

# CHAPTER ONE

## 1.0 INTRODUCTION

About three decades ago, research on medicinal plants all over the world, especially in the tropical areas of the Ancient World received a great deal of attention not only from chemists, but also from pharmacologists, physiologists and physicians due to its major importance to the therapeutic point of view, as nature provides a variety of interesting molecules that has great therapeutic potential value, for example reserpine 1, vincamine 2 and vindoline 3 have been found to have substantial value in human medicine.

The Malaysian flora is generally considered to be one of the richest in the world. It has still kept its primitive tropical characteristics of 200 million years ago. This may be due to a conducive climate stability and the absence of major geological events such as earthquakes or volcanic activities.

The diversity of the Malaysian flora can be attributed to these geological and climatic factors :

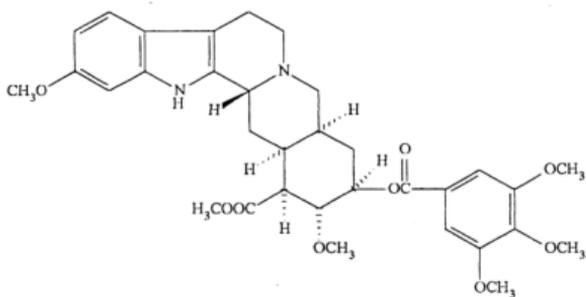
- (i) the constantly warm and humid climate enveloping this area makes it conducive for the growth of a maximum number of species.
- (ii) the variation of altitudinal and edaphic factors of the country created a myriad of environments which have evolved and sustained a great variety of plant species.

The family relationship of woody plants which is seed bearing is summarised in Scheme 1.1.

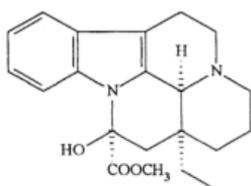
The diversity of the Malaysian flora, provide many interesting new chemical entities that have been proven to produce significant effects on the human body. For instance,

when vincalokoblastine **4** and leurocristine **5** were discovered from the Apocynaceae family, and were found to have positive effect to treat Hodgkin's disease and acute leukemia <sup>1</sup>, respectively, many other investigations on the Apocynaceae family has been done.

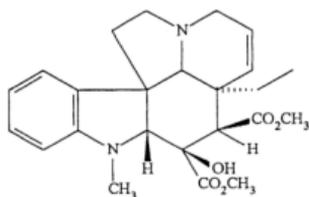
The *Kopsia* (Apocynaceae) has been known to produce various new alkaloid structures as well as alkaloids of medicinal values. For the above reasons, a study on *Kopsia terengganensis*, has been done due to its high alkaloidal content and being a new *Kopsia* species, there is a potential to find new alkaloids which may have medicinal value.



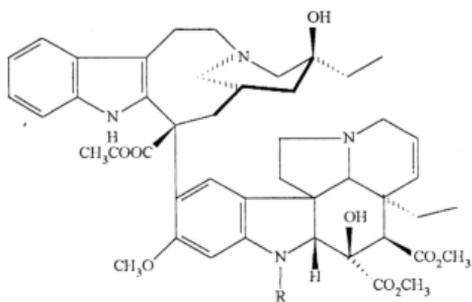
1



2



3



R = CH<sub>3</sub>      4

R = CHO        5

## 1.1 BOTANICAL FEATURES

### 1.1.1 APOCYNACEAE

The Apocynaceae<sup>2</sup> is represented by four tribes, which are Rauvolfieae, Plumerieae, Tabernaemontanae and Carisseae with 32 genera. The classification of the genus is dependent upon the characteristics of the leaves, fruits and flowers. Table 1.1 outlined the generic classifications of Apocynaceae<sup>3</sup>.

#### DISTRIBUTION

There are more than 1000 species known, mostly situated in the tropical countries. However, there are a few from the temperate region eg. *Vinca*. Overall there are 180 genera and 1500 species, of which 35 genera and about 123 species are found in Malaysia. Only 10 genera and about 38 species are trees or shrubs, pulai (*Alstonia*) and jelutong (*Dyera*) are the common ones while the rest are climbers called 'akar gerit'.

#### USES

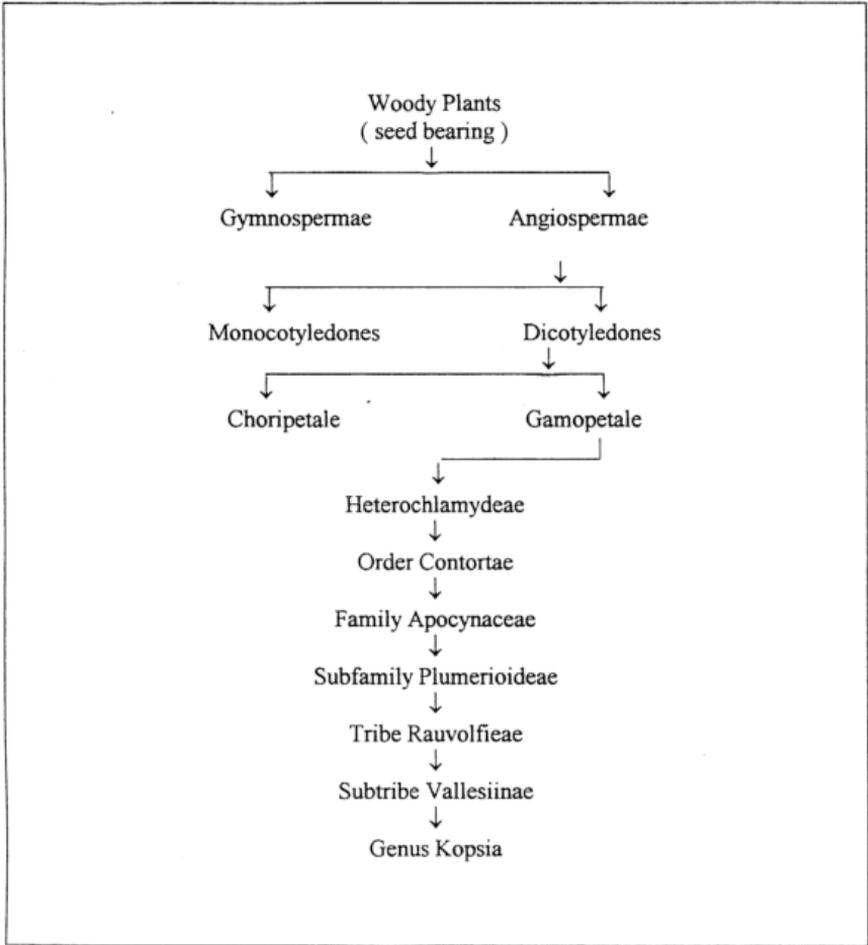
Apocynaceae is of rather minor timber importance, however the alkaloids in the latex have led to their becoming important in native medicine. Many are widely cultivated as ornamental shrubs in gardens eg. *Plumiera*, the frangipanni.

### 1.1.2 KOPSIA<sup>2,4</sup>

A small genus of shrubs or trees, usually found in South-East Asia, Malaysia, India, China and Oceania. It is situated mainly in the lowlands.

The leaves are opposite, elliptic, pointed at both ends and the midrib sunken above. The flowers are rather large and showy, colours ranging from white to pink. The tube are narrow with a bulge in middle or near top and the petals strongly twisted in bud, overlapping to the right. The stamens are within the tube, free from stigma with the

base rounded. There are two separate glands alternating with two free carpels. It has only one ovule. The fruits are two small drupes with a flattened appendage on one side towards the top (except *K. arborea*) with viscous pulps and thin stones.



Scheme 1.1: Family relationships in woody plants.

Family: Apocynaceae

Subfamily : Plumerioideae

<u>Tribe</u>	<u>Subtribe</u>	<u>Genera</u>
1. Carisseae	Carissinae	<i>Melodinus</i> <i>Leuconotis</i>
	Landolphiinae	<i>Landolphia (Carpodinus)</i>
	Pleiocarpinae	<i>Picalima</i> <i>Hunteria</i> <i>Pleiocarpa</i>
2. Plumerieae (Alstonieae)	Crapidosperminae	<i>Crapidospermum</i>
	Plectaniinae	<i>Gonioma</i>
	Alstoniinae	<i>Alstonia</i> <i>Tonduzia</i>
	Aspidospermatinae	<i>Diploryncus</i> <i>Aspidosperma</i> <i>Geissospermum</i>
	Catharanthinae	<i>Rhazya</i> <i>Amsonia</i> <i>Catharanthus</i> <i>Vinca</i> <i>Haplophyton</i>
3. Tabernamontaneae		<i>Crioceras</i> <i>Callichilia</i>

		<i>Tabernanthe</i> <i>Stemmadenia</i> <i>Capuronetta</i> <i>Voacanga</i> <i>Schizozygia</i> <i>Tabernaemontana</i> ( a.k.a <i>Rejoua, Gabunia,</i> <i>Pagiantha, Ervatamia,</i> <i>Hazunta, Peschiera</i> <i>Pandanca, Conopharyngia)</i>
4.Rauvolfieae	Rauvolfiinae	<i>Cabucala</i> <i>Rauvolfia</i>
	Ocrosiinae	<i>Ocrosia (Excavatia)</i>
	Codylocarpinae	<i>Condylocarpon</i>
	Vallesinae	<i>Vallesia</i> <i>Kopsia</i>

Table 1.1 : Genera of Apocynaceae which bears species containing indole alkaloids