บทความที่น่าสนใจประจำเดือนกรกฎาคม 2557
สาขาวิทยาศาสตร์และเทคโนโลยี

1	Title:	Effects of open-air elevated atmospheric CO2 concentration on yield quality of soybean (Glycine max (L.) Merr)
	Author:	Xingyu Hao, Ji Gao, Xue Han, Zhanyun Ma, Andrew Merchant, Hui Ju, Ping Li, Wanshen Yang, Zhiqiang Gao, Erda Lin
	Journal:	Agriculture, Ecosystems & Environment, Volume 192, 1 July 2014, Pages 80–84
	Abstract:	Investigations across the world have elucidated common chemical and physiological responses of plants to the influence of elevated atmospheric CO2 concentration ([CO2]). Focus is now turning to the influence of elevated [CO2] on yield quality among a number of globally important crops including soybean (Glycine max (L.) Merr). Soybean cv. Zhonghuang 35 was grown in a free-air CO2 enrichment (FACE) field experiment at Changping-Beijing (China) under ambient (415 ± 16 μmol mol−1) and elevated (550 ± 19 μmol mol−1) CO2 concentrations. Results showed that elevated [CO2] increased the yields of soybean seeds (g m−2) by 26% and 31% respectively, in 2009 and 2011. Total protein concentration in seeds was significantly reduced by 3.3% under CO2 enrichment, but oil concentration increased by 2.8%. Accordingly, most proteinogenic amino acid concentrations were significantly reduced under elevated [CO2], whilst two fatty acids (linoleic acid and palmitic acid) increased in concentration. The protein and oil yield per unit ground area increased by 24.5% and 32.0%, respectively. Results indicate that whilst future elevated atmospheric [CO2] may improve the oil quantity of soybean, corresponding reductions in the nutritive value are likely to occur.
	Database:	ScienceDirect

2	Title:	Weed biodiversity and rice production during the irrigation rehabilitation process in Cambodia
	Author:	Akihiko Kamoshita, Yuji Araki, Yen T.B. Nguyen
	Journal:	Agriculture, Ecosystems & Environment, Volume 194, 1 September 2014, Pages 1–6
	Abstract:	A phytosociological survey of weed species was conducted during the rainy season in 2008 in paddy fields at different distances from the main irrigation canal in the Kamping Puoy Irrigation Rehabilitation Area in northwestern Cambodia. The spatial variation in water depth was large between upstream (shallower) and downstream (deeper) paddies, which resulted in different weed, with many Poaceae and Cyperaceae species observed on levees in upstream and aquatic herbs in downstream paddies. Chemical fertilizer input levels were generally small and average rice yield was relatively low (ca. 2.3 t/ha). Traditional and less intensive weed management options such as hand weeding, mid-season tillage, and post-harvest straw burning were common, while the herbicide 2,4-D was also widely used. Weed species in the paddy ecosystem used by villagers included Ipomoea aquatica, Nymphaea

		nouchali, and Monochoria vaginalis (occasional, for human consumption) and graminoid species (frequent, for cattle feed in addition to rice straw). Greater inorganic fertilizer input was associated with a lower diversity of weed species, but grain yield and weed diversity indices had no negative relation among different locations. This survey revealed relatively small extent of intensification in the irrigation rehabilitation area in Cambodia, which led to high weed diversity, including numerous plant species available for use to support farmers' livelihoods in the area.
	Database:	ScienceDirect

3	Title:	Spatial heterogeneity stabilizes livestock productivity in a changing climate
	Author:	Brady W. Allred, John Derek Scasta, Torre J. Hovick, Samuel D. Fuhlendorf, Robert G. Hamilton
	Journal:	Agriculture, Ecosystems & Environment, Volume 193, 1 August 2014, Pages 37–41
	Abstract:	Sustaining livestock agriculture is important for global food security. Livestock productivity, however, can fluctuate due to many environmental factors, including climate variability. Current predictions of continued warming, decreased precipitation, and increased climate variability worldwide raise serious questions for scientists and producers alike. Foremost is understanding how to mitigate livestock production losses attributed to climate extremes and variability. We investigated the influence of spatial heterogeneity on livestock production over six years in tallgrass prairie of the southern Great Plains, USA. We manipulated heterogeneity by allowing fire and grazing to interact spatially and temporally at broad scales across pastures ranging from 430 to 900 ha. We found that the influence of precipitation on livestock productivity was contingent upon heterogeneity. When heterogeneity was absent, livestock productivity decreased with reduced rainfall. In contrast, when heterogeneity was present, there was no relationship with rainfall and livestock productivity, resulting in heterogeneity stabilizing livestock productivity through time. With predicted increases in climate variability and uncertainty, managing for heterogeneity may assist livestock producers in adapting to climate change and in mitigating livestock productivity loss caused by climatic variability.
	Database:	ScienceDirect

4	Title:	Does investment in irrigation technology necessarily generate rebound effects? A simulation analysis based on an agro-economic model
	Author:	J. Berbel, L. Mateos
	Journal:	Agricultural Systems, Volume 128, June 2014, Pages 25–34
	Abstract:	Investing in more efficient irrigation technology is usually regarded as a means to reduce the use of water by irrigated agriculture. However, some authors report that the introduction of irrigation systems that apply water more uniformly may actually increase water catchment depletion: the so-called 'rebound effect'. In this paper a simple model that combines irrigation, agronomic, and microeconomic

	concepts is used to systematically analyze the conditions under which improved irrigation application uniformity may lead to increased water use and/or consumption. The analysis is illustrated with examples from the experience with irrigation modernization in Spain. Water demand (the value of marginal water productivity) becomes inelastic as the irrigation application uniformity increases. The increase in water depletion due to the introduction of more uniform irrigation systems is insignificant if land is limited and farmers optimize their profit. If land is not a limiting factor, new water abstractions are likely to occur, potentially leading to a vicious circle in which irrigated land expands while water resources become overexploited. This cycle tends to slow down as irrigation application uniformity increases. More accurate water accounting is suggested as an instrument for controlling water depletion complementary to investing in irrigation efficiency when water conservation at the basin scale is the main objective.
Database:	ScienceDirect

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Title:	Distribution and Organoleptic Impact of Ethyl 2-Methylbutanoate Enantiomers in Wine
Author:	Georgia Lytra, Sophie Tempere, Gilles de Revel, and Jean-Christophe Barbe
Journal:	Journal of Agricultural and Food Chemistry, June 4, 2014, Volume 62, Issue 22, pp 5005–5010
Abstract:	The enantiomers of ethyl 2-methylbutanoate were assayed in several wines using chiral gas chromatography (β-cyclodextrin). Analyses of 37 commercial red wines from various vintages and origins revealed the almost exclusive presence of the S-enantiomeric form. The average concentration was 50 μg/L, but the oldest samples were found to contain higher ethyl 2-methylbutanoate levels than the youngest wines. The olfactory threshold of a racemic mixture of ethyl (2R)-2-methylbutanoate and ethyl (2S)-2-methylbutanoate (50:50, m/m) in dilute alcohol solution was 2.60 μg/L, almost twice that of the S-form, which was 1.53 μg/L. Ethyl (2S)-2-methylbutanoate and the racemic mixture of ethyl (2R)-2-methylbutanoate and ethyl (2S)-2-methylbutanoate had different aromatic nuances: the former was mainly defined by fruity descriptors, such as green apple (Granny Smith) and strawberry, whereas the latter had an unspecific, caustic, fruity, solvent odor. Sensory analysis revealed an enhancing effect of ethyl (2S)-2-methylbutanoate on the perception of fruity aromas in the matrices studied: the “olfactory threshold” of the fruity pool, consisting of esters found in red wines, in dilute alcohol solution alone was higher than that of the same mixture supplemented with 50 μg/L ethyl (2S)-2-methylbutanoate. The sensory profiles of these aromatic reconstitutions highlighted the contribution of ethyl (2S)-2-methylbutanoate to black-berry-fruit descriptors.
Database:	American Chemical Society Journal (ACS)

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Title:	Correlating Molecular Spectroscopy and Molecular Chemometrics to Explore Carbohydrate Functional Groups and Utilization of Coproducts from Biofuel and Biobrewing Processing
Author:	Limei Chen, Xuewei Zhang, and Peiqiang Yu
Journal:	Journal of Agricultural and Food Chemistry, June 4, 2014, Volume 62, Issue 22, pp 5108–5117
Abstract:	Dried distillers grains with solubles (DDGS) was coproducts from bioethanol and biobrewing industry. It was an excellent resource of protein and energy feedstuff in China. Conventional studies often focus on traditional nutritional profiles. To data, there is little research on molecular structure-nutrition interaction of carbohydrate in coproducts. In this study, five kinds of corn-grain based DDGS and two kinds of barley-grain based DDGS were collected from different manufactures in the north of China. They were coded as “1, 2, 3, 4, 5, 6, and 7”, respectively. The primary purposes of this project were to investigate the molecular structure-nutrition interaction of carbohydrate in coproducts, in terms of (1) carbohydrate-related chemical composition and nutrient profiles, (2) predicted values for energy in coproducts for animal, and (3) in situ digestion of dry matter. The result showed that acid detergent fiber content in corn DDGS and barley DDGS had negative correlation with structural carbohydrate peak area, cellulose compounds, and carbohydrate component peaks (first, second, and total peak area), which were measured with molecular spectroscopy. The correlation between carbohydrate peak area (second and total) and digestible fiber (tdNDF) were negative. There were no correlation between carbohydrate spectral intensities and energy values, carbohydrate subfractions partitioned by CNCPS system, and in situ rumen degradation. The results indicate that carbohydrate spectral profiles (functional groups) are associated with the carbohydrate nutritive values in coproducts from biofuel and biobrewing processing.
Database:	American Chemical Society Journal (ACS)

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Title:	Role of Tartaric and Malic Acids in Wine Oxidation
Author:	John C. Danilewicz
Journal:	Journal of Agricultural and Food Chemistry, June 4, 2014, Volume 62, Issue 22, pp 5149–5155
Abstract:	Tartaric acid determines the reduction potential of the Fe(III)/Fe(II) redox couple. Therefore, it is proposed that it determines the ability of Fe to catalyze wine oxidation. The importance of tartaric acid was demonstrated by comparing the aerial oxidation of 4-methylcatechol (4-MeC) in model wine made up with tartaric and acetic acids at pH 3.6. Acetic acid, as a weaker Fe(III) ligand, should raise the reduction potential of the Fe couple. 4-MeC was oxidized in both systems, but the mechanisms were found to differ. Fe(II) readily reduced oxygen in tartrate model wine, but Fe(III) alone failed to oxidize the catechol, requiring sulfite assistance. In acetate model wine the reverse was found to operate. These observations should have broad application to model systems designed to study the oxidative

		process in foods and other beverages. Consideration should be given to the reduction potential of metal couples by the inclusion of appropriate ligands.
	Database:	American Chemical Society Journal (ACS)

8	Title:	Wireless sensor network coverage measurement and planning in mixed crop farming
	Author:	David L. Ndzi, Azizi Harun, Fitri M. Ramli, Munirah L. Kamarudin, Ammar Zakaria, Ali Yeon Md. Shakaff, Mahmad N. Jaafar, Shikun Zhou, Rohani S. Farook
	Journal:	Computers and Electronics in Agriculture, Volume 105, July 2014, Pages 83–94
	Abstract:	Wireless sensor network technology holds great promise for application in agriculture to improve crop yield, improve quality, and reduce costs. This paper presents wireless sensor network coverage measurements in a mixed crop farmland. As one of its key contributions, this study shows that general vegetation attenuation models do not apply to low power wireless sensor networks. A log-linear model is proposed in this paper and validated for application in mixed crop environment. Unlike in mono-crop environment, this study shows that the network coverage is heterogeneous with asymmetric channel between communicating node pair. Crop specific parameters of the log-linear model are derived and used to simulate network coverage in a 7 acre test-bed farm. An adaptive energy consumption model for each sensor node is proposed and used to compute energy consumption in the network. A cluster head and two antenna heights deployment model is also proposed and simulated to alleviate short network lifetime due to vegetation attenuation of signals. The results show that this network deployment model extends the lifetime of the network by a factor of more than 20 compare to a deployment where cluster heads are not used.
	Database:	ScienceDirect

9	Title:	Point-trained models in a grid environment: Transforming a potato late blight risk forecast for use with the National Digital Forecast Database
	Author:	Kathleen Baker, Paul Roehsner, Thomas Lake, Douglas Rivet, Susan Benston, Bryan Bommersbach, William Kirk
	Journal:	Computers and Electronics in Agriculture, Volume 105, July 2014, Pages 1–8
	Abstract:	As publicly available weather forecasting datasets advance in accuracy and spatial and temporal resolution, it is relatively simple to apply these established models to new datasets but the results may deviate from what users of decision support systems have come to expect. Potato late blight risk models were some of the earliest weather-based models. This analysis compares two types of potato late blight risk models that were originally trained on location specific (point) data in Michigan. A unique system using NoSQL was developed to train, validate and implement potato late blight risk modeling using a grid data format. Each model was tested two ways; it was first deployed directly with

	gridded weather forecasting data as a replacement for point data, and then retrained on the gridded data. Despite consistently lower overall accuracy, the grid trained artificial neural network model was deemed of better quality for use by stakeholders because of its accuracy on days with potato late blight risk. However, the success of the model was dependent upon its retraining using the newly available data source. In the direct implementation scenario without retraining, a simpler modified-Wallin model achieved better results than the neural network model.
Database:	ScienceDirect

10	Title:	Digital image processing based identification of nodes and internodes of chopped biomass stems
	Author:	Anand Kumar Pothula, C. Igathinathane, S. Kronberg, J. Hendrickson
	Journal:	Computers and Electronics in Agriculture, Volume 105, July 2014, Pages 54–65
	Abstract:	Chemical composition of biomass feedstock is an important parameter for optimizing the yield and economics of various bioconversion pathways. Although chemical composition of biomass varies among species, varieties, and plant components, there is distinct variation even among stem components, such as nodes and internodes. Separation of morphological components possessing different quality attributes and utilizing them in 'segregated processing' leads to better handling, more efficient processing, and high-valued products generation. Using equipment to separate morphological components such as node and internodes of biomass stem that have closely related physical properties (e.g., size, shape, density) is difficult. However, as the nodes and internodes are clearly distinct in appearance by visual observation, the potential of digital image analysis for node and internode identification and quantification was investigated. We used chopped stems of big bluestem, corn, and switchgrass as test materials. Pixel color variation along the length was used as the principle of identifying the nodes and internodes. An algorithm in MATLAB was developed to evaluate the gray value intensity within a narrow computational band along the major axis of nodes and internodes. Several extracted image features, such as minimum, maximum, average, standard deviation, and variation of the computational band gray values; ribbon length of the computational band normalized gray value curve (NGVC), unit ribbon length of NGVC; area under NGVC, and unit area under NGVC were tested for the identification. Unit area under NGVC was the best feature/parameter for the identification of the nodes and internodes with an accuracy of about 96.6% (9 incorrect out of 263 objects). This image processing methodology of nodes and internodes identification can form the supporting software for the hardware systems that perform the separation.
	Database:	ScienceDirect