



CHAPTER IV

BIOSTRATIGRAPHIC CORRELATION AND AGE

Interpretation of data from field works and laboratory perform the range of fusulinoideas in study area. The study area is situated at Amphoe Ta Khli, Amphoe Tak Fa and Amphoe Phrayuha Khiri, east of Changwat Nakhon Sawan. The rocks in the investigated area are mainly composed of thin to thick bedded limestone which contain various kinds of fossils such as algae, smaller foraminifers, crinoids, gastropods and ammonoids. The result of this study shows that Tak Fa formation in study area consists of 6 Families, 10 Subfamilies and 24 genera of the fusulinoideas. Its age is ranging from Yakhtashian? (Artinskian) to Midian (Capitanian) age. The age of fusulinoideas in this study are referred to the Fusulinoidean Standard Zonation proposed by many researchers: Toriyama *et al.*, 1975; Ingavat *et al.*, 1980; Dawson and Racey, 1993; Charoentitirat, 2002, etc.

Biostratigraphic correlation and age

The data of fusulinoideas lead that the Tak Fa formation in study area is subdivided into 6 biozones and ranging from Yakhtashian? (Artinskian) to Midian (Capitanian) as shown in Figure 4.1. The biozones of the Tak Fa formation in this area are shown as follow in descending order:

- *Lepidolina* biozone

Lepidolina biozone is characterized by *Lepidolina lepida*, it occurs together with *Chusenella* sp., *Pseudofusulina* sp. and *Verbeekina verbeeki* (Geinitz). It exists in rock sample: TK 3, TK 4, TK 6, TF 1 and TF 2. *Lepidolina* biozone is probably correlated with a zone species to *Lepidolina multiseptata* zone at Changwat Sra Kaeo (Charoentitirat, 2002) and correlated with the upper part of Khao Som Phot, Changwat Lop Buri (Wielchowsky and Young, 1985).

	Stage	Stratigraphic range of unit	Fusulinoidean Biozone	Correlation
Permian	Dorashamian			
	Dzhufian	TK 3 TK 4 TK 6 TF 1 TF 2		Khao Ma Kha, Sra Kaeow
	Midian		<i>Lepidolina</i> <i>Colania</i>	Khao som Phot, Lop Bur Khao I Mot, Saraburi
	Murgabian	TK 1 TK 2 TF 1 TF 3 PK	<i>Neoschwagerina</i>	Khao Phlong Phrab, Saraburi
	Kubergandian	TK 5	<i>Makaya</i>	
	Bolorian	KN	<i>Misellina</i>	
	Yalibabian	KLK		
	Sakmarian			
	Asselian			

Figure 4.1 Schematic stratigraphic range of units in study area (TK = Ta Khli, TF = Tak Fa, PK = Phrayuha Khiri, KN = Khao Noi and KLK = Khao Look Klone).

Lepidolina multiseptata zone from Charoentitirat (2002) indicated Midian age while *Lepidolina multiseptata* in the upper part of Khao Som Phot reported by Wielchowsky and Young (1985) indicated Late Guadalupian or Capitanian, thus, the age of *Lepidolina* biozone of the study area is probably Midian or Capitanian (Late Guadalupian).

Based on Wielchowsky and Young (1985), fusulinoideas in Khao Somphot, Lop Buri area are range from Asselian to Roadian (Kubergandian), and to Capitanian (Midian), thus, the Tak Fa formation in Changwat Nakhon Sawan (study area) is chronostratigraphically equivalent to upper part of Khao Somphot.

- *Colania* biozone

The occurrence of *Colania* sp. with *Sumatrina* sp. at TK 3 and PK may be chronostratigraphically correlated with *Colania douvillei* - *Verbeekina verbeeki* zone at Khao I Mot, Changwat Saraburi (Toriyama, 1984), and correlated with *Colania douvillei* zone at Khao Khwang platform and Sra Kaeo area (Charoentitirat, 2002). The age of *Colania douvillei* zone from Toriyama (1984) is Late Guadalupian or Capitanian while *Colania douvillei* zone of Charoentitirat (2002) indicated Midian, thus, the age of *Colania* biozone in this study is Midian or Capitanian.

- *Neoschwagerina* biozone

Neoschwagerina biozone is characterized by *Neoschwagerina simplex*, it occurs together with *Afghanella* sp., *Pseudofusulina* sp., *Parafusulina* sp., *Yangcheinia* sp., *Pseudodoliolina* sp. and *Neothailandina* sp. It exists in rock sample: TK1 and TF1 and probably correlated with *Neoschwagerina simplex* zone at Khao Phlong Phrab, Changwat Saraburi indicated Wordian (Toriyama, 1984) and correlated with *Neoschwagerina simplex* zone at Khao Khwang platform (Charoentitirat, 2002) which indicated Murgabian age. The age of this biozone is Murgabian or Wordian.

Khao Noi section are found along the eastern part of Khao Noi where continuous exposures exclusively of limestone. Fusulinoideas occur in this section is subdivided into two zone: *Maklaya* biozone and *Misellina* biozone.

- *Maklaya* biozone

Maklaya biozone is characterized by *Maklaya* sp. and it occurs together with *Schubertella* sp. In stratigraphic correlation with the previous biostratigraphic zonation of fusulinoideas in adjacent area, *Maklaya* biozone at Khao Noi is probably correlated with *Maklaya* zone at Khao Phlong Phrab, Changwat Saraburi indicate Roadian age (Toriyama *et al.*, 1974) and correlated with *Maklaya confragaspira* - *Maklaya sethaputi* zone from Charoentitirat (2002) indicated Kubergandian. Thus, this biozone have Kubergandian or Roadian.

- *Misellina* zone

Misellina biozone is characterized by *Misellina* sp. and it occurs together with *Armenia* sp. and *Schubertella* sp. In stratigraphic correlation with the previous biostratigraphic zonation of fusulinoideas in adjacent area, *Misellina* biozone at Khao Noi is probably correlated with *Misellina otai* – *Misellina cf. termieri* zone at Khao Phlong Phrab, Changwat Saraburi indicate Artinskian age (Toriyama *et al.*, 1974), and with *Misellina otai*, *Misellina confragaspira*, *Armenia* zone from Saraburi Limestone indicate Bolorian age (Dawson and Racey, 1991) and *Misellina termieri* – *Misellina ovalis* zone in Pha Nok Khao Platform indicated Bolorian to Kubergandian (Charoentitirat, 2002). The age of *Misellina* biozone in thesis indicated Bolorian or Kungurian to Kubergandian or Roadian.

Occurrence of *Skinnerella?* sp. and *Pseudofusulina?* sp. in rock sample TK 5 can not be correlated with any zone by the constituent species, but *Skinnerella?* sp. indicate Kubergandian or Roadian age. Thus, the age of TK 5 is Kubergandian or Roadian age.

Due to fusulinoideas at Khao Look Klone (KLK) such as *Pseudofusulina* sp., *Staffella* sp., *Pseudostaffella* sp., *Nankinella* sp. and *Schubertella* sp. are not good index fossil or are not specific characteristic fusulinoidea which indicated age. So, this section can not be correlated with any zone by the constituent species but it may be chronostratigraphically correlated with fusulinoideas in Chondhurian, Amphoe Ta Khli which indicated Artinskian? or Yakhtashian? age (Toriyama *et al.*, 1965).