**PARATRYGON AIEREBE (MÜLLER & HENLE, 1841): THE SENIOR
SYNONYM OF THE FRESHWATER STINGRAY *DISCEUS THAYERI* GARMAN,
1913 (CHONDRICHTHYES: POTAMOTRYGONIDAE)**

Ricardo S. Rosa¹

ABSTRACT

A review of the original descriptions and available types of the South American freshwater stingrays *Trygon aiereba* Müller & Henle, 1841, *Trygon stroglyopterus* Schomburgk, 1843 and *Disceus thayeri* Garman, 1913 indicates that these three nominal species are synonymous. The senior name, placed in the monotypic genus *Paratrygon* Duméril, 1865, established for *Trygon aiereba*, is available and valid.

Based on its description, *T. aiereba* is a freshwater stingray. Therefore, this taxon is not the same as *Raja ajereba* Walbaum and *Raja orbicularis* Schneider, both names established for the marine "Aiereba" of Marcgrave, and which preferably should be treated as nomina dubia.

Paratrygon does not replace *Potamotrygon* Garman, 1877 as the type genus, because the family name *Potamotrygonidae* Garman, 1877 has priority over *Paratrygonidae* Gill, 1893.

RESUMO

A revisão das descrições originais e dos tipos existentes das raia de água doce *Trygon aiereba* Müller & Henle, 1841, *Trygon stroglyopterus* Schomburgk, 1843, e *Disceus thayeri* Garman, 1913, indica que essas três espécies nominais são sinônimas. O nome sênior, colocado no gênero monotípico *Paratrygon* Duméril, 1865, estabelecido para *T. aiereba*, é disponível e válido. A descrição de *T. aiereba* corresponde claramente a uma raia de água doce; portanto esta espécie não é um sinônimo de *Raja ajereba* Walbaum e de *Raja orbicularis* Schneider, ambos os nomes propostos para a "Aiereba" marinha de Marcgrave, e que preferivelmente devem ser tratados como nomina dubia. *Paratrygon* não substitui *Potamotrygon* Garman, 1877 como gênero-tipo, porque o nome de família *Potamotrygonidae* Garman, 1877 tem prioridade sobre *Paratrygonidae* Gill, 1893.

INTRODUCTION

The family *Potamotrygonidae* Garman, 1877 traditionally has consisted of the polytypic genus *Potamotrygon* Garman, 1877 and the monotypic *Disceus* Garman, 1877. *Disceus thayeri* Garman, 1913 is commonly recognized as the valid species in the latter genus, while its senior synonym *Paratrygon aiereba* (Müller & Henle, 1841), has

1. Departamento de Sistemática e Ecologia, CCEN, Universidade Federal da Paraíba, 58059, João Pessoa, PB. Present address: Department of Zoology, CW-312 Biological Sciences Centre, University of Alberta, Edmonton, Canada T6G 2E9.

been either overlooked in the literature or mistakenly associated with the marine "Aiereba" of Marcgrave. *Paratrygon* Duméril, 1865, established for *Trygon aiereba* Müller & Henle, 1841, was synonymized with *Disceus* by Jordan (1887) and with *Potamotrygon* by Bertin (1939). Rosa et al. (1987) recognized *Potamotrygon* and *Paratrygon* as valid genera, and described the new genus *Plesiотrygon*. One other nominal genus, *Elipesus* Schomburgk, 1843, known only from the poor original description, was considered provisional or doubtful by several authors (Eigenmann and Eigenmann, 1891; Garman, 1913; Castex, 1964, 1968; Rosa, 1985).

The review of the original description of *Paratrygon aiereba* (Müller & Henle, 1841), and its comparison with species of *Potamotrygon*, with *Trygon stroglyopterus* Schomburgk, 1843, and the more usually employed junior synonym *Disceus thayeri*, corroborates the generic synonymy proposed by Jordan (1887), and indicates that *Paratrygon aiereba* is the senior synonym of the other two nominal species.

METHODS AND MATERIALS

Measurements taken were limited to those cited by Müller and Henle (1841). Measurements under 150 mm were taken to the nearest 0.1 mm with dial calipers; measurements over 150 mm were taken to the nearest 1 mm. The German "Zoll" used in Müller and Henle's measurements was converted as 1 Zoll = 26.15 mm. Measurements of the type of *T. stroglyopterus* were taken on photographs and radiograph.

"Aiereba" is used in this paper to refer to vernacular citations (non-binominal) of the pre-Linnean name *Aiereba* (or *Ajereba*) of Marcgrave. Institutional abbreviations follow Leviton et al. (1985).

Material Examined: *Paratrygon aiereba*, 22 specimens (121-738 mm in disc length, DL): AMNH (2 uncatalogued specimens housed at UMMZ); FMNH 84092; INPA TOC-409; INPA (4 uncatalogued specimens); IRSNB 17884; MCZ 297-S (syntype of *D. thayeri*); MCZ 563-S (idem); MZUSP 8286; MZUSP 8287; MZUSP 10288; MZUSP 14772; MZUSP 14773; MZUSP 14774; SOSC (1 uncatalogued specimen housed at UMMZ); UMMZ 204840; ZMB 4632 (type of *T. stroglyopterus*, photographs and radiography only). Comparative material: *Potamotrygon castexi*, 5 specimens (226-538 mm DL): ANPS 14284; ANSP 142486; LACM 39934-1; LACM 41722-2; MZUSP 10152; *Potamotrygon magdalenae*, 3 specimens (134-245 mm DL): USNM 1674; USNM (2 uncatalogued specimens); *Potamotrygon orbignyi*, 7 specimens (110-317 mm DL): ANSP 103998; ANSP 134006; FMNH 53271; MZUSP 14796; MZUSP 14775; MZUSP 14791; MZUSP 19192; *Potamotrygon schoederi*, 2 specimens (206-231 mm DL): MZUSP 10290; MZUSP 19209; *Potamotrygon yepesi*, 4 specimens (136-159 mm DL): USNM 121666; USNM 205276 (3 specimens).

Paratrygon Duméril

Paratrygon — Duméril, 1865: 594 [type-species *Trygon aiereba* Müller & Henle, 1841 (non-Marcgrave) by monotypy].

Disceus — Garman, 1877: 208 [type species *Trygon stroglyopterus* Schomburgk, 1843 by monotypy].

Paratrygon aiereba (Müller & Henle)

- Trygon aiereba* — Müller and Henle, 1841: 196 (not 160, non-Marcgrave), [original description, Brazil; type lost, originally deposited in München Zoologisches Museum].
- Trygon stroglyopterus* — Schomburgk, 1843: 183, plate 22 [original description, Rio Branco, Brazil].
- Disceus strongylopterus* — Garman, 1877: 208 [redescription of *Trygon stroglyopterus*, with *Lapsus calami*].
- Disceus thayeri*. — Garman, 1913: 426 [new name for *Disceus stroglyopterus*; three syntypes, Thayer Expedition, Óbidos, Manaus and Pará, Brazil].

Remarks: *Raja ajereba* walbaum, 1792 and *Raja orbicularis* Schneider, 1801 are doubtful names for a marine taxon based on the original description of "Aiereba" Marcgrave, 1648, which cannot be properly identified.

TAXONOMIC HISTORY

"Aiereba" (Marcgrave, 1648) is the earliest name and description of a South American stingray. This name has been considered doubtful (Walbaum, 1792; Müller and Henle, 1841; Garman, 1913; Castex, 1964; Castex and Castello, 1969), because the imprecise description precluded its identification even at the familial level. The original illustration probably did not correspond with Marcgrave's specimen, because it lacked the two caudal stings mentioned by the author, and because the illustration previously had been used by Laet (1640), the editor of Marcgrave's book, for a marine batoid that he named "Paraque" (Whitehead, 1979a). The same print, with modifications on the tail, was labelled as a freshwater stingray from the Rio Parana drainage in Dobrizhoffer (1822). The original oil painting ("Ajereba" mss in Theatri rerum naturalium Brasiliae, vol. 1, p. 29), which served as a model for the published woodcut illustration, similarly lacked the caudal stings and diagnostic details. The "Aiereba" probably was a marine dasyatid stingray, because the freshwater Potamotrygonidae are absent from the area sampled by Marcgrave and the Dutch party in Brazil. Marcgrave visited Salvador, possibly in March 1638 (Whitehead, 1979b). He also visited Fort Maurits (Penedo) at the São Francisco River, possibly in May 1639 (see Marcgrave, 1648: 204). There is no exact reference to his travels to the north of Recife, but he probably went as far as Rio Grande do Norte, as shown by the map based on his topographical work (Barlaeus, 1647). According to Hershkovits (1987), Marcgrave's explorations were restricted to northeastern Brazil in the present states of Pernambuco, Paraíba and Rio Grande do Norte. Marcgrave's longest journey took one month and nine days, round trip from Recife, with a party of 415 men (Whitehead, 1979b). It is almost certain that they never reached the lower Amazon drainage, the eastern limit of distribution of *Paratrygon*. Furthermore, there is no mention in the *Historia Naturalis Brasiliae* that Marcgrave visited the Amazon.

The marine origin of "Aiereba", though not cited by Marcgrave, was inferred by Schneider (1801), who based *Raja orbicularis* on "Aiereba" and cited its habitat as the same for *Raja guttata* ("...Americae australis, maria..."). Ribeiro (1907) and Ihering (1940) considered *R. orbicularis* (and consequently "Aiereba") as a marine *Dasyatis* from the Brazilian coast. Marcgrave's specimen of "Aiereba" was never found, and the

tentative identifications based on the original description (Martius, 1867; Ribeiro, 1907; Garman, 1913; Carvalho and Sawaya, 1942; Fowler, 1948) resulted in a extensive synonymy, including *Trygon aiereba* Müller & Henle, *Raja ajereba* Walbaum, *Raja orbicularis* Schneider, and *Disceus thayeri* Garman.

Müller and Henle (1841) described *Trygon aiereba*, which was not merely a binominal repetition of "Aiereba" Marcgrave, as were *Aiereba brasiliensis* Jonston, 1649 (also Willughby, 1686; Jonston, 1718), *Raja ajereba* Walbaum, 1792, and *Raja orbicularis* Schneider, 1801, but was based on a new specimen from Brazil. Müller and Henle's type was redescribed with slightly different measurements by Duméril (1865), who established the subgenus *Paratrygon* for the species. Günther (1870) used *Paratrygon* at the generic level, by including *P. aiereba* in the synonymy of *Trygon orbicularis* (Schneider). Müller and Henle's type was lost in Munich, probably destroyed in World War II (Castex and Castello, 1969; Kottelat, 1988; F. Terofal, pers. comm.).

Garman (1877) established the new genus *Disceus* for *T. stroglyopterus* Schomburgk, 1843. The identity of *T. aiereba* and *T. stroglyopterus*, previously suggested by Müller and Troschel (1848), was denoted by the inclusion of the former species in Garman's synonymy of *D. stroglyopterus*. Garman (1913) redescribed *D. stroglyopterus*, and without justification, changed the specific name to *D. thayeri* (Figs. 1 and 2). *Trygon stroglyopterus* was removed from the synonymy, but *T. aiereba* was retained as a possible synonym.

Jordan (1887), Eigenmann and Eigenmann (1891), and Eigenmann (1910, 1912) considered *Paratrygon* as a senior synonym of *Disceus*. Eigenmann (1912) mistakenly named *R. orbicularis* as the type species of *Paratrygon*, due to nomenclatural confusion in previous synonymies. *Paratrygon* was originally established with the single species *T. aiereba* (type species by monotypy). The name *D. thayeri* had been used commonly after 1913, until other generic and specific synonymies were proposed. Bertin (1939) and Fowler (1948) synonymized *Paratrygon* and *Potamotrygon*. Fowler (1948, 1970) and Castex (1968) mistakenly selected the marine *R. ajereba* as the type species of *Paratrygon*. Bailey (1969) stated that *Elipesus spinicauda* and *T. stroglyopterus* were senior synonyms of *D. thayeri*, and chose the former name as valid for the species. Castex and Castello (1969) stated that the original description of *T. stroglyopterus* lacked differential characters and "systematical value", but considered this species as a senior synonym of *D. thayeri*, by identifying Schomburgk's type specimen (Figs. 3 and 4) with Garman's syntypes. They also synonymized *T. stroglyopterus* with *T. aiereba*, but incorrectly chose *D. stroglyopterus* (Schomburgk) as the valid name for the species. Taniuchi (1982) stated that *T. aiereba* had priority over *D. thayeri*, but accepted the latter as the most commonly used name for the species. Rosa (1985) supported the synonymy of *D. thayeri* and *T. stroglyopterus*, and listed the diagnostic characters found in the original illustration of the latter.

Fig. 1. *Disceus thayeri*. Syntype (MCZ 297-S), female, 305 mm DL, dorsal view.

Fig. 2. *Disceus thayeri* (MCZ 297-S), ventral view.

Fig. 3. *Trygon strogylopterus*. Type (ZMB 4462), male, 257 mm DL, dorsal view.

Fig. 4. *Trygon stogylopterus* (ZMB 4632), ventral view.

Fig. 5. Proportional measurements (% of Disc Width) on specimens of Potamotrygonidae. A = preocular length, B = preoral length, C = prenarial length, D = distance from mouth to scapulocoracoid cartilage. 1 = *Potamotrygon* spp., 2 = *Paratrygon aiereba* (= *Disceus thayeri*), 3 = *Trygon aiereba* (type), 4 = *Trygon stroglyopterus* (type). Vertical lines represent mean; horizontal lines, range; ends of white bars, ± 1 standard deviation; ends of black bars, ± 2 standard error of the mean. Sample sizes are indicated in Table 1.

DISCUSSION

The identity of *T. stroglyopterus* and *D. thayeri* is irrelevant to the solution of the nomenclatural problem, because *T. aiereba* Müller & Henle, placed in the genus *Paratrygon*, is herein considered to be the senior synonym of both nominal species. The original description of *T. aiereba* contains most of the diagnostic characters for the species usually known as *D. thayeri*, including the large knob-shaped appendix projecting into the posterior rim of the spiracles ("Am hintern Rande des Spritzlochs befindet sich ein ungemein grosser zapfernartiger Vorsprung, in das Spritzloch ragend"); teeth flat, few in number ("Zähne wenig zahlreich, plat"); very small eyes ("Augen ausserordentlich klein"); buccal papillae lacking ("Zapfen im Munde wurden nicht wahrgenommen") or minute. The measurements given to the type are similarly diagnostic, and when compared with the morphometrics of species of *Potamotrygon* and *Disceus thayeri* (Table 1) are much closer to the latter. Diagnostic morphometrics are the relative distance from mouth to scapulocoracoid cartilage, and the relative preocular, preoral, and prenarial lengths (Fig. 5), which show the highest significant differences between the two genera. The agreement of diagnostic character states and morphometrics demonstrates the synonymy of *P. aiereba* and *D. thayeri*. Moreover, nothing in Müller and Henle's description precludes such a synonymy.

Table 1. Proportional measurements (% of Disc Width) on specimens of *Potamotrygonidae*. $t_{0.05}$ = probabilities of Student-t Test at 5% confidence level. S.D. = standard deviation, N = sample size.

	Potamotrygon spp.			Paratrygon aiereba (= Disceus thayeri)			Trygon aiereba from Müller and Henle (1" = 12" = 26.15 mm)	
Disc width (mm)	95-500			108-675			196	
Proportional measurements	Mean	S.D.	N	Mean	S.D.	N	$t_{0.05}$	
Preocular Length	27.6	1.3	24	33.3	2.1	21	11.09	33.3
Preoral length	22.7	1.8	25	32.8	1.8	21	18.95	33.3
Prenarial length	16.6	1.2	25	30.1	1.9	21	29.28	30.0
Precloacal length	90.0	5.4	25	89.8	3.4	21	0.14	93.3
Distance from mouth to tip of pelvic fin	87.5	8.8	23	71.1	3.9	5	4.03	66.7
Distance from mouth to scapulocoracoid	32.7	2.2	23	22.7	2.0	13	13.52	22.2
Eye diameter	4.4	1.1	24	1.9	0.5	19	6.61	—
Distance between eyes	20.1	2.3	23	13.3	1.6	18	10.67	13.3

The pre-Linnean name "Aiereba" of Marcgrave has no status in nomenclature, therefore its mention in the original synonymy of *P. aiereba*, as well as its other post-Linnean vernacular citations (Walbaum, 1792; Cuvier, 1816), do not prevent the availability of the specific name *aiereba* in *Trygon aiereba*, where it was first used in binominal combination for a freshwater batoid. Variable spelling of "Aiereba" ("Ajereba" mss in the Theatri; "Aereba" in Willughby, 1686, pl. 12) occurred in Marcgrave's manuscripts and in later literature. Walbaum (1792: 533-535) used both "Aiereba" and *R. ajereba*. Although the different spelling of *aiereba* and *ajereba* (in *R. ajereba* Walbaum) does not

preclude their homonymy according to the provisions of the International Code of Zoological Nomenclature, ICZN, the two names were not in competition when Müller and Henle described *T. aiereba*, because they had different generic placements, i.e., they cannot be treated as primary homonyms. The former name was used for a freshwater stingray, and the latter referred to a marine species, the "Aiereba" of Marcgrave. Furthermore, *T. aiereba* cannot be regarded as a change in spelling of *R. ajereba*, because Müller and Henle (1841) did not cite Walbaum (1792) nor his species. The selection of *R. ajereba* as the type species of *Paratrygon* (Fowler, 1948, 1970; Castex, 1968) is erroneous because this nominal species was not cited when Duméril (1965) established the generic name. Citations of the junior secondary homonym *Paratrygon ajereba* (Walbaum) (Fowler, 1948, 1970), cannot be maintained in nomenclature because they represent a misidentification of a marine batoid as a freshwater species (see ICZN, article 49).

CONCLUSIONS

The "Aiereba" Marcgrave (1648) and its vernacular repetitions (Marcgrave, 1658; Walbaum, 1792; Cuvier, 1816) have no taxonomic status. The taxa based on its original description (*Aiereba brasiliensibus*, *Raja ajereba* and *Raja orbicularis*) cannot be properly identified and preferably should be treated as *nomina dubia*.

Paratrygon Duméril, 1865 is the senior synonym of *Disceus* Garman, 1877. *Paratrygon* was established for the freshwater stingray *Trygon aiereba* Müller & Henle, and not for *Raja ajereba* Walbaum, as erroneously stated by Castex (1968), not for the "Aiereba" of Marcgrave, as misinterpreted by Bailey (1969).

The review of the original description of *Trygon aiereba* showed that it clearly applied to the freshwater stingray usually known as *Disceus thayeri*, and not to any known marine batoid species. *Trygon aiereba* is not an objective junior synonym nor a primary homonym of *Raja ajereba*, and the latter species, being a marine batoid, should not be cited in the genus *Paratrygon*.

Paratrygon aiereba (Müller & Henle, 1841) is the senior synonym of *Trygon stroglyopterus* Schomburgk, 1843 (= *T. stroglyoptera* sensu Günther, 1870), of *Disceus stroglyopterus* (Schomburgk, 1843) sensu Garman, 1877, and of *Disceus thayeri* Garman, 1913. Therefore, it is the valid name for the taxon associated with these nominal species.

Potamotrygon should be maintained as the type genus, because the family name Potamotrygonidae Garman, 1877 has priority over Paratrygonidae Gill, 1893.

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