



## CHAPTER I

### INTRODUCTION

The genus *Papaver* belongs to the tribe Papavereae, subfamily Papaveroideae, of the family Papaveraceae (Santavy, 1979). These plants are annual to perennial herbs with milky latex, distributed in Europe, Asia, South Africa, Australia and America (Willis, 1966), chiefly in the temperate and sub-tropical region of the old world. According to Stermitz (1968), Phillipson *et al.* (1981b) and Preininger *et al.* (1981), 97 species have been recognized. They are divided into 10 sections as follows.

#### Section 1. Orthorhoeades

*Papaver ameristophyllum* Fedde

*P. apicigenatum* Fedde

*P. arenarium* Marsch.-Bieb.

*P. bipinnatum* C.A. Mey

*P. caespitosum* Fedde

*P. californicum* A. Gray

*P. cassandrinum* Charrel

*P. chelidoniifolium* Boiss. & Buhse

*P. clavatum* Boiss. & Hausskn.

*P. commutatum* Fisch. & Mey.

*P. dubium* L.

*P. erosolum* Jord.

*P. exspectatum* Fedde

*Papaver gurlekense* Stapf.

*P. hirtodubium* Fedde

*P. humifusum* Fedde

*P. humile* Fedde

*P. integrifolium* Vig.

*P. lemmonii* Greene

*P. modestum* Jord.

*P. pinnatifidum* Moris

*P. polytrichum* Boiss. & Kotschy

*P. postii* Fedde

*P. pseudo-haussknechtii* Fedde

*P. rapiferum* Fedde

*P. rhoeas* L.

*P. rhopalotheca* Stapf.

*P. robertianella* Fedde

*P. roubiaei* Vig.

*P. schweinfurthii* Fedde

*P. simoni* Foucaud

*P. stipitatum* Fedde

*P. strigosum* (Bonningh.) Schur.

*P. stylatum* Boiss. & Bal.

*P. subadpressiusculo-setosum* Fedde

*P. subpiriforme* Fedde

*P. subumbilicatum* Fedde

*P. syriacum* Boiss. & Blanche

*P. tenerifae* Fedde

*P. tenuifolium* Boiss. & Hohen.

*P. tenuissimum* (Heldr.) Fedde

*Papaver thumasiosepalum* Fedde

*P. trilobum* Wallr.

*P. tunetarium* Fedde

*P. umbonatum* Boiss.

#### Section 2. Argemonorhoeades

*P. apulum* Ten.

*P. argemone* L.

*P. belangeri* Boiss.

*P. hybridum* L.

*P. pavonium* Fisch. & Mey.

*P. virchowii* Aschers. & Sint.

#### Section 3. Carinatae

*P. bornmulleri* Fedde

*P. dalechianum* Fedde

*P. divergens* Fedde & Bornmuller

*P. kurdistanicum* Fedde

*P. macrostomum* Boiss. & Huet.

*P. piptostigma* Bienert

*P. tubuliferum* Fedde

#### Section 4. Mecones

*P. setigerum* DC.

*P. somniferum* L.

Section 5. *Glauca*

*Papaver decaisnei* Hochst. & Steud.

*P. glaucum* Boiss. & Hausskn.

*P. gracile* Auch.

Section 6. *Miltantha*

*Papaver acrochaetum* Born. syn. *P. fugax* Poir. var. *microcarpum*  
(Boiss.) Fedde, *P. tauricum* Boiss. var. *microcarpum* Boiss.

*P. armeniacum* (L.) DC. syn. *P. caucasicum* M.B. var. *stenocarpum*  
Boiss., *P. roopiarum* (Bordz.) Sosn.

*P. bartuschianum* Fedde

*P. curviscapum* Nab.

*P. cylindricum* Cullen

*P. flabauti* Fedde

*P. fugax* Poir. syn. *P. caucasicum* M.B., *P. floribundum* Desf.

*P. libanoticum* Boiss.

*P. persicum* Lindl. possibly identical with *P. tauricum* Boiss.  
(i.e. *P. tauricum* in Flora of Turkey), syn.

*P. hyoscyamifolium* Boiss. & Hausskn.

*P. polychaetum* Schott & Kotschy

*P. triniifolium* Boiss. syn. *P. urbanianum* Fedde

Section 7. *Pilosa*

*P. apokrinomenon* Fedde

*P. atlanticum* (Ball) Coss.

*P. heldreichii* Boiss.

*P. lateritium* C. Koch

*Papaver monanthum* Trautv.

*P. oreophilum* F.J. Rupr.

*P. pilosum* Sibth. & Smith

*P. pseudostrictum* Fedde

*P. ramosissimum* Fedde

*P. rupifragum* Boiss. & Reut.

*P. spicatum* Boiss. & Bal.

*P. strictum* Boiss. & Bal.

#### Section 8. Macrantha

*P. bracteatum* Lindl.

*P. lasiothrix* Fedde

*P. orientale* L.

*P. paucifoliatum* (Trautv.) Fedde

*P. pseudo-orientale* (Fedde) Medw.

#### Section 9. Scapiflora

*P. alpinum* L.

*P. anomalum* Fedde

*P. nudicaule* L.

*P. pyrenaicum* (L.) A. Kerner

*P. suaveolens* Lap.

#### Section 10. Horrida

*P. aculeatum* Thunb.

The only one species of *Papaver* in Thailand, cultivated in the North, is the Opium Poppy, *Papaver somniferum* L. (Fin, "ฝิ่น") (Smitinand, 1980). The Opium Poppy is indigenous to Asia Minor, and is cultivated largely in European and Asiatic Turkey, Iran, India and China for the production of Opium (Grieve, 1975). The plant is an erect annual, of a glaucous green, glabrous, or with a few hairs on the peduncle, scarcely branched (Kirtikar and Basu, 1980), about 0.5-1.5 m high (Pistola, 1979). Leaves are simple, ovate-oblong or linear-oblong, clasping the stem by their cordate base, irregularly toothed and slightly sinuate or lobed (Kirtikar and Basu, 1980). Flowers are large, solitary varying in colour of corolla from white to reddish purple (Grieve, 1975). Capsules are varying much in shape and size, about 2.5-4 cm in diameter. They are usually hemispherical, but depressed at the top, where many rayed stigma occupies the center. They have a swollen ring below where the capsule joins the stalk. The small kidney-shaped seeds, minute and very numerous, are attached to lateral projection from the inner walls of the capsules and varying in colour from whitish to slate. All parts of the plant, but particularly the walls of the capsules, or seed-vessels, contain a system of anastomosing laticifer, filled with a white latex (Grieve, 1975).

When the unripe seed capsule of the opium poppy is cut or pricked, a viscous liquid is exuded. After the exudate dries and darkens on exposure to air, a hard but still partly sticky mass is obtained. This is called "Opium", which has been used for many centuries by some practitioners for medicinal purposes and by others to smoke in their pipes, reaching most pleasant Elysian fields of sensation, albeit addicting and enslaving (Ginsburg, 1962).

The cultivation of the Opium Poppy is controlled internationally by the International Narcotic Control Board of the United Nations. At the present time, licit production takes place primarily in India, Turkey, the Soviet Union and the People's Republic of China, where it is carried out under strict government control. Most of the opium destined for the illicit trade originates in Turkey, India, Pakistan, Afghanistan and the "Golden Triangle" (Tyler *et al.*, 1981). The Golden Triangle, one of the major opium producing areas in the world, is the area extending from the Kachin hills and Shan plateau of Burma to the mountainous area of northern Thailand and northern Laos. Much of the opium in this area is exported illicitly but a small portion is consumed by local addicts (Suwanwela *et al.*, 1977).

The most valuable constituents of opium are alkaloids, which are present most in the latex. More than 40 different alkaloids have been obtained from opium and its extracts, some of which are alteration products of the alkaloids occurring naturally in the drug. The most important of these are morphine, codeine, noscapine (narcotine), thebaine and papaverine. Opium was well known in ancient Greece and Hippocrates mentioned the use of poppy juice as a cathartic, hypnotic, narcotic and styptic. Dioscorides (77 A.D.) distinguished between the juice of the opium and the extract of the entire plant (Cordell, 1981). Although opium has been used for centuries, opium addiction became widespread only in the sixteenth and seventeenth centuries, mostly in China, where opium smoking developed into a destructive vice (Ramstad, 1959). Opium is official in pharmacopoeiae of several countries. It is used as narcotic, sedative, anodyne, antispasmodic, hypnotic and sudorific. Whole opium is much less used nowadays, its pure alkaloids,

mainly morphine and codeine, and particularly their salts are preferred (The Wealth of India, 1966).

Morphine, the most important of opium alkaloids, was first isolated by Derosne in 1803 (Cordell, 1981), and Serturmer in 1805 (Ginsburg, 1962), but it was 118 years before the structure was eventually deduced by Gulland and Robinson (Cordell, 1981). It was a powerful analgesic and narcotic, and also has stimulant action. It especially depresses the thalamus, sensory cortex, respiratory and cough centers. It stimulates the spinal cord, the vagus, the vomiting centers, and the third-nerve nucleus. Morphine increases tone of involuntary muscle, especially the sphincters of the gastro-intestinal tract. It reduces secretions, except those of the skin glands. It dilates skin vessels but has little effect in therapeutic dose on the circulation as a whole. The chief uses are for the relief of pain, the procuring of sleep where sleeplessness is due to pain, the checking of peristalsis, the suppression of cough, and the relief of anxiety and apprehension.

Codeine resembles morphine in its general effects, but is less narcotic. It is used as antitussive. Narcotine has only a very mild narcotic action and stands between codeine and thebaine in its convulsant activity. It acts as an involuntary muscle relaxant and accelerates the respiration. Thebaine has convulsant activity rather than narcotic (Wade and Reynolds, 1977).

Opium Poppy in Thailand is illicitly cultivated in mountainous area of the North, a part of Golden Triangle. This area is inhabited by minority ethnic people referred to as the hill tribes. The health



practice of them is still primitive, based upon legendary beliefs. They believe in the concept of heaven and hell as the after world with the presence of gods and ancestor spirits. Sickness and poor health is thought to be induced by spirits and gods. Herbs and physical means are used to treat the sick in addition to sacrifices to spirits. Opium is known to be effective as medicine for many conditions such as pain, diarrhea and cough. Abdominal pain, headache and backache are among the common reasons given for opium use. A number of them use opium for the tranquillizing and euphoric effect at the time of severe sorrow from death of beloved ones. Some use it when they cannot sleep (Suwanwela *et al.*, 1977).

When capsules of Opium Poppy are ready for lancing, the villagers incise them. Usually, each capsule is lanced two or more times until no latex exudes. Yield of latex and alkaloid contents of the first lancing differ from the later. For this present investigation, the author wishes to study quantitatively four main alkaloids, i.e. morphine, codeine, thebaine and narcotine in the latex obtained from the first and second lancements in order to find the optimum time for the second lancing. The findings of the proportions of the main alkaloids in the latex may help verify the basic biosynthetic pathway of opium alkaloids.