

2002 TAIWAN INTERNATIONAL SCIENCE FAIR

CATEGORY : Zoology

PROJECT TITLE : Palatability Tests on Rana Chalconota
Tadpoles

AWARD : Second Award

SCHOOL : Temasek Junior College

FINALISTS : Ng Peiying

COUNTRY : Singapore

Abstract Of Exhibit

Name : Ng Peiyong
Country : Singapore
Category : Zoology
Title : PALATABILITY TESTS ON *RANA CHALCONOTA* TADPOLES

Purpose Of Research

The skin of amphibians can secrete poisons from glands which reduces palatability or sometimes result in rejection by predators. My research serves to confirm the hypothesis that the pair of glands located on the ventral side of *Rana chalconota* tadpoles acts as an anti-predatory structure. Their palatability was measured by the consumption of them at developmental stages intermediate and post-metamorphic by *Channa gachua* and Giant Dragonfly Nymph. A known-palatable tadpole, *Rana malesiana*, was used as a control.

Procedures

5 *Channa gachua* and 2 Giant Dragonfly Nymphs samples were collected and labelled G1-G5 and D1-D2 respectively. As many samples of *Rana chalconota* and *Rana malesiana* tadpoles were collected. All these were stored in different tanks placed in cool and dry areas. The predators were blocked from each other using cardboards. They were placed undisturbed for 24 hours to adapt to their new environment. They were starved for another 24 hours before the experiments began. They were all large enough to subdue and consume samples of *Rana chalconota* and *Rana malesiana*.

Experiment 1

Rana chalconota and *Rana malesiana* tadpoles at intermediate developmental stages (31-41) were fed to G1-G5, D1 and D2. A tadpole was fed to the different predators each time.

Experiment 2

Rana chalconota and *Rana malesiana* at the post-metamorphosing developmental stages (emergent) were fed separately to G1-G5, D1 and D2.

Experiment 3

Dead *Rana chalconota* tadpoles at intermediate developmental stages (31-41) which had their pair of poisonous glands removed and washed thoroughly and those which were alive and have no glands removed were fed separately to G1-G5.

Results

Experiment 1

Key: A=Acceptance, R=Rejection

	G1	G2	G3	G4	G5	D1	D2
<i>Rana malesiana</i> (Control)	A	A	A	A	A	A	A
<i>Rana chalconota</i>	R	R	R	R	R	A	A

Experiment 2

	G1	G2	G3	G4	G5	D1	D2
<i>Rana malesiana</i>	A	A	A	A	A	A	A

<i>Rana chalconota</i>	A	A	A	A	A	A	A
------------------------	---	---	---	---	---	---	---

Experiment 3

	G1	G2	G3	G4	G5
<i>Rana chalconota with glands removed</i>	A	A	A	A	A
<i>Rana chalconota without glands removed</i>	R	R	R	R	R

Conclusions

Experiment 1

The pair of poisonous glands on *Rana chalconota* tadpoles at intermediate developmental stages (31-41) reduced their palatability, thus, protecting them from G1-G5. However, this pair of poisonous glands only has limited defence as D1 and D2 consumed them. Therefore, the pair of glands serves only limited protection.

Experiment 2

The pair of poisonous glands on *Rana chalconota* at the post-metamorphosing stage (emergent) failed to protect them from consumption by G1-G5, D1 and D2. When dissection of the emergent was done to observe the pair of glands, it was found that this was disintegrated. Thus, chemical defence is reduced.

Experiment 3

The results obtained from this experiment confirmed the hypothesis that the pair of poisonous glands on *Rana chalconota* tadpoles acts as an anti-predator defence towards *Channa gachua*.

Further Studies (*In the process*)

1. Ways *Rana chalconota* emergents protect themselves.
2. Other predators of *Rana chalconota* tadpoles which are not shunned off by the pair of poisonous glands.
3. Will predators die upon consumption of poisonous glands?
4. Toxic chemicals present inside the poisonous glands?
5. Will pair of glands disappear as *Rana chalconota* tadpoles grow?

評 語

This Project is to study the possible “defense” mechanism of R. Chalconota Tadpole. The idea is quite novel and the experiment is well executed. Although it is a “simple” experiment, the data clearly indicated that the ventral glands does provide some sort of “protection”. This study thus recieves a second place award.