Determining the minimum threshold temperature for normal maturation of temperate rice in South Korea

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[Introduction] The late marginal heading date for normal maturation is essential to determine the range of late transplanting date. A minimum threshold temperature for normal maturation has been used to determine the late marginal heading date. In this study, a statistical procedure was developed to determine the threshold temperature for new Korean varieties for 40 days of grain filling period.

[Material and Method] The threshold temperature was chosen to be the minimum temperature at which grain filling ratio and weight are minimally affected. To identify the threshold temperature, grain filling ratio and weight, which were observed at Suwon and Iksan with four transplanting date (25th Jun, 2nd Jan, 9th Jan, 16th Jan) for two years in Korea, were compared with a cumulative temperature during 40 days of grain filling stage.

[Results] The accumulated temperature between 800 and 840 °C would be the point of inflection, which could be used as the threshold temperature in relative grain filling ratio (Fig 1). In contrast, the relative 1000 grain weight decreased significantly only when the accumulated temperature was lower than 760°C (Fig 2). Compared with the relative grain filling ratio, the relative 1000 grain weight would not decrease at lower temperature during grain filling period. Still, it would be preferable to choose conservative criteria for determination of the threshold temperature for normal maturation. Therefore, it would be suitable to choose 800°C as the threshold temperature for normal maturation.

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Fig 1 Relative grain filling ratio at different accumulated temperature. Fig 2 Relative grain weight at different accumulated temperature.