บทความที่น่าสนใจประจำเดือนสิงหาคม 2558

สาขาวิทยาศาสตร์และเทคโนโลยี

1	Title:	Photoperiodic Flowering: Time Measurement Mechanisms in Leaves
	Author:	Young Hun Song, Jae Sung Shim, Hannah A. Kinmonth-Schultz, and Takato Imaizumi
	Journal:	Annual Review of Plant Biology, Vol. 66, 2015, pages 441-464
	Abstract:	Many plants use information about changing day length (photoperiod) to align their flowering time with seasonal changes to increase reproductive success. A mechanism for photoperiodic time measurement is present in leaves, and the day-length-specific induction of the FLOWERING LOCUS T (FT) gene, which encodes florigen, is a major final output of the pathway. Here, we summarize the current understanding of the molecular mechanisms by which photoperiodic information is perceived in order to trigger FT expression in Arabidopsis as well as in the primary cereals wheat, barley, and rice. In these plants, the differences in photoperiod are measured by interactions between circadian-clock-regulated components, such as CONSTANS (CO), and light signaling. The interactions happen under certain day-length conditions, as previously predicted by the external coincidence model. In these plants, the coincidence mechanisms are governed by multilayered regulation with numerous conserved as well as unique regulatory components, highlighting the breadth of photoperiodic regulation across plant species.
	Database:	Annual Reviews

2	Title:	Terrestrial Ecosystems in a Changing Environment: A Dominant Role for Water
	Author:	Carl J. Bernacchi and Andy VanLoocke
	Journal:	Annual Review of Plant Biology, Vol. 66, 2015, pages 599–622
	Abstract:	Transpiration—the movement of water from the soil, through plants, and into the atmosphere—is the dominant water flux from the earth's terrestrial surface. The evolution of vascular plants, while increasing terrestrial primary productivity, led to higher transpiration rates and widespread alterations in the global climate system. Similarly, anthropogenic influences on transpiration rates are already influencing terrestrial hydrologic cycles, with an even greater potential for changes lying ahead. Intricate linkages among anthropogenic activities, terrestrial productivity, the hydrologic cycle, and global demand for ecosystem services will lead to increased pressures on ecosystem water demands. Here, we focus on identifying the key drivers of ecosystem water use as they relate to plant physiological function, the role of predicted global changes in ecosystem water uses, trade-offs between ecosystem water use and carbon uptake, and knowledge gaps.
	Database:	Annual Reviews

3	Title:	Engineering Plastid Genomes: Methods, Tools, and Applications in Basic Research and Biotechnology
	Author:	Ralph Bock
	Journal:	Annual Review of Plant Biology, Vol. 66, 2015, pages 211–241
	Abstract:	The small bacterial-type genome of the plastid (chloroplast) can be engineered by genetic transformation, generating cells and plants with transgenic plastid genomes, also referred to as transplastomic plants. The transformation process relies on homologous recombination, thereby facilitating the site-specific alteration of endogenous plastid genes as well as the precisely targeted insertion of foreign genes into the plastid DNA. The technology has been used extensively to analyze chloroplast gene functions and study plastid gene expression at all levels in vivo. Over the years, a large toolbox has been assembled that is now nearly comparable to the techniques available for plant nuclear transformation and that has enabled new applications of transplastomic technology in basic and applied research. This review describes the state of the art in engineering the plastid genomes of algae and land plants (Embryophyta). It provides an overview of the existing tools for plastid genome engineering, discusses current technological limitations, and highlights selected applications that demonstrate the immense potential of chloroplast transformation in several key areas of plant biotechnology.
	Database:	Annual Reviews

4	Title:	PIN proteins and the evolution of plant development
	Author:	Tom Bennett
	Journal:	Trends in Plant Science, Volume 20, Issue 8, August 2015, Pages 498–507
	Abstract:	Many aspects of development in the model plant Arabidopsis thaliana involve regulated distribution of the hormone auxin by the PIN-FORMED (PIN) family of auxin efflux carriers. The role of PIN-mediated auxin transport in other plants is not well understood, but studies in a wider range of species have begun to illuminate developmental mechanisms across land plants. In this review, I discuss recent progress in understanding the evolution of PIN-mediated auxin transport, and its role in development across the green plant lineage. I also discuss the idea that changes in auxin biology led to morphological novelty in plant development: currently available evidence suggests major innovations in auxin transport are rare and not associated with the evolution of new developmental mechanisms.
	Database:	ScienceDirect

5	Title:	Transport of defense compounds from source to sink: lessons learned from glucosinolates
	Author:	Morten Egevang Jørgensen, Hussam Hassan Nour-Eldin, Barbara Ann Halkier
	Journal:	Trends in Plant Science, Volume 20, Issue 8, August 2015, Pages 508-514

Abstract:	Plants synthesize a plethora of defense compounds crucial for their survival in a challenging and changing environment. Transport processes are important for shaping the distribution pattern of defense compounds, albeit focus hitherto has been mostly on their biosynthetic pathways. A recent identification of two glucosinolate transporters represents a breakthrough in our understanding of glucosinolate transport in Arabidopsis and has advanced knowledge in transport of defense compounds. In this review, we discuss the role of the glucosinolate transporters in establishing dynamic glucosinolate distribution patterns and source–sink relations. We focus on lessons learned from glucosinolate transport that may apply to transport of other defense compounds and discuss future avenues in the emerging field of defense compound transport.
Database:	ScienceDirect

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Title:	Impact of Diseases on Export and Smallholder Production of Banana
Author:	Randy C. Ploetz, Gert H.J. Kema, and Li-Jun Ma
Journal:	Annual Review of Phytopathology, Vol. 53, 2015, pages 269-288
Abstract:	Banana (Musa spp.) is one of the world's most valuable primary agricultural commodities. Exported fruit are key commodities in several producing countries yet make up less than 15% of the total annual output of 145 million metric tons (MMT). Transnational exporters market fruit of the Cavendish cultivars, which are usually produced in large plantations with fixed infrastructures and high inputs of fertilizers, pesticides, and irrigation. In contrast, smallholders grow diverse cultivars, often for domestic markets, with minimal inputs. Diseases are serious constraints for export as well as smallholder production. Although black leaf streak disease (BLSD), which is present throughout Asian, African, and American production areas, is a primary global concern, other diseases with limited distributions, notably tropical race 4 of Fusarium wilt, rival its impact. Here, we summarize recent developments on the most significant of these problems.
Database:	Annual Reviews

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Title:	Range-Expanding Pests and Pathogens in a Warming World
Author:	Daniel Patrick Bebber
Journal:	Annual Review of Phytopathology, Vol. 53, 2015, pages 335–356
Abstract:	Crop pests and pathogens (CPPs) present a growing threat to food security and ecosystem management. The interactions between plants and their natural enemies are influenced by environmental conditions and thus global warming and climate change could affect CPP ranges and impact. Observations of changing CPP distributions over the twentieth century suggest that growing agricultural production and trade have been most important in disseminating CPPs, but there is some evidence for a latitudinal bias in range shifts that indicates a global warming signal. Species

		distribution models using climatic variables as drivers suggest that ranges will shift latitudinally in the future. The rapid spread of the Colorado potato beetle across Eurasia illustrates the importance of evolutionary adaptation, host distribution, and migration patterns in affecting the predictions of climate-based species distribution models. Understanding species range shifts in the framework of ecological niche theory may help to direct future research needs.
	Database:	Annual Reviews

8	Title:	Highways in the Sky: Scales of Atmospheric Transport of Plant Pathogens
	Author:	David G. Schmale III and Shane D. Ross
	Journal:	Annual Review of Phytopathology, Vol. 53, 2015, pages 591–611
	Abstract:	Many high-risk plant pathogens are transported over long distances (hundreds of meters to thousands of kilometers) in the atmosphere. The ability to track the movement of these pathogens in the atmosphere is essential for forecasting disease spread and establishing effective quarantine measures. Here, we discuss the scales of atmospheric dispersal of plant pathogens along a transport continuum (pathogen scale, farm scale, regional scale, and continental scale). Growers can use risk information at each of these dispersal scales to assist in making plant disease management decisions, such as the timely application of appropriate pesticides. Regional- and continental-scale atmospheric features known as Lagrangian coherent structures (LCSs) may shuffle plant pathogens along highways in the sky. A promising new method relying on overlapping turbulent back-trajectories of pathogen-laden parcels of air may assist in localizing potential inoculum sources, informing local and/or regional management efforts such as conservation tillage. The emergence of unmanned aircraft systems (UASs, or drones) to sample plant pathogens in the lower atmosphere, coupled with source localization efforts, could aid in mitigating the spread of high-risk plant pathogens.
	Database:	Annual Reviews

9	Title:	Transcriptional networks in leaf senescence
	Author:	Jos HM Schippers
	Journal:	Current Opinion in Plant Biology, Volume 27, October 2015, Pages 77–83
	Abstract:	Plant senescence is a natural phenomenon known for the appearance of beautiful autumn colors and the ripening of cereals in the field. Senescence is a controlled process that plants utilize to remobilize nutrients from source leaves to developing tissues. While during the past decades, molecular components underlying the onset of senescence have been intensively studied, knowledge remains scarce on the age-dependent mechanisms that control the onset of senescence. Recent advances have uncovered transcriptional networks regulating the competence to senesce. Here, gene regulatory

	networks acting as internal timing mechanisms for the onset of senescence are highlighted, illustrating that early and late leaf developmental phases are highly connected.
Database:	ScienceDirect

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Title:	Tracing the evolutionary path to nitrogen-fixing crops
Author:	Pierre-Marc Delaux, Guru Radhakrishnan, Giles Oldroyd
Journal:	Current Opinion in Plant Biology, Volume 26, August 2015, Pages 95–99
Abstract:	Nitrogen-fixing symbioses between plants and bacteria are restricted to a few plant lineages. The plant partner benefits from these associations by gaining access to the pool of atmospheric nitrogen. By contrast, other plant species, including all cereals, rely only on the scarce nitrogen present in the soil and what they can glean from associative bacteria. Global cereal yields from conventional agriculture are dependent on the application of massive levels of chemical fertilisers. Engineering nitrogen-fixing symbioses into cereal crops could in part mitigate the economic and ecological impacts caused by the overuse of fertilisers and provide better global parity in crop yields. Comparative phylogenetics and phylogenomics are powerful tools to identify genetic and genomic innovations behind key plant traits. In this review we highlight recent discoveries made using such approaches and we discuss how these approaches could be used to help direct the engineering of nitrogen-fixing symbioses into cereals.
Database:	ScienceDirect