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A crop water stress index and time threshold for automatic irrigation scheduling of grain sorghum

Title	A crop water stress index and time threshold for automatic irrigation scheduling of grain sorghum
Title (native language)	
Category	• Reacting or variable rate technology
Short summary for practitioners (Practice abstract) in English)	Variations of the crop water stress index (CWSI) have been used to characterize plant water stress and schedule irrigations. Usually, this thermal-based stress index has been calculated from measurements taken once daily or over a short period of time, near solar noon or after and in cloud free conditions. A method of integrating the CWSI over a day was developed to avoid the noise that may occur if weather prevents a clear CWSI signal near solar noon. This CWSI and time threshold (CWSI-TT) was the accumulated time that the CWSI was greater than a threshold value (0.45); and it was compared with a time threshold (CWSI-TT) based on a well-watered crop. We investigated the effectiveness of the CWSI-TT to automatically control irrigation of short and long season grain sorghum hybrids (Sorghum bicolor (L.) Moench, NC+ 5C35 and Pioneer 84G62); and to examine crop response to deficit irrigation treatments (i.e. 80%, 55%, 30% and 0% of full replenishment of soil water depletion to 1.5-m depth).
Short summary for practitioners	
Website	
Audiovisual material	
Links to other websites	
Additional comments	

Keywords	Water management | Energy management
Additional keywords	Automatic irrigation scheduling; CWSI Time Threshold; Grain sorghum; Plant feedback system
Geographical location (NUTS)	EU
Other geographical location	Global
Cropping systems	Arable crops
Field operations	Irrigation | Crop and soil scouting
SFT users	Farmer | Contractor
Education level of users	Secondary education | Apprenticeship or technical school education | University education
Farm size (ha)	0-2 | 2-10 | 10-50 | 50-100 | 100-200 | 200-500 | >500

Scientific article

Title	A crop water stress index and time threshold for automatic irrigation scheduling of grain sorghum
Full citation	OShaughnessy, S.A.; Evett, S.R.; Colaizzi, P.D.; Howell, T.A. (2012). Agricultural Water Management, DOI:10.1016/j.agwat.2012.01.018

Effects of this SFT

Productivity (crop yield per ha)	Some increase
Quality of product	No effect
Revenue profit farm income	Some increase
Soil biodiversity	No effect
Biodiversity (other than soil)	No effect
Input costs	No effect
Variable costs	No effect
Post-harvest crop wastage	No effect
Energy use	Some decrease
CH4 (methane) emission	No effect
CO2 (carbon dioxide) emission	No effect
N2O (nitrous oxide) emission	No effect
NH3 (ammonia) emission	No effect
NO3 (nitrate) leaching	No effect
Fertilizer use	No effect
Pesticide use	No effect
Irrigation water use	Some decrease
Labor time	Some decrease
Stress or fatigue for farmer	Some decrease
Amount of heavy physical labour	No effect
Number and/or severity of personal injury accidents	No effect
Number and/or severity of accidents resulting in spills property damage incorrect application of fertiliser/pesticides etc.	No effect
Pesticide residue on product	No effect
Weed pressure	No effect
Pest pressure (insects etc.)	No effect
Disease pressure (bacterial fungal viral etc.)	No effect

Information related to how easy it is to start using the SFT

This SFT replaces a tool or technology that is currently used. The SFT is better than the current tool	agree
The SFT can be used without making major changes to the existing system	no opinion
The SFT does not require significant learning before the farmer can use it	disagree
The SFT can be used in other useful ways than intended by the inventor	no opinion
The SFT has effects that can be directly observed by the farmer	agree
Using the SFT requires a large time investment by farmer	disagree
The SFT produces information that can be interpreted directly	disagree

[View this technology on the Smart-AKIS platform.]

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