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# USING LEAF DRY BIOMASS TO IMPROVE TARO (COLOCASIA ESCULENTA) PRODUCTION SYSTEM

*(Utilisation de la biomasse sèche de la feuille pour améliorer le système de production du Taro (Colocasia esculenta)*

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## SUMMARY

Taro (*Colocasia esculenta*) leaf information was used to determine how evapotranspiration (ET) varied with growth stage and to predict foliage (i.e., lamina and petiole) dry biomass production. The ET study was conducted during 1981 and 1982, and the foliage study was conducted during 1982 and 1983. Both studies were conducted on a flooded Pahokee muck (*Lithic mediasaprist*) organic soil. Leaf area index (LAI) increased gradually from April to July, rapidly from July to September and remained relatively constant thereafter. Taro ET was strongly dependent upon the plant growth stage, specifically the LAI. Taro ET was estimated from the available standard pan evaporation (SPE), and the ET/SPE ratio. The ET/SPE ratio was closely related to LAI, being between 0.9 and 1.0 when LAI was less than 1.0 and between 0.73 and 0.75 when LAI was greater than 1.0.

Foliage harvests to two to four month intervals were better for sustained maximum production than monthly harvests. Leaf lamina constituted an increasingly greater proportion of the total foliage as harvest interval increased. Harvesting economics may dictate that the longer harvest interval (3 or 4 months) is preferable.

## RESUME

*Une information sur la feuille de taro (Colocasia esculenta) a été utilisée pour déterminer comment l'évapotranspiration (ET) varie avec le stade de croissance pour prédire la production de biomasse sèche (limbe et pétiole). L'étude de ET a été conduite en 1981 et 1982, et celle du feuillage en 1982 et 1983. Les deux études ont été conduites sur sol submergé riche en matière organique. L'index de surface foliaire (LAI) s'accroit progressivement d'avril à juillet, rapidement de juillet*

*à septembre et demeure relativement stable après. ET dépend étroitement du stade de croissance du taro, particulièrement le LAI. ET a été estimé à partir du bac standard d'évaporation (SPE) et du rapport ET/SPE. Ce rapport était très lié au LAI, avec 0,9 et 1,0 pour un LAI inférieur à 1,0 et 0,73 et 0,75 pour LAI supérieur à 1,0.*

*La récolte du feuillage à intervalles de deux à quatre mois convenait davantage à une production soutenue que la récolte mensuelle. La proportion de limbe foliaire s'accroissait dans le total du feuillage avec la réduction de l'intervalle de récolte. L'intervalle de 3-4 mois pourrait le mieux répondre aux données économiques de la récolte.*

## INTRODUCTION

Wetlands are common features of humid regions covering over 230 million hectares world wide (Angle and Wolseley, 1982). Generally these sites are among the last to be cultivated in a region, even though their potential for crop production often is recognized. In almost all cases drainage is the first step in developing wetlands for agricultural use. However many now recognize that wetlands play a useful and important role in the environment. They are sites for water storage, aquifer recharge, water purification, and provide habitat for many types of wildlife (BROWDER et al., 1975). Permanent drainage largely eradicates the beneficial aspects of wetlands. In most cases drainage requires very large capital outlays at the outset, and high operating expense for maintenance of the system and fuel charges for pumping.

Utilization of flood-tolerant crop plants would allow production on wetland sites without imposing continuous drainage. The ideal crop would be one that can tolerate flooding, but that does not absolutely require it. This would be particularly useful in a region like the Florida Everglades, which has fairly distinct wet and dry seasons. Taro (*Colocasia esculenta*) is a wetland crop cultivated in many tropical and subtropical areas of the world where it is particularly important as a staple food (CHAPMAN, 1964 ; F.A.O., 1974). Taro foliage can be utilized for silage (STEINKE et al., 1982) and the entire plant can be utilized for biomass conversion into various energy forms. In most locations, taro has a number of advantages as a biofuel relative to other aquatic crops such as rice (*Oryza sativa*). Taro has fewer pest problems, total biomass production probably is greater, and much of this in the form of easily convertible materials. Several drawbacks to taro include an 8 to 10 month minimal growing season, the necessity for vegetative propagation, and the paucity of production information.

Leaf area index (LAI) is often used as an indicator of plant growth and for evaluating assimilation and transpiration rates in plant physiological studies. This parameter is frequently used to study dry biomass production (AASE, 1978 ; ASHLEY et al., 1965 ; CHAPMAN, 1964 ; EZUMAH, 1972 ;