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Functional Plant Biology

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Review: Hormonal regulation of cereal endosperm development with a focus on rice *(Oryza sativa)* ***Mafroz A. Basunia and Heather M. Nonhebel***	493–506	The yield and quality of cereal crops, including rice, rely on hormone-dependent signalling processes taking place during grain development. In this review we discuss evidence for more than one role for auxin, highlight key gaps in knowledge relating to the involvement of other plant hormones (cytokinins, ethylene, gibberellins and abscisic acid) and their combined influence on grain size, and note problems arising from conflicting data. We suggest future work needed to guide further development of resilient and high-yielding cereal varieties
Review: Controlling the trade-off between spikelet number and grain filling: the hierarchy of starch synthesis in spikelets of rice panicle in relation to hormone dynamics ***Rashmi Panigrahi, Ekamber Kariali, Binay Bhusan Panda, Tanguy Lafarge and Pravat Kumar Mohapatra***	507–523	Increasing yield through an increase of flower unit number has been a breeding priority for rice, but the trade-off between flower number and grain filling has negated potential gains. Of the various strategies considered, control of ethylene production in flower head has the greatest potential to improve yield limit. High level ethylene production dampens reserve food synthesis and undermines filling of developing grains
In silico characterisation and functional validation of chilling tolerant divergence 1 *(COLD1)* gene in monocots during abiotic stress ***P. Anunathini, V. M. Manoj, T. S. Sarath Padmanabhan, S. Dhivya, J. Ashwin Narayan, C. Appunu and R. Sathishkumar***	524–532	ABA and G protein-coupled receptor (GPCR) play a major role during abiotic stress conditions. The chilling tolerant divergence 1 *(COLD1)* gene containing ABA_GPCR and Golgi pH receptor (GPHR) domain receptor was isolated from rice, maize, sorghum and sugarcane, and was subjected to *in silico* and gene expression analysis. Our results on gene expression and evolutionary relationships helped us to understand the importance of *COLD1* during abiotic stress condition in selected monocots, which will have an impact on crop improvement programs around the world
Phosphatidic acids mediate transport of Ca^{2+} and H^+ through plant cell membranes ***Sergei Medvedev, Olga Voronina, Olga Tankelyun, Tatiana Bilova, Dmitry Suslov, Mikhail Bankin, Viera Mackievic, Maryia Makavitskaya, Maria Shishova, Jan Martinec, Galina Smolikova, Elena Sharova and Vadim Demidchik***	533–542	Phosphatidic acids (PAs) are components of biomembranes that play essential roles in lipid signaling and trafficking. We demonstrated that PAs induce ionophore-like effects transporting Ca^{2+}, H^+ and Mg^{2+} in maize root membrane vesicles and trigger cytosolic Ca^{2+} elevation in aequorin-transformed root protoplasts. These data suggest that PAs can function as ionophore-like transporters for Ca^{2+} and Mg^{2+} in plant membranes..

Cover illustration: Disease symptoms of *CsrbohD*-silenced 'Luofu' kumquat (*Fortunella margarita*). Inoculation was done with *Xanthomonas citri* ssp. *citri* by the infiltration (*left*), or pin prick method (*right*) on detached leaves. Photos were taken at indicated time points (*left*) and at 10 days after inoculation (dai) (*right*). Image by Pengying Mei.

Functional study of *Csrbohs* in defence response against *Xanthomonas citri* ssp. *citri* ***Pengying Mei, Zhen Song, Zhong'an Li and Changyong Zhou***	543–554	Plant *rbohs* constitute a multigene family that is involved in multiple signalling pathways, including defence response, but the citrus *rbohs* are poorly understood. Here, six *Csrbohs* were identified in citrus, of which *CsrbohD* was most highly expressed in both kumquat and grapefruit and participated in resistance to *Xanthomonas citri* ssp. *citri* (*Xcc*). This finding shows *CsrbohD* promotes resistance to *Xcc* and has the potential to be a new candidate to breed citrus varieties with *Xcc* tolerance.
Acquired tolerance of the photosynthetic apparatus to photoinhibition as a result of growing *Solanum lycopersicum* at moderately higher temperature and light intensity ***Milena T. Gerganova, Aygyun K. Faik and Maya Y. Velitchkova***	555–566	Plants are often exposed to adverse environmental factors that have an effect on the photosynthetic apparatus. Here, we investigate the acclimation of tomato plants to moderately high temperature and light intensity can lead to the development of tolerance to photoinhibition. The study sheds light on the mechanisms underlying the acquired tolerance to high light intensity and the strategy of plants to cope with light energy that exceeds the needs of photosynthesis.
Probing functional and optical cross-sections of PSII in leaves during state transitions using fast repetition rate light induced fluorescence transients ***Barry Osmond, Wah Soon Chow, Barry J. Pogson and Sharon A. Robinson***	567–583	Plants adjust the relative sizes of light-harvesting pigment-protein complexes in the antennae of both photosystems to the spectral composition light in the shade. Our holistic, *in situ* parameterisation of PSII functional and optical cross-sections showed an adjustment in PSII antenna complex pools participate that was 3-fold larger than previously thought. Fluorescence yields from the novel excitation protocols used may reflect the larger assembly of pigment-protein complexes now deemed to participate in state transitions.
Vigna unguiculata seed priming is related to redox status of plumule, radicle and cotyledons ***Lilya Boucelha, Réda Djebbar and Ouzna Abrous-Belbachir***	584–594	Seed priming allows an improvement of germination performances as well as a tolerance to abiotic stress and higher yields. We have hypothesised that *Vigna unguiculata* seed priming is related to redox status of different parts of the embryo. We showed that priming allows activation of antioxidant enzymes, especially in the plumule, and that it causes an accumulation of ROS in radicle and the meristematic zones of the plumule.

Corrigendum to:
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