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Effect of Sunshine Hours to Ripened Grain Ratio and Grain Weight of Processing Rice Cultivars in North Central Area of Korea

Bon Il Ku^{1*}, Won Young Choi¹, Yong Jae Won¹

¹Cheorwon Branch, National Institute of Crop Science, Cheorwon-gun, Korea

[Introduction]

Cheorwon has shorter rice growing period which is located in northernmost and inland region in major rice fields of Korea. Ripening environment after heading have a greater impact on rice yield than that of before heading, so about 74% carbohydrate is made of photosynthesis after heading. Especially, there was a big difference in sunshine hours between 2020 and 2021, and it had a big impact on ripened grain ratio and grain weight of rice. Therefore this study was conducted to evaluate the effect of sunshine hours of 2020 and 2021 to yield components of processing rice cultivars in north central area of Korea.

[Materials & Methods]

17 processing rice(5 glutinous, 7 colored, 3 flavor, 2 special use) cultivars were transplanted on May 20 in 2020 and 2021 by 30×12cm planting density. And we checked weather change after heading of rice and variation of yield components chiefly ripened grain ratio and grain weight. And we investigated the weather change from 1991 to 2021 to measure the effect of weather conditions of 2020 and 2021.

[Results]

Compared to little sunshine hours in 2020 owing to frequent rain from August, sunshine hours increased greatly in 2021 because of little precipitation after mid-July. Mean temperature during 50 days after heading(July 20, July 25, August 1, August 10, August 15) from 1991 to 2021 gradually decreased(23.8°C→20.9°C), but cumulative sunshine hours continuously increased(275hr→307hr) in later heading date. Compared to mean sunshine hours from 1991 to 2021, it were -15.1%, -11.8%, -11.1%, 8.3%, 10.6% in 2020, but it increased 51.0%, 42.7%, 30.9%, 19.0%, 16.3% in 2021 in each heading date. So rice cultivars which headed in late July in 2021 were ripened in highest sunshine hours condition.

The ripened grain ratio of rice cultivars which headed before and after August 10 were 64.4% and 76.0% in 2020. but it increased 85.0% and 86.8% in 2021. The 1,000 grain weight of rice cultivars which headed before and after August 10 were 19.7g and 18.0g in 2020. but it increased 21.0g and 20.3g in 2021.

The cultivars which showed big difference in ripened grain ratio between 2020 and 2021 were Joeunheugmi, Seonhyangheugmi, Jeogjinjuchal. The cultivars which showed big difference in 1,000 grain weight between 2020 and 2021 were Seonhyangheugmi, Joeunheugmi, Hongjinju.

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*Corresponding author: E-mail, kubonil@korea.kr Tel. +82-33-455-2031