

## Yearly Variation of Growth and Yield of Sorghum (*Sorghum bicolor* L.) under Different Paddy-Upland Rotation.

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### [Introduction]

It has been reported that sorghum is rich in minerals, and vitamins, which are insufficient in rice, to prevent chronic diseases and prevent aging. Recently, as people are more concerned about quality of life, and interest in well-being foods has been increased, The consumption of sorghum has also increased (Park, 2012). Therefore, this study was conducted for three main purposes. The first was to investigate the growth and yield of sorghum in the organic paddy-upland rotation system, the second was to investigate yearly variation of growth and yield of sorghum and the third was to select the suitable varieties for paddy-upland rotation.

### [Materials and Methods]

This study was conducted in a field of sandy loam located in the middle district of Gyeonggi-do, Korea. We used the upland field rotated from matured paddy field, which have been used as a paddy field long time, for three years from 2015 to 2017. 7 varieties of Nampungchal, Hwanggeumchal, Aneunbangi, Moktak, Donganmae, Sodamchal and DS202 were tested. Planting space was 70cm (ridge) × 20cm (plant). Plot design was randomized block design with three replications. Other cultural and analyzing methods were based on the standards of RDA in Korea. Statistical analysis of the data was conducted by use of SAS 9.2.

### [Results and Discussions]

Days to heading in the three-year average of 7 varieties showed 66.1 days in the 1st year, 67.6 days in the 2nd year and 68.6 days in the 3rd year. There was no difference in the days from seeding to heading among three years. Culm length in the three-year average of 7 varieties was 117.1 cm in the 1st year, 134.4 cm in the 2nd year and 149.3 cm in the 3rd year respectively, showing 32.6 cm longer in the 3rd year than that of the 1st year. Ear length in the three-year average of 7 varieties was 26.3 cm in the 1st year, 26.9 cm in the 2nd year, and 24.6 cm in the 3rd year, showed no difference among three years. In grains per ear in the three-year average of 7 varieties, 2nd and 3rd year showed more grains from 150 to 200 grains than that of the 1st year. 1000 grain weight in the three-year average of 7 varieties, the 1st year was 23.4 g, the 2nd year was 24.2 g, and the 3rd year was 23.7 g. There was no significant difference among three years in 1000 grain weight. Average of yield of 7 varieties in the three-year was 208.3 kg/10a in the 1st year, 243.5 kg/10a in the 2nd and 254.1 kg/10a in the 3rd year, and showed that the 1st year was the lowest yield. The yields of sorghum tend to increase as the number of years of upland field increased after conversion from rice paddy field. Among the three-year average of 7 varieties, Donganmae had the highest yield (279.9 kg/10a), while Sodamchal showed the lowest yield(187.3 kg/10a). Donganmae is considered to be a suitable variety for paddy-upland rotation.

### [Acknowledgements]

This research was supported by a grant from the Rural Development Administration (Project No: PJ0126192018)

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