



CHAPTER 1

INTRODUCTION

Sophora exigua Craib is a member of the family Leguminosae subfamily Papilionoideae, tribe Sophoreae (Niyomdham, 1980). Description of Sophoreae (Bronn.) DC. are as below :

Trees or shrub. Leaves odd-pinnate, 5-many-foliolate, rarely simple or 1-foliolate. Petals subequal to clearly differentiated into standard, wings and keel. Stamens with filaments all free or only united at the very base; anthers uniform. Ovary with style glabrous on upper part. Fruit not jointed, dehiscent or not (Niyomdham, 1980).

The tribe is composed of 47 genera (Soladoye , 1985) , but only two are indigenous to Thailand. One of them is *Ormosia* Jack., which comprises about 90 species in Asia and South America, only 8 species occur in Thailand such as *Ormosia robusta* Bale, Cha Khai ton (Smitinand,1980). The other is *Sophora* Linn. , which consists of about 50 species distributed in tropic and subtropic , only 4 species are found in Thailand (Niyomdham,1980). as follow:

1. *Sophora exigua* Craib, พืชขนาด Phitsanaad
2. *S. tomentosa* Linn., สารพัดพืช Saaraphatphit , สุรพิษดำ Suraphitdam
3. *S. velutina* Lindl.
4. *S. wightii* Baker, มะกล่ำสร้อย Ma Klam soi

(Chiang Mai Univerity,Social Research Institute, 1982; Niyomdham, 1980; Smitinand, 1980)

Niyomdham (1980) described the genus *Sophora* Linn.as follow:

Tree, shrub or rarely perennial herb. *Leaves* alternate, odd-pinnate; leaflets usually opposites; petiolules very short; stipules setaceous or often absent. *Flowers* in terminal or axillary, racemes or panicles; bracts small; bracteoles very small when present, but usually absent. *Hypanthium* often well developed. *Calyx* more or less oblique, campanulate to tubular, with very short to prominent teeth, the upper 2 often connate up nearly to the apex. *Corolla* white, yellow, blue or purple; standard spatulate, oblong, obovate or orbicular, often emarginate apex, base attenuate to auriculate, claw short, wings oblique, oblong; Keel oblong, falcate. *Stamens* 10, free or shortly joined at the very base; anthers uniform. *Ovary* shortly stipitate; style glabrous, with a small terminal stigma; ovules 5-many. *Pod* moniliform, often winged, dehiscent or indehiscent; valves coriaceous to fleshy; seeds ellipsoid, obovoid or globose, brown or red.

According to the Index Kewensis and its supplement, the 98 species of genus *Sophora* are shown below:

- Sophora acuminata* Desv.
- S. albescens* (Rehd) C.Y. Ma
- S. albo-petiolulate* Leonard
- S. alopecuroides* Linn.
- S. ambigua* P.C. Tsoong
- S. arizonica* S. Wats.
- S. bakeri* C.B. Clarke ex Baker
- S. benthamii* Steenis
- S. brachygyna* C.Y. Ma
- S. buxbaumii* (Bunge) B.Fedtsch
- S. chathamica* (Pursh) Yakovlev
- S. chinensis* G. Don.

- Sophora chrysophylla* Seem.
S. conzattii Standley
S. crassifolia Hassk.
S. davidii Kom. ex Pavol.
S. denudata Bory
S. dunii Prain
S. exigua Craib
S. fernandeziana Skottsb.
S. flavescens Ait.
S. franchetiana Dunn
S. frasew Benth.
S. gibbosa (DC.) Yakovlev
S. grandiflora (Salisb) Skottsb.
S. grisea Dagener & Sherff
S. gypsophylla B.L.Yurner & A.M. Powell
S. heptaphylla Linn.
S. heterophylla Arn.
S. hortensis (Boiss.& Buhse) K.H.Rechinger
S. howinsula (W.R.B.Oliver) P.S.Green
S. interrupta Bedd.
S. jabandas Mortr.
S. japonica Linn.

Sophora koordersii (Bocker ex Koord.Schum.) G.Y.Yakovlev

S. koreensis Nakai

S. korolkowi Hort.ex Dippel

S. lanaionsis (Cheek) O.Degener & I.Degener

S. leachiana M.E.Peck

S. lehmannii (Bunge) Yakovlev

S. linearifolia Griseb.

S.longicarinata G.Simpson & I.S Thomson

S. longipes Merrill

S. ludovicea-decima-sexta Buc'hoz

S. macnabiana (R.Grah) Skottsb.

S. mangaravaensis H.St John

S. masafurana Skottsb.

S. macrocarpa C.Y. Ma

S. mollis R.Grah.

S. moorcroftiana Benth.ex Baker

S. nitens Benth.ex Harv. & Sond

S. nitida Sm.

S. oblongata P.C. Tsoong

S. oblongifolia Ruiz & Pav

S. oligohylla Baker

S. oligosperma Urb. & Eleman

- Sophora pachycarpa* Schrenk. ex C.A.Mey.
S. pentaphylla Desv.
S. persica (Boiss.& Buhse) K.H.Rechinger
S. platycarpa Maxim.
S. polyphylla Urb.
S. praetorulosa Chun & T.C. Chen
S. prodanii E. Anders.
S. prostrata J. Buch.
S. pubescens Tausch
S. purpursi T.S. Brancelegge
S. rapaensis H.St. John
S. reediana (R.Phil.) Yakovlev
S. reticulata Hayek
S. rhynchocarpa Griseb.
S. robinoides Walp.
S. rubriflora P.C. Tsoong
S.saxicola Proctor
S. secundiflora Lag.ex DC.
S. sericea Nutt.
S. shikokiana Makino
S. sinuata Larranaga
S. somalensis Chiov.

Sophora songarica Scherenk

S. stenophylla A. Gray

S. subprostrata Chun & T.C. Chen

S. sumatrana G.P. Yakovlev

S. tetragonocarpa J. Mill

S. tetraptera J. Mill

S. tomentosa Linn.

S. tonkinensis Skottsb.

S. vanioti Leveille

S. velutina Lindl.

S. vestita Nakai

S. viciifolia Hance

S. unifoliata (Rock) Degener & Sherff

S. wightii Baker

S. xanthoantha C.Y. Ma

S. yunnaensis C.Y. Ma

S. zambesiada Baker

(Brenan, 1981; Davies, 1987 a, 1987 b; Duran and Jackson, 1941; Heslop-Harrison, 1974; Hill, 1926, 1929, 1933, 1938; Hill and Salisbury, 1947; Hooker and Jackson, 1895; Prain, 1908, 1913, 1921; Salisbury, Taylor, 1959, 1966, 1970; Thiselton-Dyer, 1904)

According to Niyomdham (1980), the synonyms of *Sophora exigua* Craib are *S.violacea* Thw. var. *pilosa* Gagnep. and *S.violacea* Thw. ssp. *pilosa* (Gagnep.) Yakovlev. It distributes in the north-eastern and eastern part of Thailand. Niyomdham also described the characteristic feature of this species as below:

Shrub about 0.5 m high; young shoots, leaf-rachises, inflorescences, calyces and pods densely tawny pubescent to tomentose. *Leaves* 15-30 cm long; stipules absent; leaflets coriaceous, 11-13, lateral ones slightly oblique, broadly elliptic to suborbicular, rounded at both ends, terminal one broadly obovate, cuneate at the base, apex rounded, 2-3 by 1.5-2.5 cm, upper surface glabrous, lower surface glabrescent with densely pubescent along margins and midrib. *Inflorescence* terminal racemes, soon leaf-opposed, up to 20 cm long; bracteoles small, subulate; 2-3 cm long; pedicels 4-5 mm long; bracteoles absent. *Calyx* tubular, about 8 mm long; teeth triangular-acute. *Corolla* purple; standard about 20 by 9 mm, spatulate-emarginate, base attenuate; wing about 16 by 3 mm; keel about 11.5 by 3 mm. *Ovary* hairy; ovules 10. *Pod* not seen in maturity (Fig.1).

Several species of *Sophora* have been reported to be used for medicinal purpose in many countries, especially in Asia, such as:

Sophora flavescens Ait., the North East Asia native plant, is reported that the root is bitter, refrigerant, diuretic, stomachic, astringent, antiinflammatory and anthelmintic. It has been prescribed to treat jaundice, leukorrhea, swollen ankles, fevers, scrofula, sore throat, skin- fungal, intestinal hemorrhage, syphilis, leprosy, toothache, asthma and dysentery. The Japanese have used the fresh root to promote hair growth. The plant is also used as an insecticide (Hyatt, 1975; Keys, 1976; Perry, 1980)

Sophora japonica L. has been widely used in the traditional medicine. The Korean have used the flower buds to treat leukorrhea, ulcers and amenorrhea. In China, the seed and flower are analgesic, styptic and hemostatic in the dose of 5-10 g. It is prescribed for various kind of hemorrhages, intestinal ulcers and menstrual clots. The most important use is the source for rutin; the substance which is mentioned to be specific in treating and preventing hypertension. In many countries, the flower, fruit, dried seed are used as an abortifacient. Besides that, the fruit is an insecticide and vermifuge. (Hyatt, 1978; Keys, 1976; Perry, 1980)

Sophora tomentosa Linn. has been well known of its use from Indo-China to Guam. In Malay Peninsula, the seed, leaf and root are used as an astringent in diarrhoea. In Indonesia, the seed and root have been explored as a remedy for cholera, colic, and dysentery. The root in combination with those of *Caesalpinia* is used as an antidote for poisoning. The finely grounded leaf or chewed seed may be applied to wounds caused by poisonous fish. The fresh leaf is treated in admixture with *Thespesia populnea* Soland.ex., *Correa* and *Piper latifolium* C.DC. leaves for cancer of the breast. (Chopra and Chopra, 1955; Chopra *et al*, 1956; Perry, 1980; Quisumbing, 1951)

Sophora exigua Craib is a deciduous shrub native to Thailand. The root has been used in traditional Thai medicine for antipyretic and respiratory diseases (Pongboonrod, 1950).

Sophora exigua Craib is the Thai indigenous medicinal plant. It has been used as a medicinal plant for a long time. Although there were few studies about the chemical constituents from *Sophora exigua* Craib. Those studies indicated the presence of alkaloids and flavonoids, some studies had reported that its alcoholic extract had antibacterial activity against *Pseudomonas aeruginosa*, *Staphylococcus aureus* and β -*Streptococcus* group A. But compounds that found in *Sophora exigua* Craib had never been reported on biological activity. So the phytochemical works on this indigenous plant are undertaken in order to study the chemical constituents comparing in this genus and to search for compounds which might exhibit therapeutic values.