

Learning of a trial and error escape routine in an Arizona Mountain Kingsnake (*Lampropeltis p. pyromelana*)

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A group of five adult Arizona Mountain Kingsnakes comprising one large male, one young adult male, and three females were maintained in a large vivarium at my Manx home. On a visit of several weeks duration to Scotland they were brought and housed in a 3-foot (90cm) glass tank with a standard vivarium lid, the central portion of which was a horizontal glass panel. The vivarium was accessed by sliding out the glass panel.

About a week after housing them in Scotland I noticed one morning that the vivarium lid was partially open and that the snakes had all escaped. I thought perhaps I had not closed the lid properly after feeding them the previous day. I rounded up the snakes, returned them to the vivarium and slid the lid home carefully. The next morning the lid was again open and all the snakes were again absent. They were again collected and returned to the vivarium.

The following evening I entered the room before dusk (when the snakes become active) and sat quietly where I could observe the vivarium largely unseen. The large male emerged from cover as dusk fell, climbed up onto the glass ledge near the top of the tank immediately below the vivarium lid, and by a combination of pressing its body against the glass and making sideways movements of its body all in one direction, slid the glass lid back. It then moved out of the vivarium followed shortly thereafter by the other four kingsnakes.

The snakes were again returned to the vivarium and the lid closed. I watched again the following evening when the large male again slid the lid back and all five snakes climbed out.

Prior to being brought to Scotland these snakes had no previous experience of a sliding vivarium lid. The fact that one of them (assumed to be the

large male on all four occasions) managed to escape by sliding the glass of the vivarium lid is unremarkable. What is noteworthy is that having once managed to slide the lid back and escape it was able to repeat the performance at will (first on the following evening, and then on each of the next two evenings while under observation).

On evenings three and four whilst under observation the snake opened the lid quickly. It was obvious from watching it that the snake was carrying out a precise set of movements which resulted in a rapid escape, not effecting escape by trial and error as must have happened on the night of the first escape.

Hence the components of what began as a trial and error escape routine were learned as a result of the single 'trial' on the first escape night, and used successfully to effect escape on each of the three following nights.

This behaviour has interesting parallels with rapid learning – single instance learning – in a number of naive, juvenile, wild *Crocodylus porosus* (Bustard, 1968). There are also parallels with apparent learning of a complicated task – again a routine to escape from confinement – by a *Testudo hermanni* (Bustard, 2001).

The tortoise escape routine is seen as a far more difficult task for a tortoise on morphological grounds than the method employed by the kingsnake to make its escape. The interesting parallel, however, is that both successful routines appear to have been learned from the one successful escape and then been used to effect further successful escapes thereafter. These third and fourth subsequent escapes in the case of the kingsnake were observed and were speedy.

It would have been interesting to remove the large male and see how long it was before further

escapes occurred by trial and error and to test whether these were also rapidly learned.

It is not suggested that another member of the group would have been able to observe what the larger male did and copy it, but that they would have had to learn the escape routine by trial and error.

Clearly the data reported here offer great scope for follow-up experiments.

REFERENCES

- Bustard, H. R. (1968). Rapid learning in wild crocodiles (*Crocodylus porosus*). *Herpetologica* 24, 173-175.
- Bustard, R. (2001). Apparent learning of a complicated task by an adult Hermann's Tortoise (*Testudo hermanni boettgeri*). *Herpetol. Bull.* 77, 23-24.