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Effect of Vinyl-film Mulch on the Growth Promotion of Spring Potato in Central Region of Korea

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[Introduction]
Appropriate soil temperature and early planting of potato is very important for the successful potato-soybean cropping system in central region of South Korea. This experiment was carried out to determine the effect of mulching materials on the growth and yield of potato (*Solanum tuberosum L.*) related with the temperature rise.

[Materials and Methods]
Five different treatments had been applied on an upland soil in central region of south Korea; no mulching (NM), transparent film (TF), transparent film + additional transparent film (TF + ATF), black film (BF), and black film + additional transparent film (ATF).

[Results and Discussions]
In the period of sowing time to removing additional films, mean soil temperature of the treatments was in the order of TF+ATF > TF > BR+ATF > BF as 20.3oC > 18.5oC > 16.1oC > 15.4oC, respectively and that of NM was 13.8oC. The accumulated soil temperature was TF > NM > BF during the removing additional films to earthing at inter-tillage. On the changes in the soil temperature during a whole day, the temperature in the BF was lower than NM during around 18:00 PM to 12:00 NM, while NM was higher than BF in the time period of 10:00AM to 21:00PM.
The sequence of potato sprout emergence was 15 > 18 > 20 > 22 days of TF+ATF, TF, BF+ATF, and BF, respectively and that of NM was 24 days. Comparing to the NM, potato sprout emergence was observed on the TF+ATF treated plot as early as 9 days. At 10 days before harvest, the significant difference in the tuber dry weight had been observed and the sequence tuber weight was in the order of TF > TF+ATF > BF+ATF > BF > NM. The potato yields of TF, TF+ATF, and BF+ATF were increased of 40.7, 37.3, and 22% as compared to NM (2,805kg $10a^{-1}$), but almost same yield in the BF. The differences of tuber dry weight and potato yields was co-related with the temperature rise of soil by the application of mulching materials on soil. Based on these results, application of mulching film had been very effective to increase the tuber size and the yield of potato by the temperature rise during seedling stage of potato. Transparent mulching was better than black mulching especially for the emergence of sprout of potato in relation to minimizing cooling injury.

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