CHAPTER 1

INTRODUCTION

Distribution and biogenesis of chemical substances in plants is now well established and has proved to be useful not only as an addition to the armoury of plant taxonomists, but also by indicating interesting taxa and biosynthetic sequences to natural product chemistry. Obviously an enormous labour is required to work out the distribution of the various kinds of compounds throughout the plant kingdom.

At the moment what is studied often depends on the development of techniques which are successful with certain kinds of plant material or on the selection of products which have economic or pharmacological importance. Research has been done to provide an orientation of plant chemistry, the general nature of compounds encountered, methods of dealing with them and the ways that they are biochemically interrelated.

In view of the reason above, chemical and biological studies of new plants are actively pursued all through the world. Plants were collected, extracted, tested for their chemical contents and biological activity and finally the compound of interest were isolated for further chemical and pharmacological studies.

Two plants has been studied during my research are ; *Fissistigma lanuginosum* and *Polyalthia hookerian* both were collected in Peninsular Malaysia and they belong to the family of Annonaceae.

1.1 Family of Annonaceae

Annonaceae plants have been known long ago, which comprising more than 2000 species classified in 120 genera [1]. Annonaceae commonly known by the Malays as 'Pisang-Pisang' or variants of this on account of the bunch of carpels suggesting bananas[2].

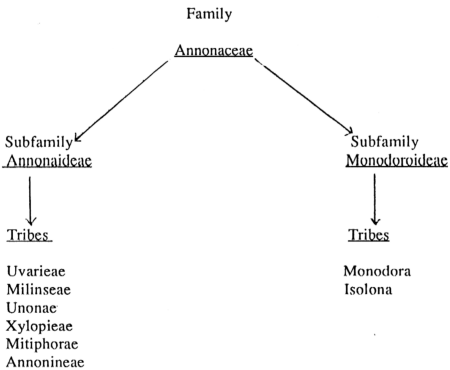
Annonaceae is a large family of aromatic trees, shrubs or climbers which exist in lowland dense evergreen forest in tropical and subtropical region[3]. Asia and Australasia are the basic centre of the distribution of the Annonaceae.

The seeds of the Annonaceae plant can produce edible oil [4] and soap [5]. The woods can be used to manufacture alcohol and the fragrant flowers like Canaga odorata are important as raw material for perfumery[6]. The timber is usually too small to be of value like some big trees *Mezzethia leptopoda* , *Depanonthus*, *Xylopia* which are being used in house building, for ratters or poles[2].

1.2 Annonaceae : General Characteristic And Its Classification

The Annonaceae are characterized by primitive and archaic features which are fairly constant throughout the family. Takhtajan included this family within the order Magnoliales (Annonales)[7]. Furthermore, the family itself are divided into two subfamilies, Monadoraideae (carpels united into a one celled ovary, with parietal Placentation) and Annonaideae (free carpels) which include other genera, tribe and subtribe according to the combination of characters.

Scheme 1 and **Table 1** shows the summarised classifications made by Sinclair[8].



Scheme 1 : Classification of Annonaceae.

Table 1 : Genera of Annonaceae

Tribe	Genera
Uvarieae	*Sageraea*
	Stelechocarpus
	Kingstonia
	Eniscosanthum
	Trivalvaria
	Uvaria
	Rauwenhoffia
	Ellipeia
Unoneae	*Cyathocalyx*
	Artabotrys
	Desmos
	Monocarpia
	Oncodostigma
	Polyalthia
	Mezzettia
	Disepalum
	Meiogyne
Xylopieae	*Xylopia*
	Anaxagorea
	Fissistigma
	Pyramidanthe
	Mitrella
	Melodorum
Miliuseae	*Marsipopetalum*
	Phaeanthus
	Miliusa
	Alphonsea
	Platymitra
	Orophea
Mitrephoreae	*Pseuduvaria*
	Neo-uvaria
	Goniothalamus
	Oxymitra
	Mitrephora
Annonineae	*Annona*

I. 3 : The Tribe : Xylopieae

The Genus : *Fissistigma*

The tribe Xylopieae based mainly on petal characters. The petals valvate thick connivent and the outer are long, narrow or broad where the inners are small but similar.

There are approximately 70 species in this genus of *Fissistigma*. It is a woody climbers of the family Annonaceae which are found in the tropics. The names and uses given below may belong to anyone of the species for prescriptions have come to hand in which the genus *Fissistigma* is certainly used. The Malays use the species medicinally and the uses found are those from the Malay Peninsular , like a poultice of the leaves of *Fissistigma* fulgens . It is applied to sore legs and is administered as a partum protective medicine.

A decoction of the roots of *Fissistigma* manubriatum is used in the treatment for stomachache or acts as febrifuge. *Fissistigma lanuginosum* which were investigated for their chemical components here also used to treat stomachache.

Fissistigma cylindricum, a climber found from lower Thailand to Singapore also used for diarrhoea, snake bite and frequently used after childbirth.

There are also various name of species in this genus like 'akar pisang-pisang bukit' for *Fissistigma maingayi* and *Fissistigma prismaticum*, 'akar larak merah ' for *Fissistigma lypoglausum* and ' akar larak tepang for an undetermined species.

1.3.1 : *Fissistigma* : General Appearance And Morphology.

The trees are climbers. The leaves, pedicals, flowers and carpels are usually pubescent or tomentose, sometimes copiously so. Secondary veins of leaf absent; reticulations when visible scalariform, at right angles to the nerves.

The flowers are terminal in branched panicles opposite the leaves but sometimes a part of the inflorescence appearing axillary due to branching low down between the main axis and the leaf. The sepals are valvate, united at the very base. The petals are valvate in two series, coriaceous and with thickened edged, usually elongated, lanceolate but sometimes ovate or oblong ; the outer erect or spreading, flat ; the innner slightly shorter, triquetrous and concave at base inside.

The stamens are numerous, connectives slightly produced, oblique, obtuse or slightly apiculate. The ovaries are pubescent, slightly curved, grooved on inner side ; style present, sometimes narrowing clavate at the stigmatic portion being very short and not differrentiated clearly from the style. The carples are usually large, 2 cm. or more in diameter ; spherical, ovoid or oblong, thick -walled ; stalked (nearly sessile in *F. lanuginosum*). The seeds are several in 2 rows, smooth and shining[9].

1.4 The Tribe : Unoneae

The Genus : *Polyalthia*

Unoneae is one of the most successful in the family of Annonaceae and is large because of its wide distribution.

The genus *Polyalthia* is a large one but very uniform. It is probably one of the oldest genera. Quite a lot of groups in it having similiar characters, for examples axillary flowers, extra - axillary flowers, the carliflorous habit, sessile, stalked carpels and containing species differing very little from each other. One species has a wide distribution is *Polyalthia cauliflora*. It has a number of varieties and also one or two very closely related species such as Polyalthia socia and *Polyalthia lateritia*.

Polyalthia may be looked on as the central genus of Unoneae. Tagged on to it are various genera like Desmos and Cananga with a greater or less degree of relationship. These two have spreading petals similar to *Polyalthia disepalum* is another near relative, where the style has elongated.

It is most logical therefore to regard the large genus *Polyalthia* as the central or basic one in the Unoneae and these others given here as offshots or satellites of *Polyalthia*.

1.4.1 : *Polyalthia* ; General Appearence And Morphology

These species are trees or shrubs. The leaves are glabrous or with simple hairs. The flowers are hermaphrodite, axillary, extra-axillary, opposite the leaves or below them, on tubercles or woody outgrowths on the older branches or on the trunk or rarely on subterranean, special, woody twings.

The sepals are valvate. The petals are valvate in two series, sub-equal, often quite large and showy, coloured, red, orange, yellow, greenish or white, spreading flat, variously shaped, linear, strap-shaped, lanceolate, ovate, oblong or obovate, the inner occasionally slightly vaulted, spreading later.

The stamens are usually numerous, cuneate, with flat-topped or slightly convex, orbicular or rhomboid connectives. The ovaries are numerous or few, oblong, cylindric or angled, with 1 ovule or with 2-5 ovules, basal or superposed ; style nearly always absent ; stigma rectangular, globose or irregularly shaped with a faint groove on inner side running down the inner, adaxial side of ovari. The torus is convex and the ripe carpels are few to many, stalked or sub-sessile. The seeds are 1-5 with a longitudinal circumferential groove, best seen in the species of section *Monoon*[9].