

# Ambush site adjustment of a pit viper based on the presence of prey and competition in association with season and habitat

Chun-Kai Yang

## Introduction

Predators adjust foraging tactics in accordance with prey characteristics and competition intensity to increase foraging success. Prey characteristics such as palatability, abundance, and anti-predator tactics would overall affect predators' decision in selecting suitable prey. This decision is especially important for sit-and-wait predators. Limited moving distance of sit-and-wait predators indicates that selecting ideal ambushing sites is crucial to maximize foraging efficiency. Thus, such predators should overlap their active period and habitat with those of suitable prey to increase the encounter rate with prey while lowering energy spent at the same time.

Intraspecific competition often occurs when different age classes of individuals share the same diet. In case of sit-and-wait predators competition for ideal ambushing sites could occur. Therefore, individuals need to change foraging tactics to maximize energy gain when competitors are present. Two abilities are essential for predators to decrease competition in foraging: 1) the ability to recognize potential competitors, and 2) the ability to adjust ambush sites based on the competition intensity.

*Trimeresurus stejnegeri* is an arboreal sit-and-wait predator which was selected as a target species. Frog consists of its main diet, and thus *T. stejnegeri* is commonly observed to ambush at the water habitats to forage on breeding frogs. In this study I conducted indoor experiment and field research to answer how prey and competition affect ambush tactics of *T. stejnegeri*.

## **Materials and methods**

Three studies were conducted in Taiwan to investigate prey differentiation, ambush site selection, and competitor avoidance of the snake. First, I conducted a chemical preference test to examine whether the snake can differentiate among anuran species. Stomach contents of the snake collected in the wild were compared with the result of the chemical preference test.

The second study was conducted in the field to compare habitat selection of *T. stejnegeri* for ambushing between juveniles and adults. I recorded water habitats used by the snake in each month. Correlations between the number of frogs and snakes were analyzed in each water habitat. Ambush site selection in each season was compared between juveniles and adults.

The last study was conducted in two study areas in the field. I divided lentic water habitat into experimental and control sites. Adult snakes were removed from the experimental sites in each survey, whereas no adult snake was removed from the control sites. Perch height and distance of ambush site to the water were recorded for each individual. We examined whether adult and juvenile snakes change ambush site depending on the presence of competitors.

## **Results and Discussion**

In the chemical preference test, *T. stejnegeri* showed different levels of preference among anuran species. Tongue flick ambush score indicated that the snake can differentiate species belonging to the same family. Diet composition obtained from wild snakes did not necessarily correspond to preferred species indicated by the chemical test.

In the field survey, I found that prey abundance and characteristics both affected ambush site selection of *T. stejnegeri*. In addition, different ambushing patterns

between juveniles and adults in the temporary pool suggested the occurrence of competition between them.

In the field experiment, I found that intraspecific competition occurs between juveniles and adults. Juveniles avoided ambushing simultaneously with adults. In addition, juveniles preferred selecting larger water area as ambush sites possibly to decrease competition with dominant conspecifics.

### **Conclusion**

Both juvenile and adult *Trimeresurus stejnegeri* preferred ambush site containing several abundant prey species year round. However, limited ambush sites force smaller snakes to adjust ambush tactics to decrease intraspecific competition.