

TAXONOMY & ECOLOGY

Beyond Classical Approaches

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ALKANE CONTENTS OF LEAF EPICUTICULAR WAX IN THREE SELECTED RHEOPHYTIC *CRYPTOCORYNE* IN SARAWAK

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ABSTRACT

The genus *Cryptocoryne* encompasses more than 60 species and naturally distributed in tropical region of Asia including Sarawak (Malaysian Borneo). *Cryptocoryne* plants were randomly collected from different forested area throughout Sarawak. *C. bullosa*, *C. uenoi* and *C. keei* were grouped under rheophytic plants (rheophyte) as they usually found in fast moving water in an environment where only a few organisms can survive. Epicuticular waxes were extracted from the leaf surfaces of three species of *Cryptocoryne* by immersing the leaf sample in chloroform for 60 seconds. The extracted waxes were then analyzed quantitatively for aliphatic hydrocarbons by using capillary gas chromatography/flame ionization detector (GC-FID). Thirteen alkane compounds were identified ranging from heneicosane (C₂₁H₄₄) to tritriacosane (C₃₃H₆₈). Normally, alkanes of C₂₇, C₂₉, C₃₁ and C₃₃ were the major hydrocarbons identified epicuticular waxes from all three species of *Cryptocoryne*. *C. uenoi* and *C. keei* were characterized by high abundance of nonacosane (C₂₉) with percentage composition of 22.5% and 20.4%, respectively. Meanwhile, tritriacontane (C₃₁) was the major alkane detected in *C. bullosa* with percentage composition of 65.7%. The carbon preference indices (CPI) values were ranged from 1.4 to 7.4. The preliminary result from this study provides an evidence of potential application of plant epicuticular waxes composition for chemotaxonomical purposes.

Keywords: epicuticular wax, *Cryptocoryne*, hydrocarbon, rheophytic, CPI, chemotaxonomy.

INTRODUCTION

The genus *Cryptocoryne* consists of more than 60 species and naturally distributed in tropical region of Asia including Sarawak (Malaysian Borneo). Araceae or aroid is one of the families found in the order of Arales and it is characterized by the present of thick spadix covered with spathe. Variation in leaf shape form is mostly due to the adaption to specific environments (Orgaard and Jacobsen, 1998). For example, the characteristics of rheophyte's leaf which are narrow and thick are due to extremely strong wide spreading root systems.

Epicuticular wax is the outer surface of plant cuticle which cover the external side of the leaf epidermis of all higher plants (Barthlott, 1989) and it consist of a variety of long-chain compounds with different functional group (Jetter *et al.*, 2000). The most plentiful and widely distributed alkanes in higher plants are nonacosane (C₂₉) and hentriacotane (C₃₁) (Caldicott and Eglinton, 1973 in Medina *et*

al., 2006). Eglinton and Hamilton (1967) suggested that distribution of alkanes with odd-carbon predominance (C₂₅, C₂₇, C₂₉ and C₃₁) as main components indicate the composition of organic matter in the drainage basins originated from land plants. Hydrocarbons patterns that may exist in the foliar epicuticular waxes can be useful evidence for the taxonomic purposes at the interspecific, specific and infraspecific hierarchic levels (Skorupa *et al.*, 1998).

This study was aimed to examine the distribution of alkanes in the leaf epicuticular waxes of *Cryptocoryne* species in order to assess chemotaxonomic relationship between the selected species.