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## An application on rice of reasonably using canopy temperature to improve the precision of water stress monitoring

Crop water stress index (CWSI) has been recognized as a water stress indicator and as a potential tool for irrigation scheduling. In present study, CWSI calculated based minimizing the low temperature impact was suitable to improve the precision of water stress monitoring. Thermal images were taken with FLIR thermal infrared imager at 14:00. Upper, sunlit and non-covered temperatures derived from canopy images, and canopy temperature cumulative frequency curves were discovered as discrete distribution under different degrees of water stress. CWSI used canopy temperature as the main driver for evaluation, and was calculated based on average temperature over a certain quantile. Regression equation between different CWSI and photosynthetic activity were built to find which one is the most sensitive index. Statistical analysis revealed that higher correlation coefficients were found after minimizing the low temperature. Further, the most sensitive CWSI also showed better relation to root soil moisture. CWSI thresholds were redefined. Optimal diagnose of the water stress was based on reasonably using canopy temperature. The results of this study were promising in precise irrigation scheduling.

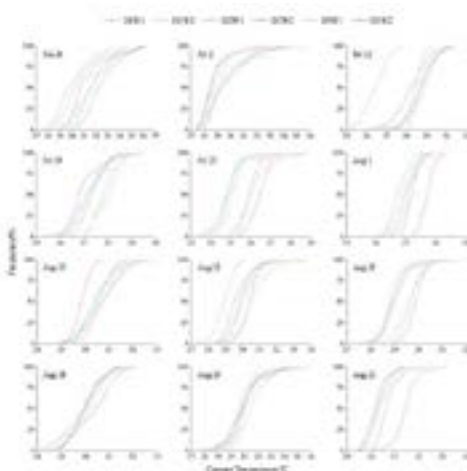


Fig.2 The cumulative frequency curve of canopy temperature on different dates.

## Recent Publications

1. Xu JZ, Bai WH, Li YW, Wang HY, Yang SH\*, Zhang JG. 2019. Calibration and validation of AquaCrop in simulating rice growth, yield and field water balance under drying-wetting cycle condition in eastern China. *Agricultural Water Management*, 213: 289-297
2. Xu JZ\*, Liu BY, Wang HY, Liu WH, Li YW, Dai YB, Lu T. 2019. Ammonia volatilization and nitrogen leaching following top dressing of urea from water saving irrigated rice field: impact of two-split surge irrigation. *Paddy and Water Environment*, 17: 46-51
3. Lv YP, Wei Q, Luan YJ, Xu JZ\*, Fazli Hameed, Twecan Dalson, Wei Z. 2019. Coupling Effect of Soil Water Deficit and Air Aridity on Crop Water Stress of Pepper. *International Journal of Agriculture and Biology*, 21 (3 ): 506-512
4. Xu JZ, Wei Q\*, Yang SH, Liao LX, Qi ZM, Wang WG. Soil degassing during watering: an overlooked soil N<sub>2</sub>O emission process. *Environmental Pollution*, 242(A): 257-263.
5. Xu Junzeng, Xiaoyin Liu, Shihong Yang\*, Zhiming Qi, Yijiang Wang. 2017. Modeling rice evapotranspiration under water-saving irrigation by calibrating canopy resistance model parameters in the Penman-Monteith equation. *Agricultural Water Management*, 182:55-66.

## Biography

Junzeng Xu, Male, Professor of Hohai University. Research interests were: Efficient irrigation and drainage management, Eco-environmental aspects of efficient irrigation and drainage management in rice paddy and so on, and more than 50 papers have been published during the last 5 years.

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