

Leaf surface characteristics of selected Malaysian weed species of oil palm.

ABSTRACT

Laboratory and glasshouse studies were conducted to examine the leaf surface characteristics of selected weed species of oil palm. The broadleaf weeds selected were *Asystasia gangetica*, *Borreria latifolia*, *Cleome rutidosperma*, *Clidemia hirta*, *Diodia ocimifolia* and *Mikania micrantha*, while for the narrow leaves, *Axonopus compressus*, *Cyperus kylingia*, *Eleusine indica*, *Paspalum conjugatum* and *Pennisetum polistachyon* were investigated. The weeds were categorized into different types of roughness based on the macroscopic roughness, microscopic roughness and the estimation of three roughness parameters: R_a (arithmetic average height parameter), R_q (root-mean-square roughness parameter, corresponding to R_a), and R_z (average of high peaks and low valleys over the evaluation length). The leaf was examined using scanning electron microscopy (SEM) for the surface roughness, while the epicuticular wax content of the leaf was extracted using chloroform. The amount of wax extracted from the weeds varied between species. For broadleaf plants, *Mikania micrantha* ($44.22 \mu\text{g}/\text{cm}^2$) was identified as the plant that contained the highest quantity of wax. *Clidemia hirta* ($24.03 \mu\text{g}/\text{cm}^2$) and *Asystasia gangetica* ($23.03 \mu\text{g}/\text{cm}^2$) were grouped in the plants with a medium quantity of wax while *Cleome rutidosperma* ($16.52 \mu\text{g}/\text{cm}^2$), *Borreria latifolia* ($14.19 \mu\text{g}/\text{cm}^2$) and *Diodia ocimifolia* ($10.75 \mu\text{g}/\text{cm}^2$) were grouped in the plants with a low quantity of cuticular wax weight. For narrow leaf plants, *Eleusine indica* ($44.23 \mu\text{g}/\text{cm}^2$) and *Imperata cylindrica* ($49.88 \mu\text{g}/\text{cm}^2$) were recognized as the plants that contained a high quantity of wax. *Pennisetum polistachyon* ($32.16 \mu\text{g}/\text{cm}^2$) and *Cyperus kylingia* ($22.85 \mu\text{g}/\text{cm}^2$) were categorized under the plants with a medium quantity of wax, whereas *Paspalum conjugatum* ($19.59 \mu\text{g}/\text{cm}^2$) and *Axonopus compressus* ($16.78 \mu\text{g}/\text{cm}^2$) were classified under the plant with a low quantity of wax. The wax on the abaxial surface data of the broadleaf weeds was found to be significantly different when compared to the adaxial surface data. In contrast, the amount of wax on the abaxial and adaxial leaf surface of the narrow leaf weeds was more or less similar. For the leaf surface roughness of the broadleaf species, *Borreria latifolia* was categorized as the roughest, followed by *Clidemia hirta*, *Diodia ocimifolia*, *Asystasia gangetica* and *Cleome rutidosperma*. *Mikania micrantha* had the smoothest leaf surface among the broadleaf species. On the other hand, the narrow leaf of *Pennisetum polistachyon* was identified as the roughest, followed by *Imperata cylindrica* and *Paspalum conjugatum*, while *Eleusine indica*, *Axonopus compressus* and *Cyperus kylingia* were categorized as having the smoothest leaf surface.

Keyword: Leaf surface characteristic; Roughness; Wax amount.