

เถาย่านาง

Pharmacognostical Studies on the Root of Thao-ya-nang (*Tiliacora triandra* Diels.)

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Tiliacora triandra Diels is commonly known as Thao-ya-nang (1) in Thailand and sometimes it is called Choi-nang or Thao-wan-khiew due to localities (2) (3). It is a woody climber with perennial stems, twining around trees. Leaf is ovate-lanceolate to lanceolate-oblong shape with small yellow flowers; drupaceous fruits. This plant has a big root (Plate I fig. 1,2). It is widely distributed throughout Thailand (1). According to Burkill (4) *T. triandra* was found in Indo-China and southwards to the northern parts of the Malay Peninsula, and he described this plant as a poultice to cuts.

In Thailand, root of *T. triandra* has been so far used as a decoction for all kinds of fever (2) (5).

Material and Methods

Tiliacora triandra Diels was collected for this investigation From Chantaburi Botanical Garden in Thailand during the summer of 1971 and for the comparison the drugs under the same local names from markets in Bangkok have been studied.

Cross and longitudinal sections from 10 to 30 microns thick were used. Some of the sections were stained by safranin and contrasted with methyl green and mounted in glycerin water. For the examination of the individual cells, Schulze's maceration process, as indicated by Youngken (6), was employed.

Tillacora triandra Diels

The root

The roots are conical and tortuous of various sizes. The surface is smooth, greyish brown and sometimes has a brown appearance owing to adherent earth; they are marked with faint longitudinal ridges and crossing with cracks. The root is unbranched; rootlets are few and attached to the main axis. The transversely cut surface shows vascular bundles in brown color radiating from the center; and pale yellowish white of ground tissues, all tissues are starchy (Plate I fig.3). The odor is not at all peculiar. In an old root anomalous structure can be observed.

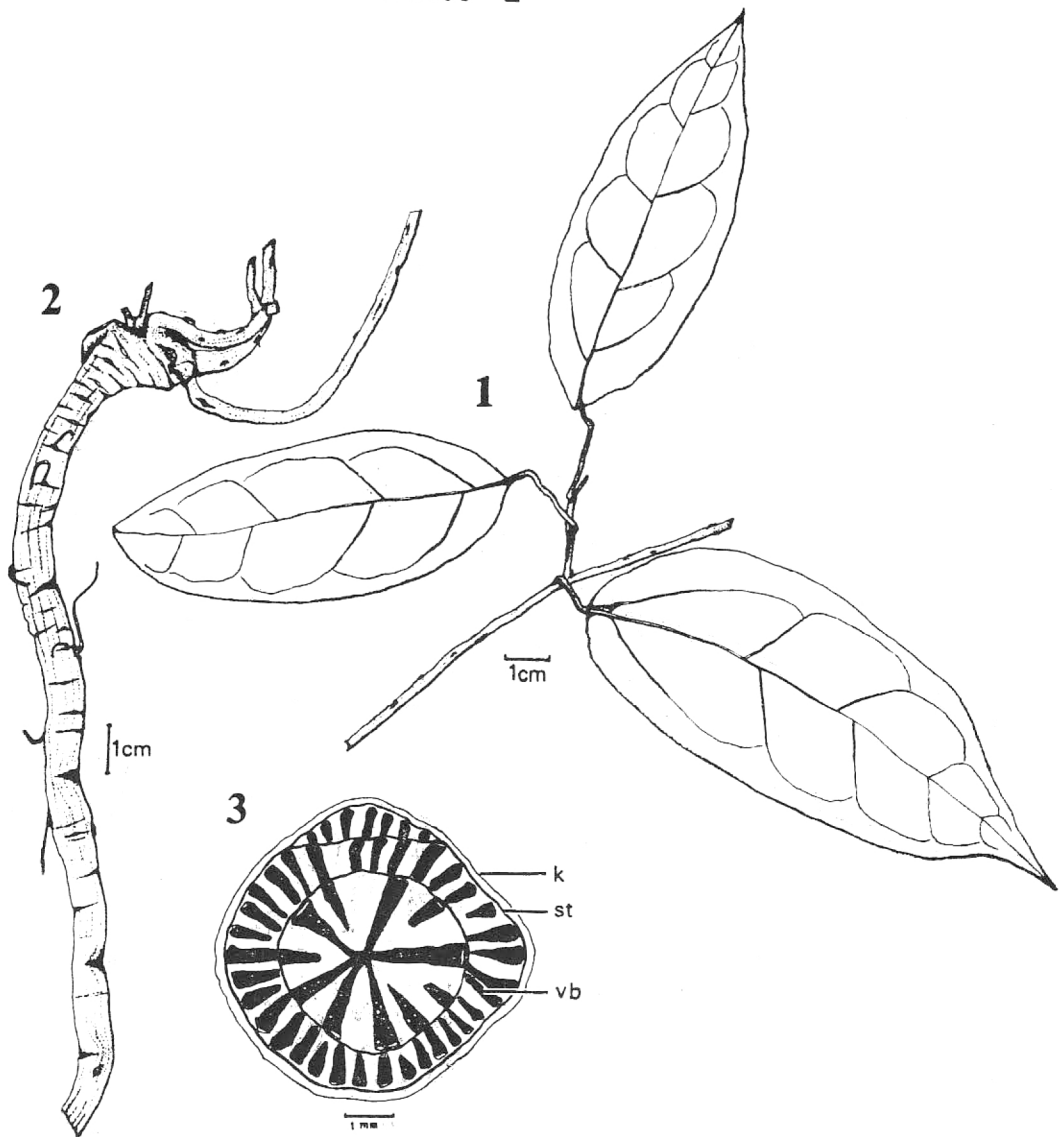
The drug of Thao-ya-nang sold in the market is cut slantly to small pieces of about 2 inches in length. It is rarely obtained from the store in fresh condition. This is perhaps due to the fact that the Thao-ya-nang root contains a lot amount of starch and can not keep for long time without drying.

Structure of the root

A thin transverse section reveals that epidermis, primary cortex and endodermis have completely peeled off, even if in the root of 0.5 mm. in diameter. The cork is composed of five to ten layers of unlignified thin-walled polygonal and tabular cells, some cells contain yellow substance. (Plate II fig.1). At the centre of the root is a hexarch xylem and five medullary rays passing outwards (Plate II fig.3). Cork cambium can not be distinguished. The cortex is thin and is composed of four to six layers of tangential elongated parenchyma cells containing starches. (Plate II fig.1).

The pericycle is composed of the sclerenchymatous cells of one to three layers surrounding the root. They consist of thick-walled and lignified cells with polygonal outline in cross section, Their walls are pitted, unbranched, (Plate II fig 1,2).

Plate 1



Tiliacora triandra Diels.

Plate I. Fig. 1: The sketches of stem and leaves

Fig. 2: The sketch of the root

Fig. 3: Transversely cut surface of the root

Plate 2

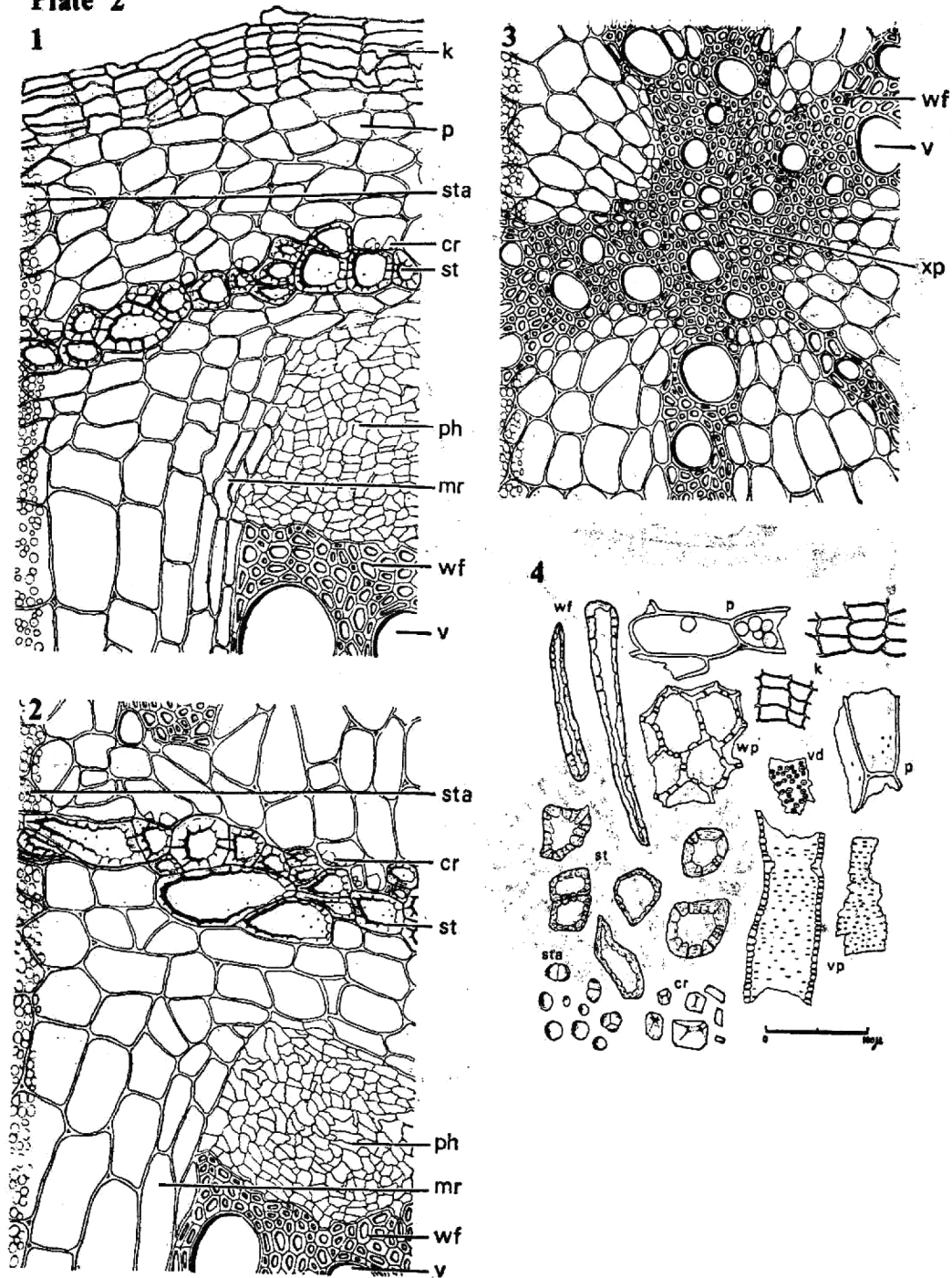


Plate II. Fig. 1-3: Transverse sections of the root
 Fig. 4 : Isolated elements

The vascular bundles are separated from one another by broad medullary rays, and they can be distinguished even to the naked eye in a transverse section of the root. The phloem is composed of sieve tubes and companion cells. The phloem cells towards the periphery are usually flattened or obliterated, while those towards the central portion are polygonal and rectangular in outline and arranged in irregular rows (Plate II fig. 1,2).

The xylem is composed of vessels, wood parenchyma (Plate II fig. 1, 2, 3). The vessels are characterized by their large lumina measuring from 20 to 125 microns in diameter (in transversely). They are mostly single and arranged in radial rows, occasionally some of them are in a group of two. They have simple and bordered pits. The metaxylem and protoxylem have smaller cavities. The wood parenchyma cells are rather thick-walled and unlignified. The wood fibers are thick-walled, lignified and elongated cells with bordered pits. One end is somewhat pointed and sometimes wavy. They measure from 125 to 250 microns in length.

The medullary rays made up of several rows of thin-walled, slightly lignified, radially elongated parenchyma cells. The ray cells mostly filled with starch grains. (Plate II fig. 1, 2,3).

The starch grain

The cells of cortical parenchyma and medullary rays contain abundant, small, rounded to ovoid, eccentric hilum of X-shaped like starch grains measuring from 7 to 16 microns in diameter (Plate II fig.4)

The crystal

The solitary crystals of calcium oxalate which measure from 3 to 20 microns are observed in the cells of cortical parenchyma closing to the pericycle and xylem parenchyma. (Plate II fig.4).

The anomalous structure

The anomalous secondary thickening is very common in this plant. It consists of newly formed vascular bundles of xylem and phloem repeating the structure of the young root. According to Solereder (7) and Metcalfe and Chalk (8), they indicated that the anomalous structure is due to the formation from extrafascicular cambia, of one or more cocentric rings of bundles.

List of abbreviations:

cr: crystal, k: cork, mr: medullary ray, p: parenchyma, ph: phloem, st: stone cell, sta: starch, v: vessel, vb: vascular bundle, vd: bordered pit vessel, vp: pitted vessel xp: protoxylem, wf: wood fiber, wp: wood parenchyma.

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เรื่องย่อ

เถาย่านาง มีชื่อเรียกทางพฤกษศาสตร์ว่า *Tiliacora triandra* Diels. ลักษณะเป็นไม้เถาเลื้อยพาดพันต้นไม้อื่น เถาเหนียว และเขียวสด ขึ้นตามพื้นที่ราบรกร้างทั่วไป รากของเถาย่านาง มีสรรพคุณแก้ไข้ได้ทุกชนิด

จากการศึกษาลักษณะต่าง ๆ ของรากหญ้านาง สรุปผลได้ดังนี้คือ :-

1. Cortex บางประกอบด้วย parenchyma 4-6 ชั้น
2. Xylem เป็นแบบ hexarch
3. Vessel มี lumen กว้าง 20 ถึง 125 ไมครอน
4. Wood fiber ผนังหนา ปลายแหลมหรือเป็นคลื่น ยาวประมาณ 125 ถึง 250 ไมครอน มี bordered pits.
5. มี anomalous structures.