



CHAPTER II

LITERATURE REVIEW

Cyclophorus Montfort, 1810 is a genus of operculated land snail, which mostly occurs in various kinds of mountain. It belongs to the family Cyclophoridae, subfamily Cyclophorinae. *Cyclophorus* has its unique large solid, low conical shell form with thin operculum and multispiral type. Both male and female are distinctly determined by clear reproductive systems (Bentham Jutting, 1948). The distribution ranges from Southeast Asia to some parts of Sub-temperate region i.e. Hongkong, Taiwan, Korea, China and Okinawa.

Taxonomic lists and the basic classification of *Cyclophorus* species have been done and published by Reeve (1861), (Nevill 1881), Morlet (1891), Möllendorff (1894), Kobelt (1902), Blandford (1903), Gude (1921), Bentham Jutting (1948, 1949), Zilch (1956), Habe (1964), Solem (1966), and Abbott (1989). Those authors used shell morphology and colour patterns to separate species.

There are not many papers reported on radula and reproductive organs of *Cyclophorus* species for taxonomic propose. Bentham Jutting (1948) determined the number and arrangement of the teeth in the different groups of snail with constant in given group. Some anatomical data on cyclophorid are given by Tielecke (1940), studied on reproductive system of three land snail species suggested that the shape of bursa copulatrix, albumin gland and seminal vesicle are significant characters for snail classification. Some anatomical data on the *Cyclophorus* by Kasinathan (1975).

Concerning chromosome studies, Kasinathan and Natarajan (1975) reported the squash technique chromosome number of *C. jerdoni* from India. The chromosome number of $n=14$, $2n=28$ was clarified, Karyotype and sex chromosome characteristics were still unknown. Choudhury *et al.* (1997) reported the air-drying method chromosome number of the *C. polynema* from India is $2n=28$, and interpreted the chromosome formula of $n=13m+1sm$ and $FN=56$. The cyclophorid chromosome looks so complicate and were observed by the usual technique because of their small size and large number variable characters (Kasinathan and Natarajan, 1975).

As above complicated problems, various analyses were focused. Shell morphology, shell morphometric analysis, soft parts anatomy, radula morphology and karyotype study were employed in order to study and revise taxonomy and systematics of Thai *Cyclophorus* species.