POSTER 17

상승된 대기 온도 및 이산화탄소 농도가 콩의 생장 및 군락광합성에 미치는 영향

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Impact of elevated air temperature and CO_2 concentration on canopy photosynthesis and growth of soybean

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Global climate change is one of the biggest problems the world is facing now. Elevated air temperature and CO_2 caused by global warming can affect the growth and productivity of most crops. In this study, experiments were conducted to evaluate the impacts of climate change on the canopy photosynthesis, growth, and seed yield of the determinate soybean cultivar in Southern Korea.

Both air temperature and CO_2 did not affect the phenology of vegetative stage and were not significantly related to the flowering time. Elevated temperature extended the R1-R5 period, while elevated CO_2 extended the R5-R7 period.

Canopy photosynthesis and growth were strongly influenced by elevated air temperature and CO_2 and also showed significant differences according to the growth stages. On vegetative stage, both of elevated air temperature and CO_2 had positive effects on daily net photosynthetic rate and synergistic effects on growth and development of soybean. On reproductive stage, elevated air temperature had negative physiological effects such as the abortion of flower and decreased photosynthetic ability. However, elevated CO_2 relieved these negative effects induced by elevated air temperature.

Elevated temperature decreased pod and seed numbers. However, elevated CO_2 compensated for negative effects on pod and seed number by heat stress by creating more branches. Seed size tended to be more strongly affected by air temperature than CO_2 concentration. Seed size had a strongly negative relationship with elevated temperature during seed filling stage, whereas a weaker positive relationship with elevated CO_2. Based on these results, we also revealed that elevated temperature was a major factor in determining seed size rather than elevated CO_2.

Therefore, considering the climate change at 2071~2100 years in southern Korea, it will be required strategies to avoid high temperature stress during reproductive stage, especially R5-R7 period

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for stable production of soybean.