

Soil water availability as affected by the cover crop *Pueraria phaseoloides* in the central Amazon

Marques, Jean ⁽¹⁾, Teixeira, Wenceslau ⁽²⁾ and Lehmann, Johannes ⁽³⁾

⁽¹⁾ Universidade de São Paulo, ESALQ, SP, Brazil;

⁽²⁾ Empresa Brasileira de Pesquisa Agropecuária, Embrapa-Amazônia Ocidental, Manaus, Brazil;

⁽³⁾ Institute of Soil Science and Soil Geography, University of Bayreuth, Bayreuth, Germany

Cover cropping is a common technique in fruit tree plantations of the tropics. One of the many reasons for planting a cover crop is the improvement of soil physical properties, an improved nutrient cycling, input of atmospheric N₂ by biological fixation and reduction of erosion. Whether and to what extent cover crops can influence soil water contents through effects on evaporation losses is not known for Xanthic Ferralsols in central Amazonia. In order to study the effects of the cover crop *Pueraria phaseoloides* on soil water cycling, TDR probes (time domain reflectometry) were installed at 0.1 m increments to 1 m depth. Soil water measurements were done weekly for 5 months. Precipitation and interception were measured automatically and manually. Transpiration and stomatal conductance were determined with a porometer. Continuous measurements were done during 10 hours for leaves exposed to direct sunlight and for shaded leaves. The results show that about 80 % of the rainfall can be stored as interception by the cover crop. This also decreases the danger of soil surface sealing by direct rain impact (splash). The maximum radiation was 1800 and 900 $\mu\text{mol}\cdot\text{m}^{-2}\cdot\text{s}^{-1}$, with an estimated transpiration of 25 and 17 $\text{mmol}\cdot\text{m}^{-2}\cdot\text{s}^{-1}$ for sun-exposed and shaded leaves, respectively. The mean soil water storage under pueraria amounted to 436 mm, which was higher than the amount observed under bare soil with 386 mm. These results show that under the experimental conditions, there is a higher soil water availability under the cover crop than in bare soil due to reduced evaporation from the soil surface. Under these conditions, a cover crop may play an important role in water conservation and hence crop production on Xanthic Ferralsols of the central Amazon.