Chapter VI

Conclusions and Recommendation

6.1 Conclusions

6.1.1 Fluctuation of Relative Humidity and Temperature during the Study Period

The mean relative humidity at Tarn Lord Noi Cave was relatively high throughout the study period. The mean relative humidity inside the cave was quite parallel to the mean relative humidity outside but the difference was found in some periods of the year. Most of the sampling times, the mean relative humidity inside the cave was higher than the mean relative humidity outside.

The mean temperature inside the cave quite coincided with the mean temperature out side. All of the sampling time of which the mean temperature between inside and outside was different, the mean temperature inside was lower than the mean temperature outside.

6.1.2 Population

A total of 167 toads, including, 68 males, 48 females, 47 young, 2 young became to males, and 2 young became to females, was found inside the cave.

Using the Jolly-Seber model of population estimation, the population size of all toads varied from 71.9 $\pm$ 7.9 to 91.9 $\pm$ 8.5 individuals. The population size of the male varied from 27.3 $\pm$ 5.0 to 56.0 $\pm$ 4.9 individuals. The population size of the female varied from 11.0 $\pm$ 2.6 to 34.7 $\pm$ 16.5 individuals. The population size of the young varied from 12.0 $\pm$ 3.1 to 29.8 $\pm$ 9.5 individuals.

Population size of the male and the female correlated with the temperature but the correlation was on the opposite way. The change of female population size coincided with the temperature. On the other hand, when the temperature increased, the population size of male conversely related.

The male was dominant in number relative to the female and the young almost throughout the sampling period. However, the estimated population size of the male was smaller than the estimated population size of the female in May 2002 (in breeding season) in which the sex ratio was 1:1.27. For the other sampling time, the sex ratio varied from 1: 0.22 to 1: 0.75.

The minimum and maximum size of the male were 88.4 mm and 111.0 mm, respectively and the size that was frequently found was during 90 to 110 mm. The minimum and the maximum size of the female were 112.0 mm and 147.0 mm, respectively and the size that was frequently found was between 110 to 140 mm. The smallest and the largest size of the young toads were 34.3 mm and 110.4 mm, respectively and the size that was frequently found was between 30 to 90 mm.

6.1.3 Habitat Utilization

Most of the toad was found inside the cave but it could not concluded that they spent their time only inside the cave due to they were not caught for every sampling time. A large number of them showed movement between inside and outside the cave for both breeding and non-breeding season and most of them showed 2-way movement.

Most of them exhibited area fidelity behavior for both breeding and non-breeding season. There was no difference in habitat utilization between sexes and between the male of different sizes for both breeding and non-breeding season.

Section 7 (180-210 m from the downstream exit) was not the most frequently used area for both the male and the female. There was no difference in the proportion of the toad among the most frequently used sections for both breeding and non-breeding season. The result suggested that the importance of the 8 areas inside the cave were not different.

6.1.4 Breeding Season

The result suggested that *B. asper* in Tarn Lord Noi Cave was not explosive breeder. They took about 5 months in rainy season for each breeding season. The

breeding seasons were quite similar for 2 successive years that were during April to August 2001 and March to July 2002.

6.2 Recommendations

1. To properly identify sex, various sexually dimorphic traits should be examined. Multivariate analysis methods could be powerful tools for the identification and should be further investigated.

2. Although the result of this study provides more information on *Bufo asper* population in Tarn Lord Noi Cave, it requires more long-term study for the better conclusion. Due to the small population size of *B. asper*, the population monitoring both inside and outside of the cave should be conducted regularly to examine the fluctuation of the population.

3. In order to understand the population structure in term of age structure, individual age should be figured out and the skeletochronological study should be applied.

4. Based on the data of population and habitat utilization that indicate the importance of the cave as their breeding and shelter site, the result can be applied for conservation management.