

## 한국 의성 사과 과수원에서의 물-에너지-탄소 플럭스의 특징

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### Characteristics of the Water-energy-carbon Fluxes at an Apple Orchard in Uiseong of Korea

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Apple trees play an important role in the fruit production and about 32.4 thousand ha of land in Korea is currently under apple tree cultivation. Measures of plant evapotranspiration and water use efficiency (WUE) are important indicators of the responses of plant growing under different soil water conditions. The development of flux-monitoring procedures including the Bowen ratio-energy balance principal, the large aperture scintillometer, and eddy covariance method. In spite of those recent development, there is still a dearth of long-term systematic investigation into water dissipation and WUE at the orchard-scale. In this study, seasonal trends in evaporation and WUE were examined by using the eddy covariance technique in no-tillage apple orchard in Korea over the whole period of fruit production.

Annually total net radiation ( $R_n$ ) was  $2421.6 \text{ MJ m}^{-2}$  of which latent heat flux accounted for 71.3%. Annually average water use efficiency (WUE) was  $2.71 \text{ g CO}_2/\text{kg H}_2\text{O}$ . Annually total evapotranspiration (ET) was 581.3mm and daily ET ranged from 0.2 to 5.4mm during apple growing season (from March through October), while daily ET varied from 0.1 to 1.9mm after harvesting date. Variation of ET can be explained well by the change of leaf area index (LAI). Net ecosystem exchange (NEE) and gross primary production (GPP) of  $\text{CO}_2$  were  $-397.3$  and  $1401.0 \text{ g C m}^{-2} \text{ yr}^{-1}$ .

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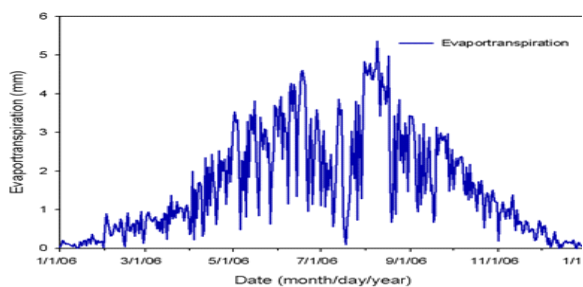


Fig. 1. Seasonal variations of evapotranspiration (ET) at the Uiseong apple orchard.

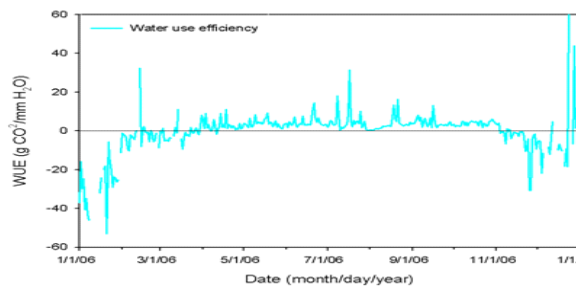


Fig. 2. Seasonal variations of water use efficiency (WUE) at the Uiseong apple orchard.

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