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Effect of biodiversity management of cereal and legume crop species on ecological resources utilization, productivity and land use efficiency

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Field experiments were conducted to examine the interaction of biodiversity of different cereal-legume crop species in the same land area. Cereals species maize (*Zea mays* L) and grain sorghum (*Sorghum bicolor* L Moench) were planted simultaneously with legume species C-3 i.e., soybean (*Glycine max* L Merrill), mungbean (*Vigna radiata* L Wilczek) and Cowpea (*Vigna unguiculata* L Walp). Each crop species was grown as sole or mixed in different cropping patterns for comparison and the interactions of crop species on competition for ecological factors, productivity as well as land use efficiency were recorded. The data of light intensity showed reductions along the C-3 legumes soybean, mungbean and cowpea canopies. Soybean and mungbean showed more shading tolerance to the biological stress resulted from adjacent taller cereal crop species than of cowpea. On contrast, reversible magnitude in light energy flux density was reported for the maize which was less competitive for light under mixed cropping than that in the solid cultures. All legumes showed reductions in growth and yield parameters compared with the solid cultures. On contrast beneficial effects due to mixed cropping were reported for maize and sorghum. The data of the land equivalent ratio (LER) showed yield advantages due to mixed cropping by (12%-37%) according to the adjacent crop species. It could be concluded from this study that biodiversity of C-3 and C-4 crop species with proper management of growing such contrasting species could effectively help in better agro-ecological factors use and increase land use efficiency.

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Antioxidant contents of perilla seeds from different cultivars

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Perilla species is a self-fertilizing annual plant belonging of the Lamiaceae family, subfamily Lamioideae that is widely cultivated and distributed in the Korea, China, and Japan. In Korea, perilla has been one of the most important oil crops and has been used as edible and industrial oil. Especially, *Perilla frutescens* is known as “Dlggae” in Korea. The seed of perilla is source of oils produced and then used as a salad oil or cooking medium in Korea. Perilla seeds contain high levels of linolenic acid (ω -3), which can be expressed to possess various effects such as heart disease, high cholesterol, high blood pressure, and asthma. The linolenic acid exposed to air, oxidation and rancidity is advanced. The rancidity causes the unpleasant smell or taste, thus, the use of perilla is limited. Recently, studies for suppressing the rancidity are underway. Antioxidant component can be suppressed and a delay rancidity. In previous studies on perilla, antioxidants such as caffeic acid, ferulic acid, rosmarinic acid, luteolin and apigenin have been reported. So, in this study, we analyze the content of antioxidants in the perilla 21 cultivars using HPLC. An analysis of the antioxidant contents in the perilla cultivar seeds was performed using high-performance liquid chromatography. The total antioxidant contents was 0.336–1.708 mg•g⁻¹, of which Daesil (1.708 mg•g⁻¹) formed the highest amount, approximately five times of the lowest content (Areum, 2.195 mg•g⁻¹). Thus, progression of rancidity of Daesil thought to be slower than the other perilla cultivars.

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