

CHAPTER 2

LITERATURE REVIEW

Taxonomic study of *Argostemma* Wall. in Thailand and the adjacent South-East Asian regions

The genus *Argostemma* (Rubiaceae) was described by Wallich in *Flora Indica*. There were four species in the original publication of the genus, i.e. *A. sarmentosum* Wall., *A. verticillatum* Wall., *A. rostratum* Wall. and *A. pictum* Wall. The genus was described as a small succulent and elegant herbaceous plant, with unequilateral leaves, snow-white flowered, four- or five-parted, largish with respect to the size of the plant (Wallich in Roxburgh, 1824).

Indo-chinese Region

In the Indo-chinese region, seven species of *Argostemma* were recorded and the members of this genus were separated based on the number of merous (four- or five- merous) (Pitard, 1922). Recently, a new species, *A. fasciculata* K. Sridith & K. Larsen, was described from Cambodia (Sridith & Larsen, 2005).

Malesian Region

King and Gamble (1903) reported that there were twenty-three taxa of this genus occurring in the Malay Peninsula, and these taxa were distinguished from each other in terms of size of leaves and number of leaf-pairs. Later, Ridley (1923) reported forty-one with some additional new taxa from the region. Ridley (1927)

recorded 28 species of Malay Peninsular *Argostemma* spp. and divided them into two sections, i.e. *Eu-argostemma* K. Schum. and *Pomangium* (Reinw.) Ridl. Later, Bakhuizen van den Brink, Jr. (1953) recorded 16 species of this genus for the whole Malesian region and proposed five sections, i.e. *Eu-argostemma* K. Schum., *Pomangium* (Reinw.) Ridl., *Argostemmella* (Ridl.) Bakh.f., *Elatosteemoides* K. Schum and *Borragineum* Bakh.f. Recently, Schumann (1981) proposed three sections, i.e. *Euargostemma* K. Schum., *Monophyllum* K. Schum. and *Elatosteemoides* K. Schum.

In 1989, Bremer studied the genus in Borneo. Twenty-eight species were reported, which included six new and endemic species. Members of this genus are distinguished from each other by leaf arrangement, i.e. pseudo-verticillate and scattering along the stem.

Thailand

In Thailand, 33 taxa of *Argostemma* were recorded in *Florae Siamensis Enumeratio* (Craib, 1932). Later, Sridith (1999^a) reported four additional species to the flora of Thailand, i.e. *A. monophyllum* K. Sridith, *A. rotundicalyx* K. Sridith, *A. thaithongae* K. Sridith and *A. puffii* K. Sridith, one new variety: *A. lobulatum* Craib var. *variabile* K. Sridith and changed the status of *A. setosum* Geddes to *A. laeve* Benn. ssp. *setosum* (Geddes) K. Sridith. He also revised the genus for the Flora of Thailand, in which thirty-one taxa were reported for the flora together with illustrations, distributional records and ecological information (Sridith, 1999^b). In 2000, Sridith and Puff reported the distribution of this genus with special reference to

Thailand and surrounding areas. They noted that seventeen species were endemic to Thailand (Sridith & Puff, 2000).

In 2001, Sridith and Puff have discussed the floral diversity in the genus *Argostemma* Wall. according to the morphological characters. They have proposed four major groups, i.e. star-shaped and 5-merous flower group (assumed as the “basic” *Argostemma*), star-shaped and 4-merous flower group (only one species: *A. khasianum* C.B. Clarke), bell-shaped and 5-merous flower group and bell-shaped and 4-merous flower group (believed to be more derived). However, there are intermediate species among groups which still be taxonomic problem (Sridith & Puff 2001).

Chromosomal study of *Argostemma* Wall.

Chromosome numbers

There were few chromosomal data of *Argostemma*. Just only nine of 100 species chromosome numbers were reported. In 1962, Mangenot and Mangenot reported chromosome number of *A. pumilum* Benn., which was one of the two African species of the genus as $2n = 22$. Later, Khoshoo and Bhatia (1963) studied cytology of some Rubiaceae of the North-Western Himalayas and reported chromosome number $n = 14$ for *A. verticillatum* Wall. A few decades later, Hellmayr *et al.* (1994) presented an unidentified *Argostemma* species from the Malay Peninsular $2n = 22$. After that, Kiehn (1996) reported chromosome numbers of three *Argostemma* species: *Argostemma* sp. $2n = 22$ from Papua New Guinea, *Argostemma* sp. $2n = 22$ and *A. hookeri* King $2n = 32$ from the Malay Peninsula. He also proposed the basic chromosome number of this genus is $x = 11$. Recently, Puangsomlee and

Puff (2001) have reported chromosome numbers of Thai Rubiaceae, i.e. *A. diversifolium* Ridl., *A. pictum* Wall. and *A. neurocalyx* Miq., $n=11$, $n = 11$, $2n = c.22$ respectively.

Chromosome morphology

Kiehn (1995) surveyed the chromosome of Rubiaceae. He reported that normally Rubiaceae have small chromosomes and clump together, the length and shape of all chromosomes within a diploid set are more or less uniform. In generally, one or two pairs of satellite chromosomes are found in Rubiaceae and tannins in the tissues of plants often interfering with fixation and/or staining procedures.

The chromosome studies of various *Argostemma* spp. in Thailand has been studied in the present work in order to seek the taxonomic relationship among different taxa.