Nuclear overhauser effect spectroscopy
OPLS-DA	Orthogonal partial least squares discriminant analysis
PC	Principal component
PCA	Principal component analysis
PRR7	PSEUDO-RESPONSE REGULATORY7
RSA	Rosette surface area
SDGs	Sustainable development goals
SEM	Standard error
SLS	Slice localized spectroscopy
SUS	Shared and unique structures
TALENs	Transcription activator-like effector nucleases
TCA	Tricarboxylic acid
TMS	Tetramethylsilane
TOC1	TIME OF CAB EXPRESSION 1
TOCSY	Total correlation spectroscopy
TSP	3-(trimethylsilyl)-2,2',3,3'-tetradeuteriopropionic acid
ZF-ATF	Zinc finger artificial transcription factor
ZFs	Zinc-fingers