

A-105

Effect of irrigation regime on soybean biomass, yield, water use efficiency in a semi-arid and semi-humid region in Northeast China

Wenxiu Zou*, Northeast Institute of Geography and Agroecology, Chinese Academy of Science, Heilongjiang, China

Xiaozeng Han, Northeast Institute of Geography and Agroecology, Chinese Academy of Science, Heilongjiang, China

Soybean growth is sensitive to soil water conditions. Seasonal drought can cause the loss of soybean yield due to the uneven distribution of annual precipitation in Northeast China. Irrigation could be an effective practice to mitigate the effect of water stress on soybean. The response of soybean growth, yield, water use efficiency (WUE) and irrigation water use efficiency (IWUE) to four amounts of water inputs was investigated. The experiment was conducted in the National Field Research Station of Agro-ecosystem in the Chinese Academy of Science in Hailun County Heilongjiang province Northeast China in 2011 and 2012, and included four water application treatments, they were no irrigation (R), soil water content was kept at 80% (T80), 60% (T60) and 40% (T40) of field water capacity (FWC). Rainproof shelters were used to control rainfall. The effect of different water entry on soybean biomass and plant height was shown in an increasing order of $T40 < R < T60 < T80$. Soil water kept at about 60% (T60) increased soybean 100-weight by over 5.1% than T40, T80 and R, and reduced flat pod per plant. The soybean yield was the highest in the treatment of T60, and increased averagely by 16.58% compared with that in the treatments of R, T80 and T40. WUE reached the largest values at T40 in 2011 and at T60 in 2012, IWUE were the largest at T80 in 2011 and 2012. . Though more water of 35.7% and 50.3% was applied in the treatment of R than that in the treatment of T60, respectively, in 2011 and 2012, higher soybean yield was found in T60 treatment, suggesting time of water applied was more important than the amount of water entry. Soil water content kept at about the 60% of FWC was optimum in terms of increasing soybean yield and saving irrigation amount in Northeast China.