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农牧业信息化专题

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前沿资讯

1. Fifth Season builds 60,000-square-foot vertical farm（第五季建造了6万平方英尺的垂直农场）

简介：室内农业先锋第五季（Fifth Season）将在美国建立一个商业规模的室内垂直农场。这座占地60,000平方英尺的垂直农场将于2020年初在匹兹堡附近的Braddock开业。第五季联合创始人兼首席执行官奥斯汀• 韦伯（Austin Webb）表示，该公司的农场将为城市社区高效、安全、可持续生产无农药的绿叶蔬菜和草本植物树立一个新的垂直农业标准。

全程控制水培生长过程

“我们开发了完全集成的专有机器人技术，全程控制水培种植过程，优化诸如能源、劳动力使用和作物产量的这些关键因素，”韦伯说。

减少95%的用水量

韦伯表示，运营第一年，Braddock农场将在其25,000平方英尺的种植室内生产超过500,000磅的生菜、菠菜、羽衣甘蓝、芝麻菜和草本植物。该设施部分采用太阳能供电，与传统的种植作业相比，所需水量减少了95%。

韦伯说，第五季（最初成立的公司是RoBotany Ltd）正在计划在美国其他类似规模的城市分阶段进行扩张。

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2. Step into your future at About Future Farming（“About Future Farming ”活动：走进你的未来）

简介：Misset International and Wageningen University present About Future Farming, a 3-day event that brings together precision agriculture professionals from all over the world. About Future Farming takes place 5, 6 and 7 November 2019 at the Wageningen University & Research Campus in the Netherlands. The event kicks off at 5 November with the Global Future Farming Summit, followed by the Experience Tour at 6 November and the Circular Agri Food Summit at 7 November.

Global Future Farming Summit

This summit is about tackling future challenges, experiencing tomorrow’s technologies and connecting with industry leaders in the food and ag chain.

The third Global Future Farming Summit aims to bring together 150 thought leaders, key buyers investors, business innovators, policy and decision makers in food and farming from all over the world to share new ideas and approaches on what’s happening in the future world of food and ag.

Keynote speakers

Featured speakers at the Future Farming Summit are, amongst others, Jehiel Oliver, the CEO and founder of Hello Tractor, Ole Green, the CEO and founder of AgroIntelli and Julie Borlaug, VP Communications & PR of Inari. Other speakers include several experts of

Wageningen University, including Ernst van den Ende and Sjaak Wolfert.

Experience Tour

During the Experience Tour on 6 November you will get a unique opportunity to discover the research facilities at Wageningen Campus and meet its experts. The latest developments and innovations of Wageningen University & Research will be brought to light.

Circular Agri Food Summit

The Circular Agri Food Summit will discuss the challenges, share best practices and brings inspiring solutions in the increasing demand of food production using fewer resources while taking into account the environment. The summit is designed to empower you to take tangible action, so you leave ready for what comes next.

Speakers

Featured speakers at the Circular Agri Food Summit are, amongst others, fly-farmer and insect technology pioneer at AgriProtein Jason Drew, CEO of Aosta, Nature & More Volkert Engelsman and Jan Kees Vis, Global Director Sustainable Sourcing Development at Unilever.

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学术文献

1. Current Status and Future Prospect of the Agricultural Mechanization in Brazil（巴西农业机械化的现状及未来展望）

简介：Brazil is known worldwide as one of the major producers of grain, meat, sugar, coffee and other products. Agribusiness is one of the main activities in Brazil and contributes significantly to the Brazilian economy. This fact led to even greater investments and developments in the market of agricultural machinery and implements in the country. From the 1960s to the end of 2018, land areas with agricultural potential increased substantially, while the total number of wheel tractor fleets increased six-fold; in other words, the mechanized area in hectares per tractor decreased from 410 to 65 ha/tractor. The machinery and equipment manufactures in the country today is sufficient to support a high-level mechanization process and to decrease the number of tractors/seed planters/combines and other types of equipment per hectare. The acquisition and modernization of tractors, harvesters and other equipment types depend on the income of farmers and governmental and private credit policies. The sales of agricultural machinery in Brazil are strongly influenced by the prices of international commodities such as soybean, maize, citrus and coffee. With excessive urbanization and fewer labor resources available, extensive and highly mechanized crop systems, such as soybean, sugar cane, rice and corn, have been established to attend to farm chronograms at different levels of technology. In addition to a large machinery production capacity, the Brazilian industry has also invested in advanced technology, mainly

in tractors and combines, to save time and fuel, lower the level of fatigue and reduce cost.
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2. Future Trends in the Chilean Agricultural Machinery Industry（智利农业机械工业的未来趋势）

简介：The principal objective of this work is to identify the future trends in the agricultural machinery industry according to the specific features of the Chilean production systems. These features are related to the different weather conditions along the country as well as the fragmentation degree of the agricultural productions, aimed mostly to the export market. Government policies support the mechanization of small farmers according to their requirements. The research on agricultural mechanizations is carried out by universities supported by enterprise or governmental funds, aimed to develop automated and robotics systems.
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3. High-throughput analysis of leaf physiological and chemical traits with VIS-NIR-SWIR spectroscopy: a case study with a maize diversity panel（高通量visi－ir－swir光谱分析叶片生理化学特性：以玉米品种多样性为例）

简介：**Background**: Hyperspectral reflectance data in the visible, near infrared and shortwave infrared range (VIS-NIR-SWIR, 400-2500nm) are commonly used to nondestructively measure plant leaf properties. We investigated the usefulness of VIS-NIR-SWIR as a high-throughput tool to measure six leaf properties of maize plants including chlorophyll content (CHL), leaf water content (LWC), specific leaf area (SLA), nitrogen (N), phosphorus (P), and potassium (K). This assessment was performed using the lines of the maize diversity panel. Data were collected from plants grown in greenhouse condition, as well as in the field under two nitrogen application regimes. Leaf-level hyperspectral data were collected with a VIS-NIR-SWIR spectroradiometer at tasseling. Two multivariate modeling approaches, partial least squares regression (PLSR) and support vector regression (SVR), were employed to estimate the leaf properties from hyperspectral data. Several common vegetation indices (VIs: GNDVI, RENDVI, and NDWI), which were calculated from hyperspectral data, were also assessed to estimate these leaf properties.
Results: Some VIs were able to estimate CHL and N (R^2>0.68), but failed to estimate the other four leaf properties. Models developed with PLSR and SVR exhibited comparable

performance to each other, and provided improved accuracy relative to VI models. CHL were estimated most successfully, with R^2 (coefficient of determination)>0.94 and ratio of performance to deviation (RPD)>4.0. N was also predicted satisfactorily (R^2>0.85 and RPD>2.6). LWC, SLA and K were predicted moderately well, with R^2 ranging from 0.54 to 0.70 and RPD from 1.5 to 1.8. The lowest prediction accuracy was for P, with R^2<0.5 and RPD <1.4.

Conclusion: This study showed that VIS-NIR-SWIR reflectance spectroscopy is a promising tool for low-cost, nondestructive, and high-throughput analysis of a number of leaf physiological and biochemical properties. Full-spectrum based modeling approaches (PLSR and SVR) led to more accurate prediction models compared to VI-based methods. We called for the construction of a leaf VIS-NIR-SWIR spectral library that would greatly benefit the plant phenotyping community for the research of plant leaf traits.

来源：PLANT METHODS

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4. Greenhouse environment modeling and simulation for microclimate control(温室环境微气候控制建模与仿真)

简介：Greenhouse plant science assays have been impacted by microclimates which causes significant level of noise to plant growth measurement data. Researchers and scientist have been randomizing pots locations, which helps to re-distribute the noise, but does not remove the noise. The impacts from microclimates can be eliminated by shuffling plants, but there has been no study on the optimization of shuffling pattern, such as the frequency and moving distance for the pots. It is important to quantitatively study the microclimates in the greenhouse, so we can optimize the shuffling pattern accordingly. The aim of this study was to propose a computer modeling approach for simulating microclimate in the greenhouse, and then use the simulation result to optimize pot movement distance and frequency. A computational greenhouse model was developed using inputs from real design, materials and location of a Purdue Lily greenhouse in West Lafayette, Indiana. Microclimate variables, including ambient temperature and lighting radiation over 24 h and 7 days were predicted with the simulation model. Thermometers and lighting sensors were also distributed in the greenhouse for the ground-truth measurements over a seven-day period. Comparison of measured microclimate variables with predicted variables obtained from the computational model demonstrated that the simulation model could precisely predict temperatures and light radiation at any time, and at different positions in the greenhouse. Optimized pot movement frequency and distance were then determined with the simulation result. The new shuffling pattern can remove over 90% of the microclimate variance but could save more than 95% shuffling efforts compared with non-stop movement.

来源：COMPUTERS AND ELECTRONICS IN AGRICULTURE

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