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Growth Characteristics of Soybean Cultivar According to the Temperature Rise

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[Abstract]

As the average temperature rises due to climate change, damage to caused by rising temperatures is spreading all over the world. If soybeans are exposed to high temperature during the reproductive stage, pod setting rate and seed weight is reduced, therefore, various studies are needed to prevent crop damage due to high temperature. This study is to research the effect of high temperature on yield decrease during the grow stage of soybean.

[Materials and methods]

This study was carried out Temperature Gradient Chamber(2.4m×25m) in NICS. Cultivars of soybeans were Daewon and Pungsan, and it was sown at intervals 60×15cm on June 23rd. Temperature treatments were average temperature(Ta) +1°C, +2°C, +3°C +4°C, and temperature sensors were installed to measure the temperature during the growth period of soybean. The reproductive stage of soybean was measured from beginning bloom stage(R1) to full pod stage(R4). Height, stem diameter, No. of branch, and pod per plant were measured as the growth and yield component.

[Results and discussion]

Full bloom(R2) stage of Daewon and Pungsan was measured at Ta+1°C, +2°C on Aug. 2nd and Aug. 6th, respectively. But it was delayed to Aug. 3rd and Aug. 8th at Ta+3°C and to Aug. 5th and Aug. 10th at Ta+4°C. In beginning pod(R3) stage, Daewon was meaesured on Aug. 12th and Pungsan on Aug. 19th at Ta+1°C and Ta+2°C. But it was delayed to Aug. 13th in Daewon and Aug. 22nd in Pungsan at Ta+3°C and to Aug. 18th in Daewon and Aug. 26th in Pungsan at Ta+4°C, so as the temperature increased, growth of soybean was delayed. In growth and yield component of Daewon, height was the highest(71.4cm) at Ta+1°C and the lowest(58.4cm) at Ta+4°C. No. of pod per plant was more than 60 at Ta+1~+3°C, Ta+4°C was 47.2. In Pungsan, height was the highest(69.0cm) at Ta+3°C and the lowest(55.8cm) at Ta+4°C. Stem diameter the thickest(9.3mm) at Ta+2°C and the thinnest(6.1mm) at Ta+4°C. No. of pod per plant was the most at Ta+2°C(113.8), but the least at Ta+4°C(62.8). Therefore the higher temperature, the worse growth and yield of soybeans.

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