

# A seven way division of the Amphibolurinae (Squamata: Sauria: Agamidae).

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## ABSTRACT

The taxonomy and nomenclature of the Australasian Amphibolurinae Wagler, 1830 is revised.

While the taxonomy and nomenclature of the group at the genus level is generally found to properly reflect both morphological and phylogenetic groups, a number of larger genera are split to give a more consistent taxonomy. Largely as a result of the work of Wells and Wellington 1985, as well as to a lesser extent other authors, there are available names for all generic groupings with the exception of the placement of just one west Australian species and an eastern Australian species.

A new genus is erected to accommodate the divergent species originally described as *Diporiphora superba* Storr, 1974.

Similarly a new genus is erected to accommodate the divergent species originally described as *Lophyrus spinipes* Duméril and Bibron, 1851.

The subfamily is also formally divided into seven newly named and defined tribes for the first time according to the Zoological Code.

**Keywords:** Taxonomy; nomenclature; Agamids; Wells; Wellington; new genera; *Jackyhosersaur*; *Adelynhosersaur*; new tribes; Amphibolurini; Ctenophorini; Physignathini; Adelynhosersaurini; Hypsilurini; Molochini; Intelligamini.

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## INTRODUCTION

The Australasian Amphibolurinae Wagler, 1830 has been well-studied by herpetologists in Australia and elsewhere in the period leading to 2013.

The detailed body of knowledge of the group has arisen due to a combination of circumstances relatively unusual to Australia, which is where all but a few members of the subfamily group are distributed.

The country has a stable political and economic situation and although sparsely populated, is served by efficient transportation by road network to all parts, including the most remote regions.

Extremely well-funded government paid herpetologists and relatively wealthy (by world standards) private herpetologists have also been able to travel to the most remote parts of the continent in search of specimens, meaning that most species likely to be found and scientifically described have been.

Exceptional to this of course are wide-ranging species complexes, which while well-known and collected may consist of more than one species being grouped under a single species label.

In the period post 2000 a number of such species groups have been the subject of intense study, the result being new species being named.

A review was conducted of all described species of Australasian Amphibolurinae with a view to reviewing placement of species

within appropriate genera. In terms of the materials and methods, this was based on my own field and lab work involving most species as well as a review of the relevant literature spanning the last 200 years.

The taxonomy and nomenclature that follows is a synthesis of the best fit model in terms of recognizing both morphological and molecular differences between groups. In detail it does not reflect any individual previously published work, although broadly it makes little significant changes to the well-known and established taxonomy and nomenclature currently used by publishing authors.

However what the following taxonomy does do for the first time, is to without prejudice classify all the Australasian Amphibolurinae in a consistent manner so that genus-level groups are recognized consistently in terms of relative differences between species in each group.

To this end, I make mention of two publications by Wells and Wellington in 1983 and 1985, the latter clearly being the more important of the pair.

To their credit, these authors made a significant attempt to divide the Australian herpetofauna into appropriate genera. At the time of these publications, other herpetologists lampooned the pair for daring to split so many genera and even as of 2013, many names first proposed by the pair have been totally ignored by virtually all other herpetologists.

As I reviewed the taxonomy and divided the groups of species appropriately, relying on both morphology and phylogenies recently published (e.g. Pyron *et al.* 2013), I found that time after time, I had to assign names to well defined and as yet unrecognized genera. The Zoological Code (Ride *et al.* 1999) has well defined rules of homonymity and priority in order to maintain stability and in complying with these rules, I have found myself resurrecting names proposed by earlier authors. This includes a number of effectively unused Wells and Wellington names such as *Intellagama* Wells and Wellington, 1985, *Gowidon* Wells and Wellington, 1983 and *Wittenagama* Wells and Wellington, 1985, as well as names generally unused and proposed by others.

Following publication of this paper, there will be the inevitable claims by a mob of criminals and ratbags known as the Wüster gang. These should be ignored as they will invariably be a collection of lies and defamation (see Hoser 2012a, 2012b and 2013 for the detail).

A common complaint in the past has been that I uncritically accept the taxonomy of Wells and Wellington. This has never been the case. In fact in the first paper in which I described species, namely Hoser (1998), I used a significantly different taxonomy to that proposed by Wells and Wellington. In this paper, I also use a different taxonomy to that of Wells and Wellington (1985), that being their most recent relevant publication, including non-recognition of some genera proposed by the pair, most notably including those genera they erected as a result of division of the genus *Ctenophorus* Fitzinger, 1843.

I do note however that an argument can be raised to divide *Ctenophorus* Fitzinger, 1843 into about 8 subgenera, to better define relevant species groups, in which case, if this were done, then the Wells and Wellington names must be used where appropriate.

However and I note herein explicitly, where I recognize genera that they (Wells and Wellington) were the first to formally name, I am bound by the Zoological Rules (Ride *et al.* 1999) and therefore do use their names. This is as I do for all other relevant authors, be they Wagler, Storr or whomever.

Following herein, I first present a formal description of a new genus *Jackyhosersaur gen. nov.*, to accommodate the divergent species originally described as *Diporiphora superba* Storr, 1974, from the Kimberley region of Western Australia.

Similarly a new genus is erected to accommodate the divergent species originally described as *Lophyrus spinipes* Duméril and Bibron, 1851, currently most widely known in the literature as *Hypsilurus spinipes* (Duméril and Bibron, 1851).

I then present a series of seven formal descriptions of tribes, formally named for the first time that in combination accommodate all the Amphibolurinae, listing the complete list of component genera for each.

As an instruction to first or subsequent revisors of this work, no names proposed herein should have their spelling changed or altered in any way unless this is a mandatory requirement under the existing in force Zoological Code, as published by the ICZN. If emendation of names is in the normal course of events optional only, then the original spelling herein should be used.

In the event any tribes are merged by later authors, they should be merged in favour of page priority, in that those described first in this paper take priority over the later one/s.

While it is not necessary or even possible for me to list all the material consulted in terms of the Amphibolurinae over the last 30 plus years that I have been studying these reptiles, important and relevant publications relating to the taxonomy of Amphibolurinae as described within this paper include the following: Cogger (2000), Cogger *et al.* (1983), Hoser (1989, 2007, 2012a, 2012b, 2013), Joger (1991), Pianka and Vitt (2003), Pyron *et al.* (2013), Storr (1974), Wells and Wellington (1983, 1985), Wilson and Swan (2010) and sources cited therein.

#### **JACKYHOSERSAUR GEN. NOV.**

**Type species:** *Diporiphora superba* Storr, 1974.

**Diagnosis:** *Jackyhosersaur gen. nov.*, monotypic for the species originally described as "*Diporiphora superba* Storr, 1974" is readily separated from all other *Diporiphora* Gray, 1842, the genus it was until now assigned to, on the basis of the following suite of characters: Keels of the dorsal scales are parallel to the vertebral line; gular and ventral scales (excluding chin shields) are weakly to strongly keeled; no gular fold; no indication of spines or a fold behind the ear; usually greenish or greenish yellow above, yellow below and without pale dorso-lateral stripes; there is sometimes a brown vertebral stripe present; the adpressed hind limb reaches about the eye; the hindlimb is about 70-100 per cent of the snout-vent length, the tail about 300 to 400 percent of the snout-vent length; there are four preanal pores.

**Distribution:** Known only from the region near the type locality of Mitchell River in the west Kimberley, north-west Western Australia, Australia.

**Etymology:** *Jackyhosersaur gen. nov.* is named in honour of my younger daughter Jacky Hoser, of Melbourne, Victoria, Australia, aged 12 as of 2013 in recognition of her excellent work in reptile education, working with Snakebusters, Australia's best reptile shows.

**Content:** *Jackyhosersaur superba* (Storr, 1974) (monotypic).

#### **ADELYNHOSERSAUR GEN. NOV.**

**Type species:** *Lophyrus spinipes* Duméril and Bibron, 1851.

Currently most widely known as (*Hypsilurus spinipes* Duméril and Bibron, 1851).

**Diagnosis:** *Adelynhosersaur gen. nov.* is monotypic for the type species. The species (and genus) is readily separated from other Australian *Tiaris* Duméril and Bibron, 1837 (the only genus it is likely to be confused with) and *Hypsilurus* from regions north of Australia, by the absence of a longitudinal row of grossly enlarged scales on the throat. In the other two genera, such scales are similar to those of the nuchal crest.

The genus *Adelynhosersaur gen. nov.* is also separated from all other Amphibolurinae by the following suite of characters: grey, grey-brown or chocolate brown above, often suffused with green. Immaculate or with dark brown flecks, spots of variegations and occasionally with obscure dark transverse bands across the top of the back and tail. Whitish or dirty brown below. Usually a broad, dark brown bar from the eye to the ear, and some darker bars on the jaws. The body scales are heterogeneous, the scales on the dorsum and flanks are small and keeled and with scattered, enlarged, strongly keeled or spinose scales, often aligned to form irregular transverse rows. A series of enlarged spinose scales on the upper surfaces of the limbs. There is a fairly strong nuchal crest continuous with a low but conspicuous dorsal crest. Gulars are keeled with a few scattered, larger, keeled scales, especially on the midline. Remaining ventral and caudal scales are strongly keeled. The head is large and wedge-shaped, with a thick, angular canthus rostralis which continues as an acute supraocular ridge. The tympanum is large and superficial. The nostril is subcircular, facing outwards and slightly backwards and downwards in an enlarged and somewhat swollen nasal scale lying below the canthal ridge. The adpressed hindlimb reaches to between the eye and the tip of the snout, the hindlimb being about 90 per cent of the snout-vent length and the tail being about 200 per cent of the snout-vent length, (adapted from Cogger, 2000).

**Distribution:** Wetter parts of northern NSW and Southern Queensland, generally near the coast.

**Etymology:** Named in honour of my eldest daughter, Adelyn Hoser, of Melbourne, Victoria, Australia, aged 14 as of 2013 in recognition of her excellent work in reptile education, working with Snakebusters, Australia's best reptile shows.

**Content:** *Adelynhosersaur spinipes* Duméril and Bibron, 1851 (monotypic).

**AMPHIBOLURINI TRIBE NOV.****(Terminal taxon: *Lacerta muricata* White, 1790)**Currently known as *Amphibolurus muricatus* (White, 1790).**Diagnosis:** Lizards within Amphibolurini *tribe nov.* are separated from all other Australian Amphibolurinae by one or other of the following suites of characters: One or other of the following suite of characters:1/ Body without very large conical spines or a spiny nuchal hump; a large loose "frill" or skin around the neck (*Chlamydosaurus*, Gray, 1825), or for all other genera within the tribe:2/ Body without very large conical spines or a spiny nuchal hump; no large skin frill around the neck; femoral and/or preanal pores present, at least in males; tail at most slightly laterally compressed, without a strongly differentiated dorsal keel; and not including the following suite of characters that diagnoses the tribe Ctenophorini *tribe nov.*, these relevant characters as a suite further being: a vertebral series of enlarged scales present or absent on the back and if absent, then three or more femoral pores present on each side; nuchal crest and/or series of enlarged keeled vertebral scales present or absent and if absent present along at least the anterior two thirds of the body; enlarged strongly keeled or spinose scales are present elsewhere on the dorsum; spinose scales on sides of base of tail may be present or absent, but in a single row if present; lower edge of the supralabials straight or at most slightly curved, forming a more or less straight or even edge to the upper lip; a row of enlarged scales from below the eye to above the eye; dorsal scales of the body are more or less homogeneous with at most a few slightly enlarged scattered tubercles.**Distribution:** Most parts of Australia, including Tasmania.**Content:** *Amphibolurus* Wagler 1830 (type genus); *Caimanops* Storr, 1974; *Chlamydosaurus* Gray, 1825; *Cryptagama* Witten, 1984; *Diporiphora* Gray, 1842; *Gowidon* Wells and Wellington, 1983; *Houstoniasaurus* Wells and Wellington, 1985; *Jackyhosersaur gen. nov.*; *Mantichorasaurus* Wells and Wellington, 1983; *Pogona* Storr, 1982; *Rankina* Wells and Wellington, 1983; *Wittenagama* Wells and Wellington, 1985.**TRIBE ADELYNHOSERSAURINI TRIBE NOV.****(Terminal taxon: *Lophyrus spinipes* Duméril and Bibron, 1851)**Currently most widely known as *Hypsilurus spinipes* (Duméril and Bibron, 1851).**Diagnosis:** Lizards within Adelynhosersaurini *tribe nov.* are separated from all other Australian Amphibolurinae by the following suite of characters: Body without very large conical spines or a spiny nuchal hump; no large skin frill around the neck; femoral and/or preanal pores absent; there is a transverse gular fold present; the tail is twice as long as the head and body; body laterally compressed, dorsals small, rhomboid, hardly overlapping, keeled, directed backwards and upwards; uniform ventrals significantly larger, strongly keeled.Upper head scales small, slightly heterogeneous; unlike in *Hypsilurini tribe nov.* described below, there is not a more or less curved row of enlarged scales below the eye adjacent to the orbit, or if present, it is at best only weakly developed; tympanum visible; males and females with almost equally developed gular pouch (frequently with one or two transverse folds in the relaxed state) and well developed vertebral crest. Sexual dimorphism usually only weakly developed.**Distribution:** Wetter parts of north-east Australia and New Guinea.**Content:** *Adelynhosersaur gen. nov.* (type genus); *Tiaris* Duméril and Bibron, 1837.**TRIBE HYP SILURINI TRIBE NOV.****(Terminal taxon: *Lophura (Hypsilurus) godeffroyi* Peters, 1867)**Currently most widely known as *Hypsilurus dilophus* (Duméril and Bibron, 1837).**Diagnosis:** Lizards within *Hypsilurini tribe nov.* are separated from all other Australasian Amphibolurinae by the following suite of characters: Body without very large conical spines or a spiny nuchal hump; no large skin frill around the neck; femoral and/or preanal pores absent; there is a transverse gular fold present; the tail is twice as long as the head and body; body laterally compressed, dorsals small, rhomboid, hardly overlapping, keeled, directed backwards and upwards; uniform ventrals significantly larger, strongly keeled. Upper head scales small, slightly heterogeneous; a more or less curved row of enlarged scales below the eye adjacent to the orbit (as opposed to only weakly or not developed in *Adelynhosersaurini tribe nov.* described above); tympanum visible; males and females with almost equally developed gular pouch (frequently with one or two transverse folds in the relaxed state) and well developed vertebral crest (no dorsal crest in the species *Hypsilurus modestus*). Sexual dimorphism usually only weakly developed.**Distribution:** The region around New Guinea and nearby.**Content:** *Hypsilurus* Peters, 1867 (monotypic).**TRIBE INTELLAGAMINI TRIBE NOV.****(Terminal taxon: *Lophura lesueurii* Gray, 1831)**Currently known as: *Intellagama lesueurii* (Gray, 1831).Until recently, most widely known as *Physignathus lesueurii* (Gray, 1831).**Diagnosis:** Separated from all other Amphibolurinae by the following suite of characters: Body without very large conical spines or a spiny nuchal hump; no large skin frill around the neck; femoral and/or preanal pores present, at least in males; tail strongly compressed with a strongly differentiated dorsal keel; not a strong emerald-green colour and lacks diagonal stripes of green or turquoise on the body.**Distribution:** East coast of Australia and nearby areas.**Content:** *Intellagama* Wells and Wellington, 1985 (monotypic).**TRIBE PHYSIGNATHINI TRIBE NOV.****(Terminal taxon: *Physignathus cocincinus* Cuvier, 1829)****Diagnosis:** Separated from all other Amphibolurinae by the following suite of characters: Body without very large conical spines or a spiny nuchal hump; no large skin frill around the neck; femoral and/or preanal pores present, at least in males; tail strongly compressed with a strongly differentiated dorsal keel; colouration is a strong emerald-green colour; diagonal stripes of green or turquoise are found on the body, while the tail is banded from the middle to the end with green and dark brown. Their undersides range from white, off white, very pale green or pale yellow.**Distribution:** Mainland south-east Asia.**Content:** *Physignathus* Cuvier, 1829 (monotypic).**TRIBE MOLOCHINI TRIBE NOV.****(Terminal taxon: *Moloch horridus* Gray, 1841).****Diagnosis:** Separated from all other Amphibolurinae by one or other of the following suites of characters:1/ The body is covered above with large conical spines, each being much larger than the eye and the nape has a large spiny hump (*Moloch* Gray, 1841), or:2/ Body without very large conical spines or a spiny nuchal hump; no large skin frill around the neck; femoral and/or preanal pores absent; there is no transverse gular fold and the tail is about one and a quarter times as long as the body (*Chelosania* Gray, 1845).**Distribution:** Most drier parts of mainland Australia.**Content:** *Moloch* Gray, 1841 (type genus); *Chelosania* Gray, 1845.

**TRIBE CTENOPHORINI TRIBE NOV.**

**(Terminal taxon: *Grammatophora decresii* Duméril and Bibron, 1837).**

Currently known as *Ctenophorus decresii* (Duméril and Bibron, 1837).

**Diagnosis:** Lizards within *Ctenophorini* *tribe nov.* are separated from all other Australian Amphibolurinae by the following suite of characters: Body without very large conical spines or a spiny nuchal hump; no large skin frill around the neck; femoral and/or preanal pores present, at least in males; tail at most slightly laterally compressed and without a strongly differentiated dorsal keel; a vertebral series of enlarged scales present or absent on the back and if absent, then three or more femoral pores present on each side; nuchal crest and/or series of enlarged keeled vertebral scales present or absent and if absent present along at least the anterior two thirds of the body; enlarged strongly keeled or spinose scales are present elsewhere on the dorsum; spinose scales on sides of base of tail may be present or absent, but in a single row if present; lower edge of the supralabials straight or at most slightly curved, forming a more or less straight or even edge to the upper lip; a row of enlarged scales from below the eye to above the eye; dorsal scales of the body are more or less homogeneous with at most a few slightly enlarged scattered tubercles.

**Distribution:** Most parts of mainland Australia.

**Content:** *Ctenophorus* Fitzinger, 1843 (monotypic for the type genus).

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**CONFLICT OF INTEREST**

The author has no conflicts of interest in terms of this paper or conclusions within.

