

平成 29 年度 環境科学院 修士論文内容の要旨

Comparison of photosynthesis, growth and yield in rice 'Akitakomachi' grown in cool and warm regions

(冷涼および温暖地で生育した稲'あきたこまち'の光合成、生育と収量の比較)

北海道大学 大学院環境科学院

環境起学専攻 人間・生態システムコース

李崔正陽

Japanese rice cultivars have been established so as to match the climate in original location. Because of global warming, severe hot temperatures were recorded in some places. Prediction of productivity under hot summer is important for stable rice production in future. In the present examination, growth, yield and photosynthesis of rice, cv. 'Akitakomachi', grown in Tokyo and Sapporo compared for the evaluation of the effect of hot temperature in summer.

The seedlings with 2 stages, young (24 days old) and mature (35 days old), were planted into the paddy in Tokyo University of Agriculture and Technology (Tokyo) and Hokkaido University, and plant growth and grain yield were investigated. Photosynthetic rate of completely expanded leaves was measured by LI-6800 before after the heading.

The temperature difference of Sapporo and Tokyo showed 3.4 °C in average during total cropping period, however 5.2 °C in summer, July and August 2017. Vegetative growth in mature seedling planted rice was larger than that in rice grown from young seedling in Sapporo, however, such difference between seedling types was not recognized in Tokyo. Grain yield in Tokyo was obviously smaller than that in Sapporo in both rice plants developed from young and mature seedlings. Panicle number and percentage of ripened grain in Tokyo became smaller compared with Sapporo.

There was no difference in photosynthesis rate between two types seedlings at heading stage in Tokyo, whereas at ripening stage, the plants grown from young seedling had better photosynthesis rate than that from mature seedling in both field. The photosynthesis rate in Tokyo was larger than that in Sapporo because of hot temperature.

High temperature showed high photosynthesis rate in Tokyo. While 'Akitakomachi' is sensitive cultivar to temperature for heading (flower initiation), early heading in Tokyo made smaller above ground biomass and led to yield reduction.