

A redefinition of the Australian frog genus *Platyplectrum* Günther, 1863, dividing the genus into two and including the description of two new species from mid Western Australia and far North Queensland.

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ABSTRACT

The divergent genus *Platyplectrum* Günther, 1863 as currently understood consists of two morphologically similar species according to Cogger (2014), this representing the consensus view in Australian herpetology.

These are *Platyplectrum ornatum* (Gray, 1842) and *P. spenceri* (Parker, 1940).

Notwithstanding this, a dissenting view as put by Wells and Wellington (1985) regards the species *P. ornatum* as consisting of at least four species, and resurrected three available names for each of the other alleged variants, scattered across east and northern Australia, although they provided no evidence to support their contention. Hence their view has been effectively ignored by others since.

My own inspections of the regional forms of *P. ornatum* including many thousands of individual specimens, spanning more than four decades of intensive fieldwork across Australia, does suggest more than one species is currently lumped within this group, with a proper diagnosis for three clearly different species provided herein.

These are the nominate form from the Northern Territory, found throughout the dry tropics, *P. marmoratum* Günther, 1863 from the south-east and east of Australia and a third form for which no name is available, that is found in the wet tropics region in a coastal band running north from about Townsville, Queensland.

That species is formally named *P. shaneblacki* sp. nov. according to the provisions of the *International Code of Zoological Nomenclature* current, in force edition (Ride et al. 1999).

Until now, no one has suggested that *P. spenceri* (Parker, 1940) consists of more than a single species. However inspection of many hundreds of specimens in central and western Australia has led me to conclude that there are two very different forms, apparently geographically separated by the Gibson Desert in the east of Western Australia, which should be classed as separate species, as outlined in this paper.

In fact inspection of specimens within each group, makes the conclusion they are separate species based on their morphology, unescapable.

The unnamed form from Western Australia, is formally named according to the provisions of the *International Code of Zoological Nomenclature*.

Furthermore while both the *P. ornatum* and *P. spenceri* species complexes are similar morphologically and clearly have phylogenetic affinities, there are significant morphological differences which imply some distance in this relationship and sufficient to warrant the *P. spenceri* group of species being placed in its own genus.

As no name is available, they are herein placed in the genus *Rotundishius* gen. nov. according to the provisions of the *International Code of Zoological Nomenclature*,

Keywords: Taxonomy; frogs; Anura; genus *Platyplectrum*; species; *ornatum*; *spenceri*; *marmoratum*; *occidentale*; *frauenfeldi*; Northern Territory; Western Australia; Australia; new genus; *Rotundishius*; new species; *shaneblacki*; *hayi*.

INTRODUCTION

The divergent frog genus *Platyplectrum* Günther, 1863 as currently understood consists of two morphologically similar species according to Cogger (2014), this representing the consensus view in Australian herpetology.

These are *Platyplectrum ornatum* (Gray, 1842) and *P. spenceri* (Parker, 1940).

Notwithstanding this, a dissenting view as put by Wells and Wellington (1985) regards the species *P. ornatum* as consisting of at least four species, and resurrected three available names for each of the other alleged variants, scattered across east and northern Australia.

Because they provided no evidence to support their contention, their view has been effectively ignored by others since.

My own inspections of the regional forms of *P. ornatum* including many thousands of individual specimens, spanning more than four decades of intensive fieldwork across Australia, does suggest more than one species is currently lumped within this group.

Hence I herein provide a proper diagnosis for three clearly different species as part of the description of the new species *P. shaneblacki* sp. nov..

These are:

1/ The nominate form from the Northern Territory, found throughout the dry tropics:

2/ *P. marmoratum* Günther, 1863 from the south-east and east of Australia, and;

3/ A third form for which no name is available, that is found in the wet tropics region in a coastal band running north from about Townsville, Queensland.

That species is formally named *P. shaneblacki* sp. nov. according to the provisions of the *International Code of Zoological Nomenclature* current, in force edition (Ride et al. 1999).

I had gathered considerable evidence to split the species as currently recognized, using well-defined morphological characteristics, but had the relevant research files illegally stolen in an armed raid on my facility on 17 August 2011 (see Court of Appeal Victoria, 2014 and VCAT 2015 for a summary of the relevant events).

In the absence of this material I delayed splitting the species *P. ornatum* as currently recognized, but note that such a split is inevitable and that as of early 2016, the relevant materials are not likely to ever be returned.

Therefore and with minimal data available, I do herein define three

clearly obvious species within the *P. ornatum* group as a highly conservative first step to properly dealing with the complex. It should be noted that this appears to be the minimum number of species within the complex and there may well be others.

With the name *P. marmoratum* (Günther, 1863) (type locality "Clarence River, NSW"), originally named as *Discoglossus ornatum* Gray, 1842 available for the south-east and East Australian populations, the name *Opisthodon frauenfeldi* Steindachner, 1867 (type locality Rockhampton, Qld) is herein ignored and treated as a junior synonym of the former.

Inspection of numerous specimens from both type localities, finds them effectively indistinguishable and therefore of the same species.

This conclusion is made in the absence of any evidence to the contrary and in spite of the distance between the locations. I note also that distribution appears to be continuous between both locations and in the absence of any obvious physical barriers to their dispersal.

There are no available types of *P. occidentale* Cope, 1866, and specimens from the Kimberley region do appear to be morphologically distinct from the top end of the NT animals.

However the variability of specimens in both areas and overlap of forms, has led me to provisionally treat Kimberley animals as being of the same species as the tropical NT ones.

Specimens from the general area of Magnetic Island (Townsville), Queensland, north and through the coastal wet tropics, at least as far north as Iron Range, in far north Queensland, have significant and consistent morphological differences from those found south and west of this region.

There is no clinal area known between the populations and the differences are such that they warrant them being treated as a separate species. This is particularly as there is little if any significant change in morphology in specimens from the central coast of New South Wales (Sydney) through to the Rockhampton area of Queensland (which is 1406 km by road) and then an apparently sudden change when one reaches the coastal wet zone of far north Queensland (using Townsville as a start point), just 718 km by road apart.

Thus, as already mentioned, these animals are therefore formally named *P. shaneblacki* sp. nov..

Hence, while this paper adopts the view that *P. ornatum* as currently recognized consists of at least four different species, this division is not along the same lines suggested by Wells and Wellington in 1985.

Until now, no one has suggested that *P. spenceri* (Parker, 1940) consists of more than a single species. However inspection of many hundreds of specimens in central and western Australia over a 25 year period had led me to conclude that there were two very different forms as far back as in 1983.

These are apparently geographically separated by the Gibson Desert and hence should be classed as separate species, as outlined in this paper.

In fact inspection of specimens within each group, makes the conclusion they are separate species unavoidable and this is easily duplicatable by any interested party.

The unnamed form from Western Australia, is formally named according to the provisions of the *International Code of Zoological Nomenclature*, current, in force edition (Ride et al. 1999).

Furthermore while both the *P. ornatum* and *P. spenceri* species complexes are similar morphologically and clearly have phylogenetic affinities, there are significant morphological differences, many previously documented the literature, which imply some distance in this relationship and sufficient to warrant the *P. spenceri* group of species being placed in its own genus.

P. ornatum has little if any significant webbing on the hind feet. This contrasts with the *P. spenceri* species complex, which has significant webbing on the hind feet (more than half, versus less than a quarter). Furthermore there is no proximal tubercle on the fourth toe in the *P. spenceri* species complex, whereas one is present in the *P. ornatum* species group.

The *P. spenceri* species complex also has a slightly more pointed snout than seen in *P. ornatum*.

Furthermore Pyron and Weins (2011), in their molecular phylogeny, showed a significant divergence between the species *P. ornatum*

and *P. spenceri* and enough to warrant a split of the genus. Their published phylogeny in fact found *P. ornatum* to be more closely related to the very dissimilar (in form and habit) genus *Lechriodus* Boulenger, 1882, than to *P. spenceri*, although based on forms and habits of the relevant taxa, one may infer that something may be amiss with that particular result and that more sampling of relevant species should take place.

As no genus name is available for the *P. spenceri* group of species is available, they are herein placed in the genus *Rotundishius* gen. nov. according to the provisions of the *International Code of Zoological Nomenclature*.

The genus *Rotundishius* gen. nov. is described below, followed by the formal description of the new species *hayi*, which is also placed in this new genus.

The description of *P. shaneblacki* sp. nov. follows these descriptions.

ROTUNDISHIUS GEN. NOV.

Type species: *Rotundishius hayi* sp. nov. (this paper / described below).

Diagnosis: Frogs in the genus *Platyplectrum* Günther, 1863 have little if any significant webbing on the hind feet. This contrasts with the *P. spenceri* species complex, herein placed in the genus *Rotundishius* gen. nov., which has significant webbing on the hind feet (half or significantly more than half (depending on the species), versus less than a quarter). Furthermore there is no proximal tubercle on the fourth toe in the *P. spenceri* species complex (*Rotundishius* gen. nov.), whereas one is present in the *P. ornatum* species group (*Platyplectrum* Günther, 1863).

Secondary sexual characteristics of myobatrachids include the nuptial excrescences on the first three fingers in the males of some species and flanges on the first and/or second fingers in females associated with the production of foam nests during egg deposition. Both nuptial excrescences and flanges are subject to seasonal or ontogenetic variation.

Nuptial excrescences are usually glandular and located at the base of the first finger.

Under the Scanning Electron Microscope, the nuptial excrescences appear as radial processes in (*Rotundishius spenceri*) (*sensu lato*) or alary processes in (*Platyplectrum ornatum*) (*sensu lato*). The nuptial excrescences of *P. ornatum* are found on the first three fingers (illustrated by Tyler and Davies 1986) whilst in *R. spenceri* there are several pads on the first two fingers (illustrated by Tyler, Smith and Johnstone 1984).

A diagnosis of *Platyplectrum* Günther, 1863, taken as including *Rotundishius* gen. nov. as defined above is seen in Cogger (2014).

It is effectively paraphrased here as follows:

Both species of *Rotundishius* gen. nov. and *Platyplectrum* are characterised and separated from all other Australian species by the following suite of characters. They are well-built ground-dwelling and frogs of rotund build and of burrowing habits. The limbs are short and powerful and the hindlimbs lack obvious tibial glands. Maxillary teeth are present. There is a frontoparietal foramen in adults.

Vomerine teeth are prominent, behind the choanae and extending laterally beyond their inner borders. The tongue is large and oval-shaped. The pupil is slightly elliptical with a horizontal axis. Tympanum is either indistinct or hidden. Phalanges simple, tips of digits without dilations. Second finger is not much shorter than the first. Breeding females have one or more fingers flanged to be used in "puddling" the egg mass into a floating frothy mass.

Distribution: Arid parts of central and Western Australia, south of the tropics and north of the Lake Eyre region, not including north-west New South Wales.

Etymology: Named in reflection of the shape of the relevant species, noting the name *Rotundishius* is "made up" and latinized in a form that makes it unique and therefore compliant with the rules of homonymy and priority. The name and spelling are intentional. The name should not be altered unless mandatory according to the rules of the *International Code of Zoological Nomenclature*.

Content: *Rotundishius hayi* sp. nov. (type species); *R. spenceri* (Parker, 1940).

ROTUNDISHIUS HAYI SP. NOV.

Holotype: A preserved specimen at the Western Australian Museum, Perth, Western Australia, specimen number: R97406 from

8 km west of Samphire Flats, Western Australia.

This Museum is a government owned facility that allows public access to its specimens.

Paratype: A preserved specimen at the Western Australian Museum, specimen number: R10359 from Manilya, Western Australia.

Diagnosis: *Rotundishius hayi* sp. nov. is readily separated from *R. spenceri* (Parker, 1940), by its colouration. In *R. spenceri* the dorsal colouration is one of a light beige colouration overwritten with a pattern of irregular dark blotches.

By contrast in *R. hayi* sp. nov. the borders of the dark blotches are not well defined and hence the overall colouration is of a marbled appearance. In *R. hayi* sp. nov. the sides are not marked with dark spots or blotches, in contrast to *R. spenceri*, or if present they are very faded.

In *R. spenceri* the toes of the hind feet are slightly more than half webbed. By contrast, in *R. hayi* sp. nov. are 2/3 to 3/4 webbed.

The forelimbs of *R. spenceri* are either banded or marked with distinctive large dark blotches. By contrast in *R. hayi* sp. nov., the forelimbs have no such markings and are either unmarked, speckled or with small dark blotches on the lower part of the limbs only.

The iris of *R. spenceri* is characterised as being beige to orange-brown above and brownish to grey below. By contrast the iris of *R. hayi* sp. nov. is characterised as being red to orange above and whitish pink or salmon below.

Both species of *Rotundishius* gen. nov. and *Platyplectrum* are characterised and separated from all other Australian species by the following suite of characters. They are well-built ground-dwelling and frogs of rotund build and of burrowing habits. The limbs are short and powerful and the hindlimbs lack obvious tibial glands. Maxillary teeth are present. There is a frontoparietal foramen in adults.

Vomerine teeth are prominent, behind the choanae and extending laterally beyond their inner borders. The tongue is large and oval-shaped. The pupil is slightly elliptical with a horizontal axis.

Tympanum is either indistinct or hidden. Phalanges simple, tips of digits without dilations. Second finger is not much shorter than the first. Breeding females have one or more fingers flanged to be used in "puddling" the egg mass into a floating frothy mass.

Distribution: Arid parts of Western Australia, west of the Gibson Desert.

Etymology: Named in honour of Chris Hay of Queensland, Australia, currently working as a wildlife demonstrator on the Gold Coast, formerly of Gisborne, Victoria for various services to herpetology over a number of decades.

PLATYPLECTRUM SHANEBLACKI SP. NOV.

Holotype: A preserved specimen, number R.83582, at the Australian Museum in Sydney, NSW, Australia, collected at 3 miles south of Port Douglas, Queensland, Australia, Latitude -16.516, Longitude 145.450. This Museum is a government owned facility that allows public access to its specimens.

Paratype: Preserved specimens, numbers R.83581, R.83583, R.83584 and R.148981 at the Australian Museum in Sydney, NSW, Australia, collected at 3 miles south of Port Douglas, Queensland, Australia, Latitude -16.516, Longitude 145.450.

Diagnosis: Many *P. shaneblacki* sp. nov. including all or most males, are readily separated from all other *Platyplectrum* species by a thick (wide) light brown to yellowish white mid dorsal stripe running from the snout to the very rear of the body.

Where such a stripe occurs in other species (usually *P. ornatum* sensu stricto), the stripe is either narrow or broken by dark pigment within the stripe, either as another stripe or patches, and furthermore does not noticeably expand in the region of the eyes as seen in *P. shaneblacki* sp. nov. In the case of *P. ornatum* from northern Western Australia the stripe also significantly narrows near the snout, whereas in *P. shaneblacki* sp. nov. the stripe either does not narrow anteriorly, or at best, very slightly.

P. shaneblacki sp. nov. and *P. marmoratum* Günther, 1863 are separated from *P. ornatum* by the patterning on the snout. In both these species the darker margins of the broad lighter stripe running from the snout backwards are well defined with a blackish border. In *P. ornatum* the same boundary is ill defined.

P. marmoratum Günther, 1863 is separated from *P. shaneblacki* sp.

nov. and *P. ornatum* by dorsal colouration. *P. marmoratum* has well defined smallish to medium dark blackish blotches on the flanks and lower flanks. These are either absent or indistinct in *P. shaneblacki* sp. nov. and *P. ornatum*.

P. ornatum has a small number of small dark blotches on the upper surface. Commonly specimens are almost uniformly red-brown above. In *P. shaneblacki* sp. nov. the limited amount of dorsal dark spotting or blotches tends towards being longitudinal stripes. By contrast the dorsal surface of *P. marmoratum* is characterised with a considerable amount of spotting and non-straight striping and further distinguished by a significant amount of well-defined darker spots and striping within the lighter stripes and patches, not seen in *P. shaneblacki* sp. nov. and rarely seen in *P. ornatum*.

Distribution: *P. shaneblacki* sp. nov. is known to occur from Magnetic Island in the south, which is immediately near Townsville, Queensland, north along the coast as far as Iron Range on Cape York.

P. ornatum is found in the dry tropics in the NT and WA, with eastern limit of the range unknown.

P. marmoratum is found from the central coast of New South Wales, north past Rockhampton in Queensland, to near Townsville, North Queensland and also in dry country to the west of this, including much of western Queensland and a significant area in north-east New South Wales, believed to include an area generally east and south-east of Mount Isa, Queensland.

Etymology: Named in honour of Shane Black, a herpetologist and snake breeder formerly of New South Wales and now of north Queensland in recognition of his work with numerous reptiles (mainly venomous snakes) and who has also worked with this particular species of frog.

The name "shaneblacki" was chosen in preference to the word "blacki" in this instance so to identify Shane Black in particular, noting how common the surname "Black" is within Australia.

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- CONFLICT OF INTEREST**
- The author has no known relevant conflicts of interest.