

Studies on improvement in crop productivity and smart farming

Agricultural Science and Technology

Integrating crop science based on photosynthesis and new agriculture using advanced technologies

Kenta WATANABE, Asst. Prof.

E-mail kenta.watanabe@setsunan.ac.jp



Keywords

Growth analysis, photosynthesis, evapotranspiration, biomass, cultivation management, smart farming, micro-climate, sensing, drone, sugarcane

Summary

Backgrounds

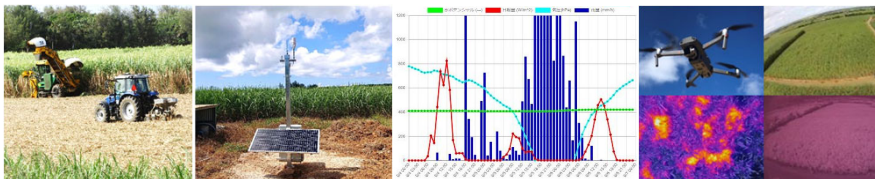
- Producing food to meet the increasing population requires more efficient farming than before.
- To achieve this goal, crop production, understanding plant-physiological mechanisms such as photosynthesis and transpiration, is necessary.
- Also, smart farming that deals with use of advanced technologies and application of complex data is highlighted these days.

Objectives

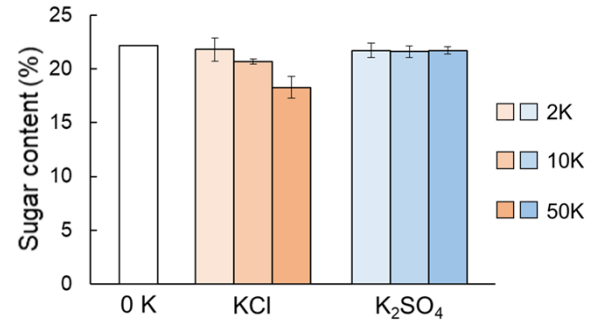
- To achieve highly productive and sustainable agriculture by learning smart farming as well as plant physiology and basic crop cultivation methods.

Major achievements

- Researches on fertilization and irrigation management methods to improve yield and quality of sugarcane in Okinawa
- Data analysis investigating the relationships between past meteorological data and sugarcane growth and yield
- Advancing smart farming in sugarcane cultivation using high technologies such as auto-steering of agricultural machinery, micro-climate post, drone, and remote irrigation system

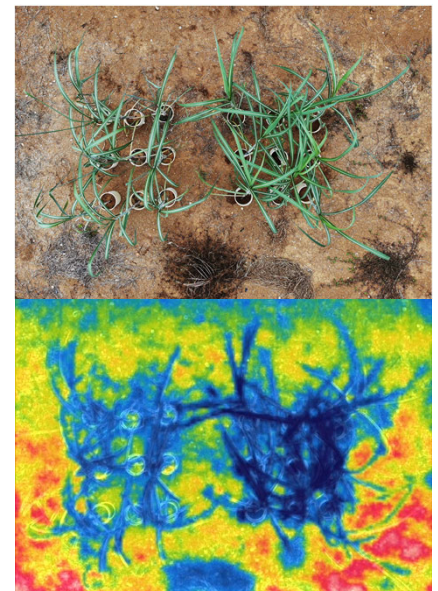


Various smart farming technologies



Effects of two different potassium fertilizers on sugarcane quality

Chloride is supposed to be the main factor to reduce sugar content since it occurred only when potassium chloride (KCl) is overdosed



Drought Irrigated

Effects of irrigation on canopy temperature

Thermography enables to detect water stress

Prospects of collaboration

【Connections to overseas research institutes】

- I encourage students to study abroad and do internship or cooperative research at overseas research institutes



Selling points

I raise growers and researchers who can cultivate crops using high technologies and data.