

Intellagama lesueurii Eastern water dragon: Cannibalism.

CELINE H. FRÈRE*, DANIEL R. NUGENT, BETHAN LITTLEFORD-COLQUHOUN
& KASHA STRICKLAND

Faculty of Science, Health, Engineering and Education, University of the Sunshine Coast,
Maroochydore DC, Queensland, Australia 4558.

*Corresponding author email: cfrere@usc.edu.au

The presence of cannibalism across the animal kingdom is well known (e.g. Polis 1981) and may evolve under intense competition for food (e.g. Ribeiro et al., 2015) crowding of conspecifics (e.g. Cooper et al., 2015) and increased predation risk (Huang, 2008). In recent years there has been increased documentation of cannibalism in lizards which includes full (e.g. *Podarcis siculu*; Capula & Aloise 2011) and partial (e.g. tails) cannibalism (e.g. *Podarcis gaigeae*; Cooper et al., 2015), as well as siblicide (e.g. *Sceloporus undulatus*; Robbins et al., 2013).

Here we report the first evidence of cannibalism in the eastern water dragon (*Intellagama [Physignathus] lesueurii*) within an urban city park, Roma Street Parkland (RSP), located in the central business' district of Brisbane, Australia (27°27.046'S, 153°1.011'E). Previous observations on this species, for example at the Australian Botanical Gardens in Canberra ACT (Meek et al., 2001) found no evidence of cannibalistic behaviour in *I. lesueurii* during a 2 month study period (Meek & Avery, 2008). This was despite a high density of *I. lesueurii* that included the close proximity of all age classes (Meek et al. 2001). The RSP population of *I. lesueurii* have similar population characteristics to the Australian Botanical Gardens population, in that they occur in a human-made curated landscape at high density. The RSP population density is unusual when compared with non-urban populations, with more than 650 individuals recorded to date and a mark-recapture population estimate of 311 animals (Gardiner et al. 2014). The social and mating behaviour of *I. lesueurii* has been studied in populations living in high densities (Baird et al. 2012, Strickland et al. 2014, Frère et al. 2015), but this is the first recording of cannibalistic behaviour in *I. lesueurii*.

The observations were made during a longitudinal behavioural and genetic study of the *I. lesueurii* population at RSP, which commenced in 2010. During the 5 year study period several cannibalistic events, which resulted in the ingestion of hatchlings were made. One of these was photographed (Fig. 1) at 4 pm on the 18th December 2014. The image and coordinates of the encounter were recorded using a Canon EOS 60D digital SLR Camera equipped with a EF 75-300mm f4-5.6 lens and a GARMIN eTrex10 handheld global positioning system respectively. The lizard (Fig. 1) was identified as a sub-adult male carrying a conspecific hatchling in its mouth through a section of the rainforest themed gardens (27° 27.740'S, 153° 1.027'E). It was assumed the dragon had cannibalised the hatchling. Unfortunately, ingestion of the hatchling was not observed as the lizard retreated with prey into an inaccessible area of the park.



Figure 1. Young adult *I. lesueurii* during the cannibalism act. Photograph taken by Daniel R. Nugent.

City-park populations of eastern water dragons in South East Queensland resemble in many ways island like communities which experience lower predation risk and relaxed interspecific competition (Losos and Ricklefs 2009). Unlike island populations, however, *I. lesueurii* may experience reduced intraspecific competition given the abundance of food these city parks offer (e.g. substantial food subsidies from public feeding and worm exposure by mechanical disturbance of flower beds by gardeners). However, it is possible that while food may be plentiful, the increase in population density would retain a high level of food competition, which may include cannibalism.

ACKNOWLEDGMENTS

We thank the staff at the Roma Street Parkland along with Brisbane City Council for supporting this research. We also thank Dr Sinta Widarsito for the development and maintenance of the genetic and behavioural database.

REFERENCES

- Baird, T. A., Baird, T.D & Shine, R. (2012). Aggressive transition between alternative male social tactics in a long-lived Australian dragon (*Physignathus lesueurii*) living at high density. *PLoS One* 7:e41819.
- Capula, M., & Aloise, G. (2011). Extreme feeding behaviours in the Italian wall lizard, *Podarcis siculu*. *Acta Herpetologica* 6:11-14.

- Cooper, W. E., Dimopoulos, I. & Pafilis, P. (2015). Sex, age, and population density affect aggressive behaviours in island lizards promoting cannibalism. *Ethology* 121:260-269.
- Frère, C. H., Chandrasoma, D. & Whiting M. J. (2015). Polyandry in dragon lizards: inbred paternal genotypes sire fewer offspring. *Ecology & Evolution* 5:1686-1692.
- Gardiner, R. Z., Doran, E., Strickland, K., Carpenter-Bundhoo, L. & Frère, C. 2014. A face in the crowd: a non-invasive and cost effective photo-identification methodology to understand the fine scale movement of Eastern water dragons. *PLoS One* B:e96992.
- Huang, W.S. (2008). Predation risk of whole-clutch filial cannibalism in a tropical skink with maternal care. *Behavioural Ecology* 19:1069-1074.
- Losos, J. B & Ricklefs, R.E. (2009). Adaptation and diversification on islands. *Nature* 457:830-836.
- Meek, R., Avery, R. & Weir, E. (2001). *Physignathus lesueurii* (Australian Water Dragon) predation on a skink (*Lampropholis delicata*). *Herpetological Bulletin* 76:31-32.
- Meek, R. & Avery, R. (2008). Basking in the Australian water dragon *Physignathus lesueurii*; why do alpha males not respond to operative temperatures in the same way as adults and sub-adults? *Amphibia-Reptilia* 29: 257 - 262.
- Polis, G. A. (1981). The evolution and dynamics of intraspecific predation. *Annual Review of Ecology and Systematics* 12: 225-251.
- Ribeiro, F. F., Forsythe, S. & Qin, J.G. (2015). Dynamics of intracohort cannibalism and size heterogeneity in juvenile barramundi (*Lates calcarifer*) at different stocking densities and feeding frequencies. *Aquaculture* 444: 55-61.
- Robbins, T. R., Schrey, A., McGinley, S. & Jacobs, A. (2013). On the incidences of cannibalism in the lizard genus *Sceloporus*: updates, hypotheses, and the first case of siblicide. *Herpetology Notes* 6: 523-528.
- Strickland, K., Gardiner, R., Schultz, A. & Frère, C. (2014). The social life of eastern water dragons: sex differences, spatial overlap and genetic relatedness. *Animal Behaviour* 97: 53-61.

Accepted: 29 July 2015