

Effect of onetime subirrigation after seeding on the emergence, growth and yield of soybean (*Glycine max*) in a heavy clayey upland field in the Hokuriku Region of Japan

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Summary

Soybean is usually seeded in late May to mid-June (before rainy season) in Hokuriku region, when soil water tends to decrease to the level which inhibit or delay the soybean emergence. We studied the effect of onetime subirrigation after seeding on emergence, growth and yield of soybean. Soybean was seeded in a heavy clay converted field equipped with Farm-Oriented Enhancing Aquatic System (FOEAS) in late May in the Hokuriku Research Station, NARO-CARC, for three years (2013 - 2015, one cultivation period per year). In one treatment plot, subirrigation was applied within 5 days after seeding to raise the soil water content at 10 cm below the soil surface (SI plot). In the other, no irrigation was applied through the entire growing period (NI plot). In SI plot, no irrigation was applied after the initial irrigation. We also monitored soil water content and water table depth through each growing period.

The results are summarized as follows:

- 1) In SI plot, soil water content in soil surface layer (10cm depth from soil surface) and water table depth were raised by subirrigation. After a month later from subirrigation, no significant differences in soil water content and water table depth was observed between the plots.
- 2) Emergence of soybean was stimulated in SI plot compared with NI plot, in 3 years.
- 3) Until flowering, soybean growth (leaf area index, stem height and dry weight of whole plant) was stimulated in SI plot compared with NI plot, in 3 years.
- 4) Seed yield at harvest stage in SI plot was greater than that in NI plot in 2014 because of larger seed weight, while significant difference in seed yield was not observed in 2013 and 2015.

These results suggest that onetime subirrigation after seeding could stabilize the emergence, growth and yield of soybean in heavy clay converted field in this region.