

YIELD AND WATER USE EFFICIENCY OF *EUCALYPTUS CALMULDULENSIS* IN EASTERN OF THAILAND

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Introduction:

Eucalyptus, native to Australia, was introduced to Thailand about one hundred years ago. This genus consists of almost six hundred species, but only *Eucalyptus calamdulensis* shows promising growth performances in commercial plantation and plays the outstanding roles in wood-chip and wood pulp industries in Thailand.

The domestic demand of logs for wood-chip industry was estimated at 6.39 million tons/year, over 90% is *E. calamdulensis* (Forest research center, 2003). Although, they were generally known as important economic forest tree species, but there are still discussion about environmental impacts, particularly high water consumer of this forest tree species. Therefore water use and also water use efficiency of this tree species should be carefully considered and researched



Objective

This research aims to study yield and water efficiency of *Eucalyptus calamdulensis* at the Eastern Thailand (Fig.1). This site is the largest area of *E. calamdulensis* plantation in Thailand. This result can be used as guidance for eucalyptus plantation extension.

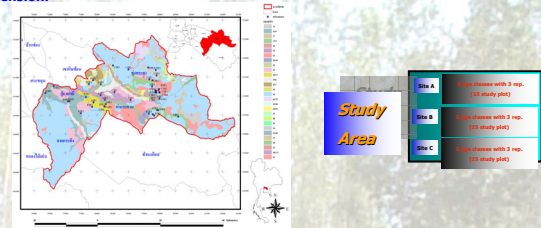


Figure 1. Layout of the experimental plot in present study area

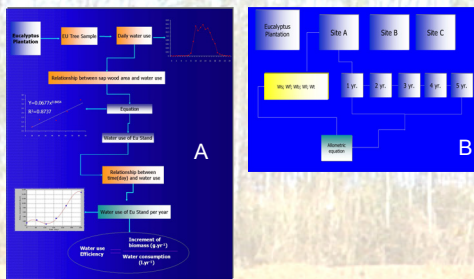


Figure 2. Flow chart of Methodology in present study (A) Water use efficiency (B) Biomass

Results and Discussion:

Yield in term of biomass of 1 and 2 year-old-coppice plots were higher than re- and af- planting. In contrast, biomass of 3-5 year- old of replanting tended to have higher than coppice plots(Fig.3).

For water use of 1-year old Eucalyptus, coppice plot used water higher than re and af- planting(Fig.4 and Fig5). On the contrary, they showed opposite value in 3-5 year old of Eucalyptus. In addition, water efficiency of Eucalyptus was about 1.276-4.832 grams/liter(Fig.6).

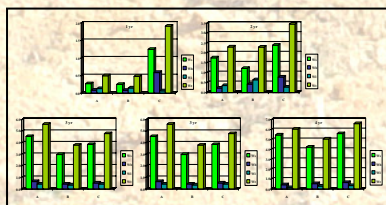


Figure 3. Biomass of *Eucalyptus calamdulensis* plantation planted at eastern of Thailand

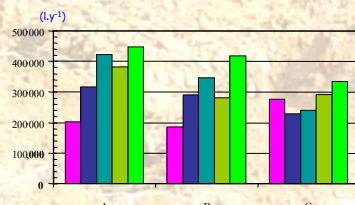


Figure 5. Water use of 1- 5 year – old *Eucalyptus calamdulensis* plantation planted at eastern of Thailand

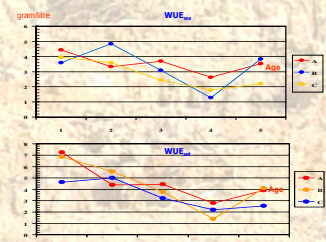


Figure 6. Water use efficiency (WUE_{ae}, WUE_{aeē}) of 1-5 year– old *Eucalyptus calamdulensis* plantation planted at eastern of Thailand

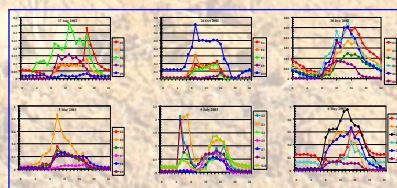


Figure 4. Diurnal variation of sapflow of *Eucalyptus calamdulensis* plantation planted at eastern of Thailand

Conclusion:

When compared to other forest trees water use of Eucalyptus was similar, but they showed distinctly better in water use efficiency(Wachrinrat *et.al.*, 2003). In addition, *E.camaldulensis* had ability to use water although in dry season. Therefore, leaves still remain in dry season.

Reference:

- Forest research center . 2003. Site Potentials for growing Eucalyptus. Faculty of Forestry, Kasetsart university, Bangkok. 174 p.
- Wachrinrat, C., W. Sungpalee, K. Phankhan and R. Srigongpan. 2003. Growth and water use efficiency of Exotic trees plantation at Doi Angkhang, pp.102-114. In B.Thaiutsa and L. Puangchit (eds.) Proceeding on Twentieth anniversary of Taiwan Angkhang Forest Forestry Project, Bangkok.

Key word: Yield, *Eucalyptus calamdulensis*, water use, water use efficiency