
Oral sessions | Farming System | O23: Crop Modeling: Recent Progress and Applications

[O23] Crop Modeling: Recent Progress and Applications

Chair: Hiroshi Nakagawa (National Agriculture and Food Research Organization, Japan)

Chair: Xinyou Yin (Wageningen University and Research, Netherlands)

Thu. Sep 9, 2021 5:00 PM - 7:00 PM Room 2 (Oral) (Farming System)

5:40 PM - 5:55 PM

[O23-03] Improving Variety Reveals Emerging Wheat Yield Gaps Associated with Humid Days in Hokkaido

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There is a lack of information on wheat yield gaps associated with changes in cultivar progression. Humid weather conditions before, during, and after flowering cause the production damage of disease and pre-harvest sprouting in Hokkaido, northern Japan. A process model, such as the World Food Studies model (WOFOST), can estimate potential yields by reflecting climate change and soil types. We used regional historical wheat sowing and heading dates during the period 1984-2019 in eastern Hokkaido (Tokachi and Okhotsk regions), where major varieties are replaced with more productive varieties almost every ten years. We implemented WOFOST using PCSE/WOFOST to enable regional and municipal estimation. There is little change in air temperature during the grain filling period from the late 1980s to the late 1990s. As a result, effective climate change adaptation measures have been implemented to avoid the hot grain filling period of early-growing species in Hokkaido. Chihoku-komugi' and 'Hokushin', exhibited higher sensitivity to air humidity before harvest and after the heading period. A new high-yield variety, 'Kitahonami', reduced the periodical mean yield gap from 2.0 Mg/ha to 1.3 Mg/ha, whereas the yield gap often expanded under low vapor pressure deficit during the specific period. Current breeding reduces humidity damage and alters the growing season sensitive to damage, while the emerging yield gap factors continue to reflect the apparent trait targets to improve. In the presentation, we will also introduce the climatic factors that further promote the outbreak of diseases. We found that changes in the yield gap of each variety reflect the benefits of breeding.