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Effects of various Geographical paddy fields on the growth, yield and seed components of sesame (*Sesamum indicum* L.) and perilla (*Perilla frutescens*)

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[Introduction]

Excessive soil water during crop growing results in decrease of yields. In Korea, the largest agricultural lands are paddy fields. Recently, upland crops are cultivated in paddy field soils to reduce overproduced rice in Korea. The objectives of this study were to investigate effects of various soil moisture contents to growth characteristics, yield and seed components of sesame and perilla from three paddy fileds with different geographical locations.

[Materials and Methods]

Sesame and perilla were selected to investigate in this study. These crops were planted in three paddy fields located in Miryang, Gyeonam with different geographical locations; Mountain foot slopes, valley, and alluvial plain. Soil water contents were measured at 15cm from soil surface every hour during growth season. Crop susceptibility (CS) and stress-day index (SDI) were calculated for each paddy field condition. Routin growth and yield characteristics were measured and seed components (K, Ca, Mg, Na, lignan) were analyzed.

[Results and Discussions]

The results of this study showed that the yield decreased significantly when the crops were affected by excessive soil moisture from the alluvial paddy field. Averaged soil moisture contents from paddy fields were 10.2% from mt. foot slope paddy field, 25.9% from ones of valley and 36.1% from alluvial. The smallest yield of sesame was 29 kg/10a from the alluvial paddy field and the greatest one was 109 kg/10a from mt. foot slope paddy field. Yeilds of perilla showed similar trend of the sesame yield changes across paddy field locations and soil moisture contents. The yield of sesame reduced up to 66% by excessive soil moisture, while perrila reduced up to 77%. Mineral components of seeds did not show any clear tred as soil moisture changed, but the lignan components from sesame had clear relation to soil moisture contents. As soil moisture increased, lignan contents increased as well. In order to quantify soil moisture stress response, SDI values of each crop were calculated from each paddy field. SDI values of both crops from mt. foot slope paddy field were 0 and this meant that there was no stress by soil moisture during cultivation. SDI values from valley were 5.4 for sesame and 7.5 for perilla. The values from alluvial plain paddy field were 212 for sesame and 497 for perilla. Based on these results, sesame is more soil water resistance than perilla from paddy field cultivation.

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