

A NEW SPECIES OF STINGRAY (F. DASYATIDAE) WITH A KEY TO THE AUSTRALIAN SPECIES

by P.R. Last
Tasmanian Fisheries Development Authority, Taroona, Tasmania

(with one table and two text figures)

ABSTRACT

LAST, P.R., 1979 (20 vii): A new species of stingray (F. Dasyatidae) with a key to the Australian species. *Pap. Proc. R. Soc. Tasm.*, 113: 169-176. ISSN 0080-4703. Tasmanian Fisheries Development Authority, Taroona, Tasmania, Australia.

Eleven species of dasyatids, *Amphotistius kuhlii* (Müller and Henle), *Dasyatis breviceaudatus* (Hutton), *D. fluviatorum* Ogilby, *D. guileri* sp. nov., *D. sephen* (Forskål), *D. thetidis* Waite, *Himantura granulata* (Macleay), *H. uarnak* (Forskål), *Taeniura brocki* Schultz, *T. Lymma* (Forskål) and *Urogymnus asperrimus* (Bloch and Schneider) are recognised as occurring in Australian waters. The new species is described and figured. The Australian species are keyed but no attempt was made to unravel the complicated generic synonymy of the group.

INTRODUCTION

Two major schools of thought exist regarding the family status of the Dasyatidae. Several authorities (Fowler, 1941; Garman, 1913; Herald, 1961; Lord and Scott, 1924; Scott, 1957; Smith, 1950; Stead, 1963; Waite, 1923) recognised a family group which now includes about ninety species, including the Australian genera *Dasyatis*, *Taeniura*, *Urogymmus*, *Urolophus* and *Gymmura*; the genus *Dasyatis* was split by Fowler (1941) into the four subgenera: *Himantura*, *Pastinachus*, *Dasyatis* and *Amphotistius*.

Many recent authors (Bigelow and Schroeder, 1953; Compagno, 1973; Grant, 1975; Munro, 1956; Scott, 1962; Scott, Glover, and Southcott, 1974) have given *Urolophus* and *Gymmura* separate family status and elevated Fowler's subgenera to genera.

McCulloch (1929), employed the former system but recognised *Himantura* and *Pastinachus* as distinct genera and checklisted seventeen species from Australia.

These species are: (1) *Dasyatis breviceaudatus* (Hutton, 1875); (2) *D. fluviatorum* Ogilby, 1908; (3) *D. thetidis* Waite, 1899; (4) *D. kuhlii* (Müller and Henle, 1841); (5) *Pastinachus sephen* (Forskål, 1775); (6) *Himantura uarnak* (Forskål, 1775); (7) *Taeniura Lymma* (Forskål, 1775); (8) *T. mortoni* Macleay, 1883; (9) *T. meyeri* Müller and Henle, 1841; (10) *Urogymmus asperrimus* (Bloch and Schneider, 1801); *Urolophus sufflavus* Whitley, 1929; *U. cruciatus* (Lacépède, 1804); *U. expansus* McCulloch, 1916; *U. testaceus* (Müller and Henle, 1841); *U. viridis* McCulloch, 1916; and *Pteroplatea australis* (Ramsay and Ogilby, 1885) which according to Marshall (1964) is a junior synonym of *Gymmura australis*.

Whitley (1933) erected *Toshia* and *Bathytoshia* with type species *Dasyatis fluviatorum* and *D. thetidis* respectively. Although these generic names have been applied (Gudger, 1937), some authors (Richardson and Garrick, 1953) considered their formation unfounded. Whitley (1940) elevated *Urogymmus* and *Urolophus* to family status but retained *Gymmura* within the Dasyatidae. Apart from including 1 (above) in his *Bathytoshia*, 9 was expunged from the list; the latter specimen being a misidentification of 7. Another two *Himantura* species, (11) *H. granulata* (Macleay, 1883) and (12)

A New Species of Dasyatid Stingray

H. toshi Whitley, 1939, were added.

Munro (1956), followed the latter school by excluding *Urolophus* and *Gymnura*, and recognised only nine species. Species 1, 2, 3, 6, 7, 10 and 11 were included as above, with 5 as *Dasyatis sephen* and 4 as *Amphotistius kuhlii*; 8 and 12 were not included.

Allen *et al.* (1976) added *Taeniura brocki* Schultz, 1953, from Lord Howe Island.

METHOD

As the author was unable to examine specimens of all the Australian species, the following key was constructed largely from the literature and uses those genera recognised by Bigelow *et al.* 1953. The Australian distribution of each species is also included. Those localities marked with asterisks represent likely occurrences that have not officially been recorded in the literature; the abbreviations for each state being: New South Wales (N.S.W.), Northern Territory (N.T.), Queensland (Qld), South Australia (S.A.), Tasmania (Tas.), Victoria (Vic.) and Western Australia (W.A.).

KEY TO THE SPECIES OF DASYATID RAYS RECORDED FROM AUSTRALIA

1. Disc oval; width less than length2
Disc quadrangular or rounded; width greater than or equal to length3
- 2(1). Disc studded with tubercles and bucklers. Tail without stinging
barbs *Urogymnus asperrimus* (Qld).
Disc smooth except for some flattened tubercles along midline.
Stinging barbs present *Taeniura lymna* (N.T., Qld, W.A.).
- 3(1). Dorsal spine inserted on posterior half of tail. Body whitish with
dark spots and blotches *Taeniura brocki* (Lord Howe Is.).
Dorsal spine inserted on anterior half of tail4
- 4(3). No cutaneous folds on tail5
Tail with upper, lower or both cutaneous folds; folds sometimes
very narrow6
- 5(4). Tail greater than 2.25 length of disc; banded with about 35 blackish
blue rings *Himantura uarnak* (N.S.W., N.T., Qld, W.A.).
Tail less than 2.25 length of disc; without rings
..... *Himantura granulata* (N.T., Qld, W.A.).
- 6(4). Tail less than 1.75 length of disc7
Tail greater than 1.75 length of disc9
- 7(6). Tail with both upper and lower cutaneous folds. Disc spotted.
..... *Amphotistius kuhlii* (N.S.W., N.T., Qld, W.A.*).
Tail with cutaneous fold only on lower surface. Disc not spotted8
- 8(7). Disc with rows of large spiny tubercles on dorsal surface
..... *Dasyatis thetidis* (N.S.W., S.A., Tas., Vic.*, W.A.).
Disc smooth, without rows of spiny tubercles on dorsal surface although
one small oval tubercle may be present
..... *Dasyatis breviceaudatus* (N.S.W., S.A., Tas., Vic., W.A.).
- 9(6). Tail with very broad cutaneous fold on lower surface; not typically
whiplike. Disc with one or two large central tubercles
..... *Dasyatis sephen* (N.S.W., N.T., Qld, W.A.).
Tail with narrow cutaneous fold on lower surface; typically whiplike.
Disc with a row of tubercles extending on to tail10
- 10(9). Dorsal surface of disc olive brown, ventral surface white
..... *Dasyatis fluviatorum* (N.S.W. Qld).
Dorsal and ventral surfaces black *Dasyatis guileri* sp. nov. (Tas.).

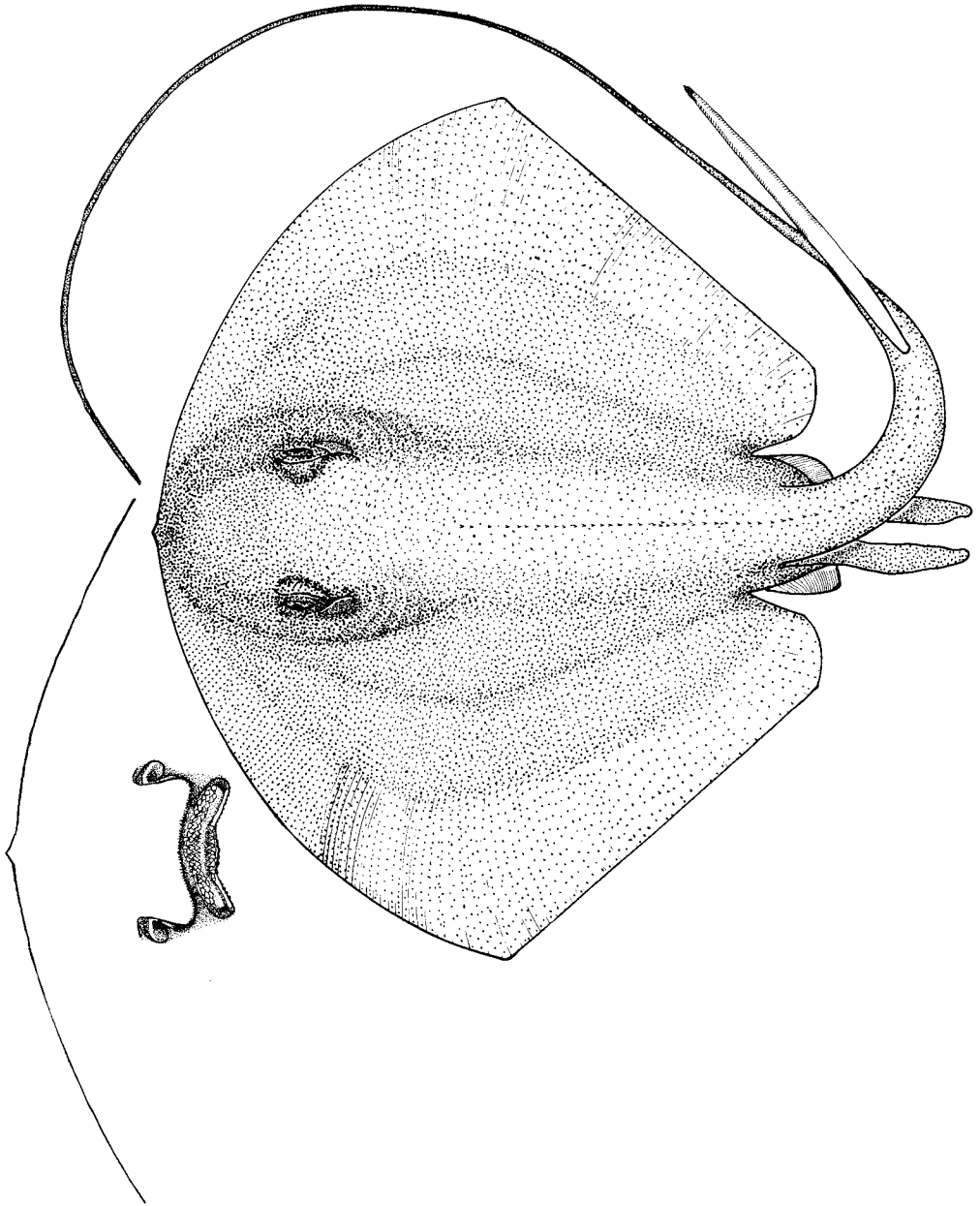


FIG. 1a (main figure).- *Dasyatis guileri* sp. nov.; holotype; 889 mm T.L.; stranded, Nutgrove Beach, Derwent River estuary; April, 1977; Queen Victoria Museum Reg. No. 1978/5/108, Type 360; x 1/3.

1b (bottom left).- Anterior ventral aspect showing buccal area; x 1/2.

A New Species of Dasyatid Stingray

Family DASYATIDAE

Genus *DASYATIS* Rafinesque 1810*Dasyatis quileri* sp. nov. (Figure 1)

Material

Holotype: 889 mm total length, male, collected by Dr. E.R. Guiler, stranded, Nutgrove Beach, Derwent River Estuary, (147° 21'E, 42° 55'S), Queen Victoria Museum Reg. No. 1978/5/108, Type 360.

Description

Body depressed, thick, antero-lateral margin moderately convex; posterior and lateral apices of pectoral fins angular. Snout tip rudimentary, barely distinguishable from anterior profile. Head wide, distinguishable from disc. Snout profile in front of eyes moderately concave, becoming slightly convex to snout tip.

Tail stout, with two spears; profile gently tapered to base of second spear then thin and whiplike to extremity; anterior to spear base, smooth except for a two of 21 large and 10 small tubercles extending along mid dorsal surface; posterior to spear base is lacking any form of spination but irregular in cross section due to very fine longitudinal furrows; narrow cutaneous fold extending posteriorly along ventral surface from below origin of large spear to approximately 0.75 post-spinal length; dorsal surface without fold. Primary spear large, tapering; 2.3 times length of snout; dorsal surface slightly convex laterally, ventral surface elevated to form prominent ridge; lateral edges with paired rows of 93, 92 sharp serrations each directed anteriorly and imperfect proximally; very sharp distally. Secondary spear small; 0.17 in primary; partly sunken in a deep groove on the dorsal surface of the tail.

Disc smooth except for a row of 32 sharp tubercles extending from disc centre along dorsal midline to join those on tail. Large sensory pores concentrated around midline of snout then bifurcating to form U patterns around both eyes. Microscopic sensory pores scattered over disc and tail. Eyes small, lateral, raised above inter-orbital. Gill slits small, sigmoid. Spiracles oblique, slightly larger than eye. Internasal flap broad, subrectangular; slightly wider than mouth; marginally wider posteriorly than anteriorly; lateral edges smooth; posterior edge rather concave; frenum stout mesially. Mouth moderately proconvex. Upper lip imperfect. Lower lip plicate. Buccal structures indiscernible. Teeth arranged in pavement, quincuncially; occlusal surface slightly convex; more acute mesially; 61 visible in upper jaw, 78 visible in lower jaw (these values may be higher as posterior section of both jaws occluded). Nostrils ovoidal, less than eye diameter. Pectorals wide, anterior margin smooth and convex; acute at tip; posterior lateral margin sinuous, rectilinear; acute posteriorly then slightly convex to posterior base. Pelvic fins small, smooth, sinuous; rectilinear along anterolateral margin; convex distally; insertion forming deep notch with pectoral. Claspers stout, longer than snout.

Dimensions

As given in Table 1. Table 1 constitutes a summary of the dimensions of the holotype; the first measurement is absolute in millimetres, while the second is expressed as a proportion in millesimals of disc length. Hubbs and Ishiyama (1968) define the disc length for rajids, as the greatest distance from snout tip to posterior margin of the pectoral fin. Although this length is included, the measurement represented by the distance from the snout tip to posterior margin of the anus was considered more reliable and herein deemed to be the disc length. All dimensions were taken as direct measurements.

Coloration

Dorsal surface uniform black, tubercles and posterior third of spear white. Ventral surface brownish black with a few lighter flecks. Whiplike section of tail and cutaneous fold black. Anus white. Teeth yellow.

P.R. Last

TABLE 1

DASYATIS GUILERI SP. NOV.

Dimensions of holotype from the Derwent Estuary, Southern Tasmania. Measurements given as absolute (mm) and relative dimensions (thousandths of disc length).

	Absolute dimensions (mm)	Relative dimensions (thousandths of disc length)
Length:		
Disc	251	
Total	889	3 541
Snout	60	239
Eye	14	56
Pelvic fin, right	50	199
Tail	638	2 542
Spear 1	141	562
Spear 2	24	96
Snout tip to base of spear 1	354	1 410
Snout tip to anterior border of anus	231	920
Snout tip to anterior apex of right pectoral fin.	226	900
Snout tip to posterior apex of right pectoral fin.	271	1 080
Snout tip to apex of right pelvic fin	278	1 108
Snout tip to anterior border right spiracle.	76	303
Snout tip to anterior border right nostril.	42	167
Snout tip to middle of upper lip	44	175
Snout tip to first right gill slit	92	367
Snout tip to last right gill slit	128	510
Anterior border of anus to apex of right clasper.	98	390
Between anterior and posterior apices of right pectoral fin.	167	665
Width:		
Maximum	348	1 386
Between posterior apices of pectoral fins	112	446
Between posterior apices of ventral fins	41	163
Between spiracles	63	251
Between nostrils	38	151
Between first gill pair	65	259
Between last gill pair	45	179
Mouth	34	135
Interorbital	61	243
Base of tail	31	124
Base of spear 1	13	52
Depth:		
Maximum	63	251

A New Species of Dasyatid Stingray

Nomenclature

This species is named in honour of the collector Dr. E.R. Guiler, who noticed the freshly stranded specimen on a Hobart beach.

Affinities

Of the Australian species *D. guileri* most superficially resembles *D. fluviorum*. Both species possess a characteristically long whiplike tail which is greater than twice the disc length. However the species are quite different in body coloration and disc shape; the former trait was used as a key character. The disc of *D. guileri* is uniquely angular at its lateral extremities and the antero-lateral profile moderately convex, while in other Australian dasyatids the profiles are rounded, and straight or only slightly convex, respectively. *D. fluviorum* also possesses a prominent tail fold on the dorsal surface posterior to the spear; this character is absent in *D. guileri*.

Two species of *Dasyatis*, *D. thetidis* and *D. brevicaudatus*, have been recorded from Tasmania; both attain huge sizes and are amongst the largest dasyatids in the world. Consequently the juveniles are similar in size to the holotype of *D. guileri*. Waite (1899) gave a short account of a juvenile *D. thetidis* and stated that the specimen was very similar to the adult except for a slightly more elongated tail. A small relative elongation of the tail was also observed by the author for juveniles of the stingaree *Urolophus cruciatus* (Lacépède). However *D. guileri* should be easily distinguishable from juveniles of the larger dasyatids by the disc shape and colour.

A Formosan species, tentatively identified and figured by Jordan and Richardson (1909) as *D. bennetti* (Müller and Henle), appears to be the most similar species to *D. guileri*. Fowler's (1941) description of *D. bennetti* portrayed a completely different species and he linked Jordan *et al.*'s specimen with *D. navarrae* (Steindachner). The Formosan species is similar to *D. guileri*, but differs by possessing a short dorsal fold and minute tubercles posterior to the spear. Undoubtedly the most diagnostic feature separating *D. guileri* from all other long tailed dasyatids is the relatively enormous spear; the length is greater than twice the snout length, barely once in other species.

DISCUSSION

Any person undertaking a literature search of the systematics of the Dasyatidae is immediately greeted with taxonomic confusion. Generic diagnoses and keys are permeated with characters that are either vague or variable. This problem has been compounded by the virtual absence of information on intraspecific and ontogenetic variation. Furthermore, the reliability of previous revisions has been influenced by the absence of representative material of each species. Stingrays generally are large animals and this poses obvious problems with storage. Consequently representation of the family tends to be poor or non-existent in museum collections. Such problems can only be overcome by improving storage facilities and more extensive collecting.

Clearly, a generic revision based solely on literature reviews would be unreliable. Consequently no attempt was made to alter generic definitions, so the classification proposed by Bigelow *et al.* and supported by the phylogenetic studies of Compagno (1973), was utilised as the basis for this account.

The isolation and recognition of entities at the specific level appears to be more reliable. Those species listed by Munro (1956) appear to be good species and along with *Taeniura brocki* and *Dasyatis guileri*, form the complement of Australian species.

P.R. Last

ACKNOWLEDGEMENTS

I wish to thank Mr. R. Green for his diagram of the holotype. I am also grateful to Doctors J. Dixon, C.J.M. Glover and D.F. Hoese for checking holdings at their respective museums. Finally I would like to thank Mrs. F.T. Reynolds for typing and Mr. A.P. Andrews for criticizing the manuscript.

REFERENCES

- Allen, G.R., Hoese, D.F., Paxton, J.R., Randall, J.E., Russell, B.C., Starck II, W.A., Talbot, F.H. and Whitley, G.P., 1976: Annotated checklist of the fishes of Lord Howe Island. *Rec. Aust. Mus.*, 30(15): 365-454, figs 1-2.
- Bigelow, H.B. and Schroeder, W.C., 1953: Chapter one, sawfishes, guitarfishes, skates and rays. *Mem. Sears Fdn mar. Res.*, 1(2): 1-514.
- Compagno, L.J.V., 1973: Interrelationships of living elasmobranchs. In Greenwood, P.H., Miles, R.S. and Patterson, C. (Eds): INTERRELATIONSHIPS OF FISHES, 15-61. Academic Press.
- Fowler, H.W., 1941: The fishes of the groups Elasmobranchii, Holocephali, Isospondylii and Ostarophysii obtained by the United States Bureau of Fisheries Steamer "Albatross" in 1907 to 1910, chiefly in the Phillipine Islands and adjacent seas. *Bull. U.S. Natn. Mus.*, 100(13): i-x, 1-879.
- Garman, S., 1913: The Plagiostoma. *Mem. Mus. comp. Zool. Harv.*, 36: i-xiv, 1-515.
- Grant, E.M., 1975: GUIDE TO FISHES. Co-ordinator General's Department, Brisbane, Queensland.
- Gudger, E.W., 1937: *Bathytoshia*, the Giant Stingaree of Australia. *Aust. Mus. Mag.*, 6: 205-210, 4 figs.
- Herald, E.S., 1961: LIVING FISHES OF THE WORLD. Hamish Hamilton L.T.D., London.
- Hubbs, C.L. and Ishiyama, R., 1968: Methods for the taxonomic study and description of skates (Rajidae). *Copeia*, 3: 483-491.
- Jordan, D.S. and Richardson, R.E., 1909: A Catalog of the fishes of the island of Formosa, or Taiwan, based on the collections of Dr. Hans Sauter. *Mem. Carn. Mus.*, 4(4): 159-204, 29 figs, pls LXIII-LXXIV.
- Lord, C.E. and Scott, H.H., 1924: A SYNOPSIS OF THE VERTEBRATE ANIMALS OF TASMANIA. Oldham, Beddome and Meredith, Hobart.
- Marshall, T.C., 1964: FISHES OF THE GREAT BARRIER REEF. Angus and Robertson, Sydney.
- McCulloch, A.R., 1929: A checklist of the fishes recorded from Australia. *Aust. Mus. Mem.*, 5 (1-4) (part 4, Index, 1930): i-x, 1-534.
- Munro, I.S.R., 1956: Handbook of Australian fishes, 4: 17-20. *Fisher. newsl.* (now *Aust. Fisher.*), 15(10).
- Richardson, L.R. and Garrick, J.A.F., 1953: *Dasyatis thetidis* Waite, a second species of Giant Stingray in New Zealand Waters. *Trans. R. Soc. N.Z.*, 81: 319-320.
- Scott, E.O.G., 1957: Observations on some Tasmanian Fishes. Part VIII. *Pap. Proc. R. Soc. Tasm.*, 91: 145-156.
- Scott, T.D., 1962: THE MARINE AND FRESHWATER FISHES OF SOUTH AUSTRALIA. Government Printer, Adelaide.
- _____, Glover, C.J.M. and Southcott, R.V., 1974: THE MARINE AND FRESHWATER FISHES OF SOUTH AUSTRALIA. Government Printer, Adelaide.
- Smith, J.L.B., 1950: THE SEA FISHES OF SOUTHERN AFRICA. Central News Agency, South Africa.
- Stead, D.G., 1963: RAYS AND SHARKS OF AUSTRALIAN SEAS. Angus and Robertson, Sydney.
- Waite, E.R., 1899: Scientific results of the trawling expedition of the H.M.C.S. "Thetis", Introduction and fishes. *Aust. Mus. Mem.*, 4: 1-132, frontispiece, pls i-xxx, text figs 1-10.
- _____, 1923: THE FISHES OF SOUTH AUSTRALIA. Government Printer, Adelaide.
- Whitley, G.P., 1933: Studies in ichthyology. No. 7. *Rec. Aust. Mus.*, 19(1): 60-112, pls 11-15, figs 1-4.

A New Species of Dasyatid Stingray

Whitley, G.P., 1940: THE FISHES OF AUSTRALIA. Part 1. THE SHARKS, RAYS, DEVIL FISH,
AND OTHER PRIMITIVE FISHES OF AUSTRALIA AND NEW ZEALAND. Royal Zoological
Society of New South Wales, Sydney.