Australasian Journal of Herpetology 63:3-16.
Published 16 June 2023.

ISSN 1836-5698 (Print)
ISSN 1836-5779 (Online)

Large breeding aggregations of the small frogs *Geocrinina otwaysensis* (Hoser, 2020) and *Geocrinia victoriana* (Boulenger, 1888).

LSIDURN:LSID:ZOOBANK.ORG:PUB:3B45E895-133F-44E3-90CB-61536B197ABF

RAYMOND T. HOSER
LSID urn:lsid:zoobank.org:author:F9D74EB5-CFB5-49A0-8C7C-9F993B8504AE

488 Park Road, Park Orchards, Victoria, 3134, Australia.
***Phone*: +61 3 9812 3322 *Fax*: 9812 3355 *E-mail*: snakeman (at) snakeman.com.au**
Received 10 April 2023, Accepted 10 June 2023, Published 16 June 2023.

ABSTRACT

Large breeding aggregations of small frogs of both *Geocrinina otwaysensis* (Hoser, 2020) and *Geocrinia victoriana* (Boulenger, 1888) were observed in Victoria in March 2023.

These observations are detailed herein.

This paper also details further differences between the two taxa including by way of comparative photos of each species that were not published with the original description of *G. otwaysensis* in Hoser (2020).

Keywords: Biology; Amphibia; ecology; frog; Australia; Victoria; Mount Sabine; Park Orchards; Melbourne; *Geocrinia*; *victoriana*; *otwaysensis.*

INTRODUCTION

The frogs of the genus *Geocrinia* Blake, 1973 (as defined by Hoser 2020) are of considerable scientific interest because they lay eggs on land, with tadpoles that live in water.

It is generally believed that the eggs are inundated with rains at which point the free living tadpoles are washed into the nearby (adjacent) pond, dam or waterhole. Alternatively, the oviposition sites become inundated and the tadpoles simply live in the same place.

The species *G. otwaysensis* (Hoser, 2020) originally described as a subspecies, but effectively elevated to species status by Hoser (2022) is similar to, but readily distinguishable from *Geocrinia victoriana.*

Inadvertently omitted from the original description was the fact that *Geocrinia otwaysensis* is most readily separated from its nearest related species *G. victoriana* by colouration in the groin, or lack of it in terms of distinctive black bordering around the red, yellow or orange marbling seen in the other species, *G. victoriana* as well as the also related *G. laevis* (Günther, 1864).

It is best to see the groin colouration in these species in the comparative images posted in this paper or online at:

http://www.snakeman.com.au/Recently-discovered-spectacular-species-of-frog-found-in-massive-numbers-at-Mount-Sabine.htm

Geocrinia otwaysensis is also separated from both other nearest related species by call.

In the pulse mode, *Geocrinia otwaysensis* usually calls at 5-6 pulses per 2 seconds, versus 8-9 in *Geocrinia victoriana*.

Examples of both species calls can also be downloaded from:

http://www.snakeman.com.au/Recently-discovered-spectacular-species-of-frog-found-in-massive-numbers-at-Mount-Sabine.htm

G. otwaysensis has tadpoles of different appearance to those of *G. victoriana* as well.

Suffice to say that the two species are in fact consistently quite different!

This is even before one looks at general colouration, although this is a variable trait and even within a single population and so for that reason is hard to quantify, either by age of gender.

GEOCRINIA OTWAYSENSIS AT MOUNT SABINE, VICTORIA

In the early hours of 18 March 2023, I drove off the Forrest to Apollo Bay Road to sleep for a few hours at Mount Sabine, before continuing to the Apollo Bay Agricultural Show, where I was scheduled to do a live reptiles display.

Where I pulled over to sleep at about 2 AM, I heard what were obviously *Geocrinia* calls but was too tired to bother investigating.

In the morning I saw a nearby small pond (probably man made) in an area of cleared forest and decided to investigate it. There were a small number of *Geocrinia* calling.

On the edge of the pond was a single log and this was lifted. Underneath was a total of 9 adult *G. otwaysensis* that were visible, as well as six already laid egg masses. Because there was smaller bits of twigs and grass under the log and to the sides, it is quite likely more frogs may have also been adjacent and not seen.

Of the nine frogs, 8 were males and only one was a female.

After some photos were taken, I left this area.

About 500 metres to the south-west was a small shallow dam, surrounded by dense matted grass, the water being about 5 metres square and the noise generated by calling *G. otwaysensis* was deafening and indicative of many dozens of frogs hiding amongst the grass at the bottom of the depression.

A second depression of similar size had a lesser number of calling *G. otwaysensis.*

It was assumed that the frogs were hiding amongst the grass at the bottom of the depression.

There had also been some rain the previous week, being the first

Swamp at Mount Sabine, Victoria, Australia showing log on far side. Underneath that were numerous *Geocrinia otwaysensis*. Below: A male *G. otwaysensis*. All photos by Raymond Hoser.

Geocrinia otwaysensis **(Hoser, 2020) males. From Mt. Sabine, Vic., Australia.**

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Geocrinia otwaysensis **(Hoser, 2020) both sexes. From Mt. Sabine, Vic., Australia.**

Top: Log where 9 *G. otwaysensis* were found. Bottom: Second site of massive calling aggregation.

Geocrinia otwaysensis **(Hoser, 2020) both sexes. From Mt. Sabine, Vic., Australia. Bottom Pic is with eggs.**

major autumn rains of the season, but not in large quantity.

Upon return to the pond with the log (referred to above) late the same day, I saw a male and female in amplexus among eggs and the other males seen in the morning still present.

These were of course under the log. In that situation is seemed that the males had occupied the underside of the log as a breeding site, being the only “hard cover” in the area and in preference to anywhere else around the pond.

Noting the number of males underneath the log and only one female (the same one on both occasions that day), it seemed that the males occupied the area more-or less continually, while the females would merely attend, mate and leave again.

***GEOCRINIA VICTORIANA* AT PARK ORCHARDS, VICTORIA.**

See photos on following pages.

Notable is that in the week preceding 18 March 2023, while there was rain in the Otway Ranges (including Mt. Sabine), this rain did not get to Melbourne, about 2 hours drive to the north-east.

However, there were small amounts of rain over the following fortnight.

On 27 March 2023 a drive around the suburb of Park Orchards, including the outer edges of the suburb, revealed a number of calling male *G. victoriana* at several locations around inside 100 Acres Reserve, including around most man-made dams and ponds in the reserve. Some individuals were also heard calling from ditches and gullies in other parts of the reserve indicating some mobility of specimens in this relatively small nature reserve.

No *G. victoriana* were heard calling from anywhere else in and around Park Orchards, even though sweeps were done of likely spots by day and night in the fortnight following 27 March 2023.

Significantly in every case, specimens were only calling from low-lying areas of dense matted grass that were obviously prone to inundation, or alternatively by dams and ponds with edges of matted grass.

Where a dam or swamp only had matted grass in one section, that was from where the frogs were calling. Other parts of the edge of the dam would have no calling frogs of this or any other kind at the time (although in passing I noted that in May 2023, three other species were found calling from the same ponds or swamps).

One of these sites where *G. victoriana* was calling on 27 March 2023, was a dam in the 100 acres reserve about 100 metres north of the corner of Arundel Road and Dalry Avenue. On the north-east corner of the dam was a slightly elevated area of tight matted grass from where the frogs were calling.

This grassed area was basically dry and about 3 cm above the level of the adjacent dam water surface.

An area of less than 1 metres square was cleared to reveal 12 *G. victoriana* indicating a sizeable breeding aggregation. All bar one were males.

They were photographed and the grass placed back as was.

Also relevant is that no laid eggs were found in the matted grass area, implying that these *G. victoriana* were breeding significantly later than their Otway Ranges counterparts.

Significantly a small shallow dam about 150 metres to the west of this dam, consisting mainly of matted grass had a massive number of calling males, but the nature of the vegetation did not lend itself to being able to locate any frogs. In terms of the site with the matted grass at the dam, where I had found the 12 *G. victoriana,* heavy rains resulted in the entire section being inundated and covered with about 10 cm of water three weeks later, which remained at roughly the same level of inundation into at least mid June 2023. This of course directly connected to the immediately adjacent dam, of which it now formed part.

Obviously the relevant *G. victoriana* caught on 27 March 2023 must have moved to another location/s, and no attempt was made to determine of this was in the same immediate area or elsewhere.

However the observation reported in Hoser (2023) implies that specimens move away from the swamps they breed at in the months outside the breeding season.

On 28 March 2023, I was called to catch a Copperhead snake at Toolangi (between Yarra Glen and Yea), in the evening.
One *G. victoriana* was heard calling from a depression at the rear of the property.

DISCUSSION

Observations at the above referred to locations indicated that both *G. otwaysensis* and *G. victoriana* called both by day and night, although this calling peaked in the early hours of the night.

Both *G. otwaysensis* and *G. victoriana* have similar breeding habits and preferences. Differences in observed timings of breeding seasons may well have more to do with rainfall events, rather than any other strict rules, but at this stage my view is largely conjecture.

When breeding, males of both species have a demonstrated preference for hiding beneath tightly matted grass that either sits in a depression prone to flooding, or similar on the edge of a dam or swamp.

That high densities of frogs can hide within relatively small areas indicates an abundance of these species not previously envisioned.

Had I not specifically looked for the frogs by moving the vegetation and looking closely when doing so (due to the small size of the froglets), none would have been seen or found from a casual viewing of the site. This is mentioned because it showed how easy it is for large numbers of small frogs to avoid detection by people not carefully looking for them.

The large populations observed in 2023 of both species indicates that they have either recovered from any Chytrid related population drops in recent decades or may otherwise have some kind of resistance to the pathogen.

In any event, noting that both aggregations observed were in areas heavily altered by human activity, it seems that neither species is rare or threatened, or likely to become so.

In fact, quite the contrary.

With the creation of man-made dams across the rural landscape, extant ranges and distributions of each species is likely to increase. In the case of the current area of absence of *Geocrinia* north of the Otway Ranges, that may one day come to be populated by one or other species.

REFERENCES CITED

Blake, A. J. D. 1973. Taxonomy and relationships of Myobatrachine frogs (Leptodactylidae): a numerical approach. *Australian Journal of Zoology* 21:119-149.

Boulenger, G. A. 1888. Descriptions of two new Australian frogs. *Annals and Magazine of Natural History*, Series 6, 2:142-143.

Hoser, R. T. 2020. 3 new tribes, 3 new subtribes, 5 new genera, 3 new subgenera, 39 new species and 11 new subspecies of mainly small ground-dwelling frogs from Australia. *Australasian Journal of Herpetology* 50-51:1-128.

Hoser, R. T. 2022. Hiding in plain sight. A previously unrecognized biogeographical barrier in Australia formed by an event of biblical proportions. Five new species of skink lizard from south-west Victoria, three more closely related species from New South Wales and another from South Australia. *Australasian Journal of Herpetology* 56:3-21.

Hoser, R. T. 2023. Litter, plastic sheets and rubbish. It’s not necessarily an eco-disaster for all species! *Australasian Journal of Herpetology* 61:3-4.

Ride, W. D. L. (ed.) *et al*. (on behalf of the International Commission on Zoological Nomenclature) 1999. *International code of Zoological Nomenclature*. The Natural History Museum - Cromwell Road, London SW7 5BD, UK.

CONFLICTS OF INTEREST - None

Low-lying grassy areas subject of seasonal inundantion at 100 Acres Reserve, Park Orchards, Victoria, which had large numbers of calling *G. victoriana*. The swamp in the lower image had hundreds of calling males on 27 March 2023.

Swamp / dam at 100 Acres Reserve, Park Orchards, where 12 *G. victoriana* were found under less than 1 square metre of matted grass (bottom left), like the one depicted on the bottom right.

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***Geocrinia victoriana*, all from Park Orchards, Victoria. Most easily separated from *G. otwaysensis* by the obvious presence of bright red, orange or yellow marbling, bordered by black on the hidden inner surfaces of the hind limbs. This trait is absent in *G. otwaysensis* (in contrast to both *G. victoriana* and the similar *G. laevis*).**

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All photographs in this paper, by Raymond Hoser, taken *in situ.*

Inundated dam/swamp/grass at 100 Acres Park Orchards.
Photo taken on 10 June 2023

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***Geocrinia victoriana* from 100 Acres in Park Orchards, Victoria, Australia.**

Cite this paper as:
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