

Asymbolus galacticus sp. nov., a new species of spotted catshark (Carcharhiniformes: Scyliorhinidae) from New Caledonia

by

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ABSTRACT. - A new species of catshark of the genus *Asymbolus* is described from 19 specimens collected on seamounts off southern New Caledonia. It is clearly distinguished from all other *Asymbolus* species by a striking, variegated colour pattern, comprised of numerous milky white blotches surrounded by rusty-brown spots and blotches, faint dusky dorsal saddles on a light brown dorsal ground colour.

RÉSUMÉ. - *Asymbolus galacticus* sp. nov., une nouvelle espèce de chien de mer (Carcharhiniformes: Scyliorhinidae) de Nouvelle-Calédonie.

Une nouvelle espèce de chien de mer du genre *Asymbolus* est décrite à partir de 19 spécimens collectés sur les monts sous-marins du sud de la Nouvelle-Calédonie. Elle se distingue nettement de toutes les autres espèces d'*Asymbolus* par une coloration remarquable constituée de nombreuses taches blanc laiteux entourées de points et de taches brun rouille, de taches sombres estompées en forme de selle sur un fond dorsal brun clair.

Key words. - Scyliorhinidae - *Asymbolus galacticus* - ISEW - New Caledonia - New species.

The scyliorhinid genus *Asymbolus* has been defined at length by Compagno *et al.* (1999). Simply, catsharks of this genus have a slim body and variegated colour pattern, narrow snout, long labial furrows, equal-size dorsal fins, and small anal fin (smaller than the dorsal fins). The group includes eight species, all from Australian waters, and six of these have been described recently (Compagno *et al.*, 1999; Last *et al.*, 1999) to provide names for species recorded by Last and Stevens (1994).

During a French program to explore the deep-sea biodiversity and fishery resources in the EEZ of New Caledonia, numerous new species of fishes were discovered. Several specimens of a new *Asymbolus* catshark were collected from seamounts off southern New Caledonia, on the northern part of the Norfolk Ridge. The new species is unique in its colour pattern making it clearly distinct from its Australian congeners. This striking new *Asymbolus* species from New Caledonia is herein described.

METHODS

Morphometric data were taken according to Compagno (2001) and were expressed in mm and as percentages of total length (TL). The holotype and five of the 18 paratypes were measured. Ratios were calculated from reliable measurements. Vertebral centra counts were obtained from radiographs; they include the number of monospondylous centra,

precaudal centra (monospondylous + diplospondylous centra to the origin of lower lobe of caudal fin) and total centra. Data for the holotype is followed in parentheses by the ranges for the five measured paratypes. Tooth row counts were obtained directly from specimens. Type specimens were deposited in the collections of the Muséum national d'Histoire naturelle, Paris (MNHN) and of the Australian National Fish Collection, Hobart (CSIRO). Figure 1 shows the capture localities of material of the new species.

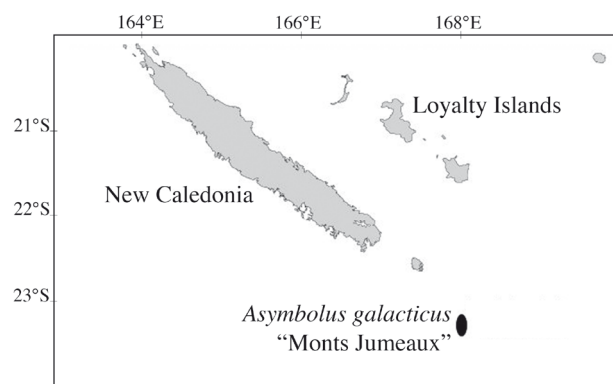


Figure 1. - Map showing the position of the seamounts "Monts Jumeaux" off southern New Caledonia from where the specimens of *Asymbolus galacticus* sp. nov. were collected. [Carte montrant la position des monts sous-marins "Monts Jumeaux" dans le sud de la Nouvelle-Calédonie où les spécimens d'*A. galacticus* sp. nov. ont été récoltés.]

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ASYMBOLUS GALACTICUS SP. NOV.

Figs 2-4, Tabs I-II

Starry catshark (English), chien étoilé (French)

Asymbolus sp. n.: Grandperrin *et al.*, 1990: annexe 1, p. 17 (listed). - Lehodey *et al.*, 1992: table 2, p. 54 and table 6, p. 85 (listed). - Séret, 1994: 7 (listed).

Material examined (19 type specimens)

Holotype. - BERYX 11, stn C 42, 23°42.50'S, 168°01'E (Banc Jumeau Ouest), 280-350 m depth, fish trawl, R.V. *Alis*, 20 Oct. 1992, male 434 mm TL (MNHN 1996-463).

Paratypes. - 18 specimens, Southern New Caledonia (northern part of Norfolk Ridge). - AZTEQUE, stn 4, 23°39'S, 168°00'E, (Bancs Jumeaux), 318 m, bottom trawl, R.V. *Alis*, 13 Feb. 1990, female 450 and male 467 mm TL (MNHN 1997-3384). - AZTEQUE, stn 5, 23°38'S, 168°00'E (Bancs Jumeaux), 235-360 m depth, bottom trawl, R.V. *Alis*, 14 Feb. 1990, males 442 and 450 mm TL (MNHN 1997-3385). - BATHUS 3, stn CH 801, 23°39.40'S, 168°00.50'E, 270-300 m depth, bottom trawl, R.V. *Alis*, 27 Dec. 1993, female 362 mm TL (MNHN 2002-1147) and female 466 mm TL (CSIRO H 6621-01). - BATHUS 3, stn CH 802, 23°40'S, 168°00.4E, 237-550 m depth, fish trawl, R.V. *Alis*, 27 Dec. 1993, 7 males 440 mm TL (MNHN 1997-3387), 442 mm TL (MNHN 1997-3386), 449 mm TL (MNHN 1997-3388), 450 mm TL (MNHN 1997-3389), 455 mm TL (MNHN 1997-3390), 462 mm TL (MNHN 1997-3391), 477 mm TL (MNHN 1997-3392) and 2 females 440 mm TL (MNHN 1999-3393) and 453 mm TL (MNHN 1997-3394). - BERYX 11, stn C 43, 23°43.06'S, 168°01.5'E (Banc Jumeau Ouest), 240-330 m, fish trawl, R.V. *Alis*, 20 Oct. 1992, female 438 mm TL (MNHN 2002-1145). - BERYX 11, stn C 47, 23°39.03'S, 167°59.95'E (Banc Jumeau Ouest), 240-330 m, fish trawl, R.V. *Alis*, 20 Oct. 1992, female 320 mm TL and male 432 mm TL (MNHN 2002-1148).

Diagnosis

A small, slender *Asymbolus* catshark with the following combination of characters: striking variegated colour pattern with numerous milky white blotches surrounded by rusty-brown spots and blotches; faint dusky dorsal saddles on back, dorsal ground colour light brown, paler on sides; claspers long and slender in adult males, distally pointed; teeth with 3 or 5 cusps; median cusps much larger than those adjacent.

Description

Small catshark with a slender and firm body; trunk sub-cylindrical anteriorly, somewhat compressed laterally and gently tapering to caudal fin; head slightly depressed, height 6.6 (5.8-6.1)% TL; abdomen long, pectoral to pelvic space 15.2 (15.1-17.1)% TL, 1.20 (1.09-1.26) of head length, pelvic to anal space 1.09 (0.73-1.02) as long as anal-fin base. Caudal peduncle high and moderately elongate, anal to caudal space 0.59 (0.48-0.75) of anal-fin base; rather compressed, almost rectangular in cross-section, dorsal surface flattened, width 1.88 (1.68-2.09) in height. Snout short and rounded-parabolic in dorsoventral view, tip broadly rounded, bluntly pointed in lateral view; preoral length 5.2 (5.5-6.2)% TL, 1.01 (0.93-1.06) times mouth width; prenarial snout 0.89 (0.88-1.17) times eye length. Eyes large, length 3.8 (3.2-4.0)% TL, 4.84 (5.03-5.81) in head length in adults; eyes dorsolateral on head, with well-developed subocular ridges. Mouth moderately large and long, broadly arched, width 7.6 (6.5-7.9)% TL, 2.63 (2.15-2.89) times its length; upper and lower labial furrows about half of mouth length. Nostrils large situated well anterior to mouth, with tube-like incurved apertures; anterior nasal flaps triangular with posterior-lateral tip forming a small lobe; nostrils well separated, internarial length 2.3 (2.2-2.4)% TL and falling well anterior to mouth.

Teeth of upper jaw exposed when mouth closed; teeth with 3 or 5 cusps; median cusp long, pointed, flanked on each side by 1-2 much smaller lateral cusps; outer lateral teeth usually minute, barely distinguishable, or abraded; 63 (57-63) rows in upper jaw, 60 (54-59) ($n = 6$) rows in lower jaw. Dermal denticles on side densely imbricated; crown shield-like, tricuspidate, with short or rudimentary lateral cusps and a long, pointed median cusp; median cusp forming a strong ridge distally, longitudinally grooved in large denticles; no caudal crest of enlarged denticles.

Clasper (Fig. 4) subcylindrical, long and slender, tapering posteriorly, tip pointed, outer length 8.0 (7.4-8.2)% TL, inner length 9.6 (8.8-9.7), width 2.27 (1.71-3.16) times spiracle length; proximal inner margin of pelvic fin fused to clasper, dorsal margin of clasper connected to pelvic fin and



Figure 2. - Lateral view of *Asymbolus galaticus*, holotype male, 434 mm TL (MNHN 1996-463). [Vue latérale.]



Figure 3. - Ventral view of head of *Asymbolus galaticus*, holotype male 434 mm TL (MNHN 1996-463). [Vue ventrale de la tête.]

to each other by a membrane to form a short partial apron over clasper insertion; no hooked denticles or clasper hooks.

Dorsal fins about the same size and shape; first dorsal fin originating over pelvic-fin insertion (slightly forward in female paratype MNHN 1997-3393); second dorsal-fin origin distinctly behind anal-fin insertion; both fins erected, with almost straight anterior margin, bluntly angular apex, truncate to weakly concave posterior margin, and acutely angular free rear tip. Pectoral fins moderately large, anterior margin length 11.0 (11.0-11.7)% TL; anterior margin slightly convex, apex bluntly angular, posterior margin truncate, rear corner broadly very rounded, lobe-like. Pelvic fins small, low, angular, length 11.5 (11.1-12.9)% TL. Anal-fin subtriangular, moderately developed, base length 11.0 (11.1-11.8)% TL, 1.40 (1.27-1.39) in interdorsal space; anal-fin origin closer to first dorsal first insertion than to second dorsal-fin origin; anal-fin height 3.11 (3.02-3.78) in base length. Caudal fin relatively short, dorsal caudal margin length 22.8 (20.2-24.4)% TL, upper lobe forming a very low ridge anteriorly, its origin barely distinguishable; lower lobe moderately developed, its anterior margin with an inflexion point at about half its length, forming a very low ridge anteriorly, barely distinguishable at origin; terminal caudal lobe fan-like, its posterior margin almost truncate.

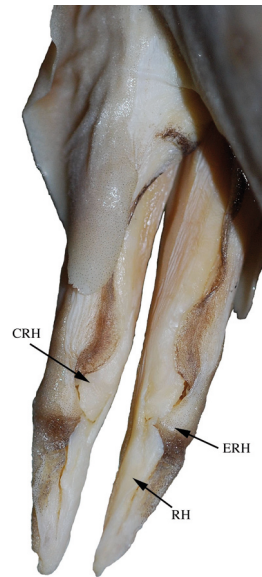


Figure 4. - Claspers of *Asymbolus galaticus*, holotype male 434 mm TL (MNHN 1996-463). CRH: Cover Rhipidion, ERH: Exorhipidion, RH: Rhipidion. [Pterygopodes de l'holotype. CRH: Cover Rhipidion, ERH: Exorhipidion, RH: Rhipidion.]

Monospondylous centra 38 (36-39); precaudal centra to caudal origin 95 (92-97), to inflexion point of ventral caudal lobe 88 (87-91); total 139 (137-144).

Coloration (from preserved specimens). - Pattern highly variegated, consisting of numerous small, densely scattered, small milky white, diffuse-edged spots on head, back and upper flanks; about 10 dusky saddles on back with white spots interspersed with numerous dark, rusty-brown spots and small circular blotches; white spots sparse or absent on sides, but rusty-brown blotches somewhat enlarged on flanks; background coloration light to medium brown dorsally on head, back and upper flanks, lower flanks and ventral surface pale. Dark saddles often indistinct, selectively distributed: across interorbital space and over gills; abdominal saddles over pectoral apex and forward of pelvic origin (these connected on the lower flanks); below both dorsal fins and interdorsally; and three on caudal fin with the last of these most prominent; some enlarged rusty blotches on sides forming a ring-like pattern. Dorsal fins, and upper surfaces of pectoral and pelvic fins similar to upper body; anal fin and ventral surfaces of pectoral and pelvic fins whitish; distal margins of dorsal and caudal fins somewhat paler than other parts of fins.

Size

To at least 477 mm TL; males maturing at about 440 mm.

Distribution

Known from the slopes of the seamounts Monts Jumeaux off southern New Caledonia, in the northern sector of the Norfolk Ridge, at 235-550 m depth.

Table I. - Morphometrics of *Asymbolus galaticus* sp. nov. expressed as a percentage of TL for the holotype, with mean, minimum and maximum values expressed as percentages of TL for five paratypes. [*Caractères morphométriques d'A. galaticus* sp. nov. exprimés en pourcentage de la LT pour l'holotype, avec la moyenne, les valeurs minimales et maximales exprimées en pourcentage de la LT pour les cinq paratypes.]

Registration		<i>Asymbolus galaticus</i>				
		Holotype MNHN 1996-463		5 paratypes (4 males + 1 female)		
		Parameters		Male adult	Mean	Min
TOT	Total length (mm)	434	%	453	434	475
PD1	Pre-first dorsal length	193.1	44.5	45.3	44.4	46.1
PD2	Pre-second dorsal length	281.5	64.9	65.4	64.0	66.7
PRC	Precaudal length	334.9	77.2	77.7	75.6	79.8
PP1	Prepectoral length	72.7	16.7	17.9	16.7	19.0
PP2	Prepelvic length	161.6	37.2	37.6	36.6	39.3
PAL	Preanal length	242.9	56.0	55.8	54.4	56.5
SVL	Snout-vent length	183.1	42.2	42.3	41.4	43.3
POB	Preorbital length (direct)	26.7	6.2	6.6	6.2	6.8
EYL	Eye length	16.4	3.8	3.6	3.2	4.0
EYH	Eye height	5.7	1.3	0.9	0.6	1.3
INO	Interorbital space	27.2	6.3	6.6	6.3	7.0
PSP	Prespiracular length	46.5	10.7	11.2	10.7	11.8
SPL	Spiracle length	2.9	0.7	0.7	0.6	1.0
PRN	Prenarial length	14.5	3.4	3.6	3.4	3.7
NOW	Nostril width	9.5	2.2	2.4	2.2	2.6
INW	Internarial space	9.8	2.3	2.3	2.2	2.4
ANF	Anterior nasal flap length	5.3	1.2	1.2	1.1	1.4
POR	Preoral length	22.7	5.2	5.6	5.2	6.2
MOW	Mouth width	32.9	7.6	7.4	6.5	7.9
MOL	Mouth length	12.5	2.9	2.9	2.7	3.1
ULA	Upper labial furrow length	6.4	1.5	1.6	1.5	1.8
LLA	Lower labial furrow length	8.7	2.0	1.9	1.5	2.1
PG1	Prebranchial length	61.4	14.1	14.3	13.5	15.0
HDL	Head length	79.5	18.3	18.7	17.7	20.2
GS1	First gill slit height	6.4	1.5	1.7	1.5	1.9
GS5	Fifth gill slit height	6.7	1.5	1.4	1.2	1.6
D1A	First dorsal anterior margin	35.6	8.2	8.2	7.9	8.6
D1B	First dorsal base	26.2	6.0	5.7	5.3	6.0
DIH	First dorsal height	19.3	4.4	4.1	3.7	4.4
D1I	First dorsal inner margin	10.8	2.5	2.4	2.2	2.7
D1P	First dorsal posterior margin	16.9	3.9	3.9	3.5	4.3
IDS	Interdorsal space	66.8	15.4	15.2	14.6	15.7
D2A	Second dorsal anterior margin	36.0	8.3	8.5	7.8	8.9
D2B	Second dorsal base	26.4	6.1	6.2	5.8	6.5
D2H	Second dorsal height	16.1	3.7	3.8	3.4	4.2
D2I	Second dorsal inner margin	11.1	2.6	2.6	2.4	2.8
D2P	Second dorsal posterior margin	17.0	3.9	4.2	3.9	4.5
P1A	Pectoral anterior margin	47.7	11.0	11.3	11.0	11.7
P1B	Pectoral base	24.6	5.7	5.7	5.5	5.8
P1I	Pectoral inner margin	25.9	6.0	6.3	6.0	6.9
P1P	Pectoral posterior margin	42.8	9.9	9.7	9.1	10.3
PPS	Pectoral-pelvic space	66.2	15.2	16.0	15.1	17.1
P2A	Pelvic anterior margin	25.5	5.9	6.0	5.8	6.2
P2B	Pelvic base	34.0	7.8	8.2	7.8	8.8
P2L	Pelvic length	49.9	11.5	11.8	11.1	12.9
P2I	Pelvic inner margin length	19.7	4.5	4.2	3.5	4.6

Table I. - Continued. [Suite.]

Registration		<i>Asymbolus galaticus</i>				
		Holotype MNHN 1996-463		5 paratypes (4 males + 1 female)		
Parameters		Male adult	Mean	Min	Max	
P2P	Pelvic posterior margin length	32.9	7.6	7.8	7.3	8.2
PAS	Pelvic-anal space	52.0	12.0	10.2	8.4	12.0
ANA	Anal anterior margin	33.3	7.7	7.7	7.1	8.3
ANB	Anal base	47.7	11.0	11.4	11.0	11.8
ANL	Anal length	55.6	12.8	13.1	12.8	13.3
ANI	Anal Inner margin	8.7	2.0	1.7	1.4	2.0
ANP	Anal posterior margin	30.3	7.0	7.4	6.9	8.1
DCS	Dorsal-caudal space	27.2	6.3	6.2	5.2	7.0
ACS	Anal-caudal space	28.3	6.5	6.9	5.5	8.3
CPH	Caudal peduncle height	16.2	3.7	3.7	3.6	3.8
CPW	Caudal peduncle width	8.6	2.0	2.0	1.8	2.2
CDM	Dorsal caudal margin	99.1	22.8	22.3	20.2	24.4
CPV	Preventral caudal margin	54.6	12.6	12.4	11.6	13.2
CST	Subterminal caudal margin	20.8	4.8	4.7	4.4	5.1
CLO	Clasper outer length	34.5	8.0	6.5	0.0	8.2
CLI	Clasper inner length	41.8	9.6	7.6	0.0	9.7
CLB	Clasper base width	6.6	1.5	1.4	0.0	1.8
HDH	Head height	28.7	6.6	6.1	5.8	6.6
HDW	Head width	45.9	10.6	10.5	9.6	11.1
ANH	Anal height	15.3	3.5	3.5	3.1	3.8
CTR	Terminal caudal margin	19.7	4.5	5.0	4.4	5.5
Ratios		Holotype	Mean	Min	Max	
34/52	Head length / Pectoral-pelvic space	1.2	1.2	1.1	1.3	
11/15	Pre-first dorsal length / Prepelvic length	1.2	1.2	1.2	1.2	
11/42	Pre-first dorsal length / Interdorsal space	2.9	3.0	2.9	3.1	
12/16	Pre-2 nd dorsal length / Preanal length	1.2	1.2	1.2	1.2	
58/60	Pelvic-anal space / Anal base length	1.1	0.9	0.7	1.1	
58/65	Pelvic-anal space / Anal-caudal space	1.8	1.5	1.3	1.8	
60/65	Anal base length / Anal-caudal space	1.7	1.7	1.3	2.1	
65/60	Anal-caudal space / Anal base length	0.6	0.6	0.5	0.7	
28/29	Preoral length / Mouth width	0.7	0.8	0.7	0.9	
28/19	Preoral length / Eye length	1.4	1.6	1.4	1.8	
14/24	Prepectoral length / Prenarial length	5.0	5.0	4.8	5.4	
24/19	Prenarial length / Eye length	0.9	1.0	0.9	1.2	
52/34	Pectoral-Pelvic length / Head length	0.8	0.9	0.8	0.9	
34/19	Head length / Eye length	4.8	5.2	4.8	5.8	
29/30	Mouth width / Mouth length	2.6	2.6	2.2	2.9	
39/45	1 st dorsal height / Second dorsal height	1.2	1.1	0.9	1.2	
42/60	Interdorsal space / Anal base length	1.4	1.3	1.3	1.4	
66/67	Caudal peduncle height / Peduncle width	1.9	1.8	1.7	2.1	
71/73	Clasper outer length / Clasper base width	5.2	4.6	4.1	5.2	

Etymology

From the Greek *galaktikos* meaning milky in reference to the vivid colour pattern resembling the Milky Way.

Remarks

Asymbolus galaticus is the only member of the genus with a colour pattern including both white and rusty

blotches. *Asymbolus analis* (Ogilby, 1885), from southern Australia, also has widely spaced rusty-brown spots and obscure dorsal saddles, but lacks white spots. *Asymbolus vincenti* (Zeitz, 1908), also from southern Australia, has numerous white spots on a chocolate-brown background, but lacks rusty-brown blotches. Furthermore, the claspers of *A. analis* are short and pointed, whereas those

Ratios		Holotype	Mean	Min	Max
34/52	Head length / Pectoral-pelvic space	1.2	1.2	1.1	1.3
11/15	Pre-first dorsal length / Prepelvic length	1.2	1.2	1.2	1.2
11/42	Pre-first dorsal length / Interdorsal space	2.9	3.0	2.9	3.1
12/16	Pre-2 nd dorsal length / Preanal length	1.2	1.2	1.2	1.2
58/60	Pelvic-anal space / Anal base length	1.1	0.9	0.7	1.1
58/65	Pelvic-anal space / Anal-caudal space	1.8	1.5	1.3	1.8
60/65	Anal base length / Anal-caudal space	1.7	1.7	1.3	2.1
65/60	Anal-caudal space / Anal base length	0.6	0.6	0.5	0.7
28/29	Preoral length / Mouth width	0.7	0.8	0.7	0.9
28/19	Preoral length / Eye length	1.4	1.6	1.4	1.8
14/24	Prepectoral length / Prenarial length	5.0	5.0	4.8	5.4
24/19	Premarial length / Eye length	0.9	1.0	0.9	1.2
52/34	Pectoral-pelvic length / Head length	0.8	0.9	0.8	0.9
34/19	Head length / Eye length	4.8	5.2	4.8	5.8
29/30	Mouth width / Mouth length	2.6	2.6	2.2	2.9
39/45	1 st dorsal height / Second dorsal height	1.2	1.1	0.9	1.2
42/60	Interdorsal space / Anal base length	1.4	1.3	1.3	1.4
66/67	Caudal peduncle height / Peduncle width	1.9	1.8	1.7	2.1
71/73	Clasper outer length / Clasper base width	5.2	4.6	4.1	5.2

Table II. - Ratios of selected measurements for the holotype and five paratypes of *Asymbolus galaticus* sp. nov. [Rapports entre caractères morphométriques sélectionnés pour l'holotype et les cinq paratypes d'*A. galaticus* sp. nov.]

of *A. vincenti* are long and distally blunt. In comparison, *A. galaticus* has claspers that are long and distally pointed. *Asymbolus analis* and *A. vincenti* grow to a slightly larger size than *A. galaticus* (about 61 cm vs about 48 cm TL, and sexual maturity in males is about 55-51 cm TL vs 44 cm TL).

None of the recently described Australian *Asymbolus* (Compagno *et al.*, 1999; Last *et al.*, 1999) has such a variegated colour pattern with both white and dusky-brown blotches. Two species of *Asymbolus* occur in eastern Australian waters, *A. pallidus* Last *et al.*, 1999 and *A. rubiginosus* Last *et al.*, 1999. *Asymbolus pallidus* has dark brown spots but lacks white blotches (both present in *A. galaticus*); a shorter snout-vent length (38.8-39.8% vs 41.4-43.3% TL), shorter prepiracular length (7.9-9.6% vs 10.7-11.8% TL), shorter pectoral-fin anterior margin (9.5-10.2% vs 11.0-11.7% TL), less compressed caudal peduncle (width 2.0-3.0% vs 1.8-2.2% TL), and teeth with five cusps (rather than tricuspidate). *Asymbolus rubiginosus* also has dark brown spots but no white blotches, and all fins are slightly situated more anteriorly (pre-first dorsal length 41.4-44.6% vs 44.4-46.1% TL, pre-second dorsal length 61.3-64.8% vs 64.0-66.7% TL, precaudal length 72.9-75.7% vs 75.6-79.8% TL, pre-anal length 51.4-54.7% vs 54.4-56.5% TL). Furthermore, in *A. rubiginosus*, the vent is also situated slightly more anteriorly (snout-vent length 39.2-40.2% vs 41.4-43.3% TL); the anal-caudal space is shorter (1.3-3.4% vs 5.5-8.3% TL) and the anal base length is longer (12.1-14.9% vs 11.0-11.8% TL), and the teeth have five cusps (rather than tricuspidate).

Key to *Asymbolus* species (after Last *et al.*, 1999)

- 1a. Body with large dark brown blotches and saddles but lacking dark or pale spots *Asymbolus funebris* (southwestern Australia)
- 1b. Body with dark or/and pale blotches and sometimes blotches and saddles 2
- 2a. Body with mainly pale spots or blotches, dark spot present or absent 3
- 2b. Body covered with small, dark spots 4
- 3a. Body with numerous milky white blotches and rusty-brown spots and blotches, faint dusky saddles *Asymbolus galaticus* sp. nov. (New Caledonia)
- 3b. Body with mainly pale spots or blotches, dark spots rare or absent 8
- 4a. Teeth with 3 cusps, large (length of longest exceeding half spiracle diameter). Dorsal-fin tips broadly rounded. Black spots sometimes on underside of head, abdomen and tail *Asymbolus submaculatus* (southwestern and possibly southeastern Australia)
- 4b. Teeth with 5-7 cusps, smaller than half spiracle diameter. Dorsal-fin tips angular or only slightly rounded. No spots on underside of head, abdomen and tail 5
- 5a. Spots distinctly orange brown, any of those on flank distinctly larger with less well-defined borders than those on predorsal space; posterior margin of first dorsal fin usually more than 4.7 % TL *Asymbolus rubiginosus* (southern Australia)

5b. Spots dark brown or black, spots on flank and back of similar size and equally well defined; posterior margin of first dorsal fin less than 4.7 % TL6

6a. Body dark greyish with poorly-defined, dark brown spots; white spots usually also evident. Interdorsal distance much less than 1.5 times total length of first dorsal fin

. *Asymbolus analis* (southern Australia)

6b. Body pale, with well-defined, brownish black spots; no white spots. Interdorsal distance 1.5 times or more total length of first dorsal fin7

7a. No obvious saddles or bands on dorsal surface; no dark spot beneath eye; usually with a pair of spots on the dorsal midline preceding each dorsal fin and a single spot at the centre of each dorsal-fin base; anal-fin length less than 2.5 times preoral length

. *Asymbolus pallidus* (northeastern Australia)

7b. Distinct saddles present on dorsal surface (more prominent in juveniles); usually a dark spot or blotch beneath each eye; mostly with a single spot on the dorsal midline preceding each dorsal fin; anal-fin length more than 2.5 times preoral length

. *Asymbolus occiduus* (southwestern Australia)

8a. Body pale brown with numerous, large white spots and blotches. Teeth with 5-7 cusps. Monospondylous centra 37 or less *Asymbolus parvus* (northwestern Australia)

8b. Body greyish brown, mottled with numerous, small white spots. Teeth mostly with three cusps. Monospondylous centra more than

. *Asymbolus vincenti* (southern Australia)

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REFERENCES

- COMPAGNO L.J.V., 2001. - Sharks of the World. An Annotated and Illustrated Catalogue of Shark Species Known to Date. Vol. 2. Bullhead, Mackerel and Carpets Sharks (Heterodontiformes, Lamniformes and Orectolobiformes). FAO Species Catalogue for Fishery Purposes. No 1, Vol. 2, 269 p. Rome: FAO.
- COMPAGNO L.J.V., STEVENS J.D. & P.R. LAST, 1999. - Australian spotted catsharks of the genus *Asymbolus* (Carcharhiniformes: Scyliorhinidae). Part 1: Description of three new species from western Australia. In: Australian Catsharks of the Genus *Asymbolus* (Carcharhiniformes: Scyliorhinidae) (Last P.R., ed.). CSIRO Mar. Lab. Rep., 239: 2-18.
- GRANDPERRIN R., LABOUE P., PIANET R. & L. WANTIEZ, 1990. - Campagne AZTEQUE de chalutage de fond au sud-est de la Nouvelle-Calédonie (N.O. *Alis*, du 12 au 16 février 1990). *Rapp. Missions, ORSTOM Nouméa, Sci. Mer, Biol. Mar.*, 7: 1-21.
- LAST P.R., GOMON M.F. & D.C. GLEDHILL, 1999. - Australian spotted catsharks of the genus *Asymbolus* (Carcharhiniformes: Scyliorhinidae). Part 2: Description of three new, dark-spotted species. In: Australian Catsharks of the Genus *Asymbolus* (Carcharhiniformes: Scyliorhinidae) (Last P.R., ed.). CSIRO Mar. Lab. Rep., 239: 19-35.
- LAST P.R. & J.D. STEVENS, 1994. - Sharks and Rays of Australia. 513 p. Hobart: CSIRO.
- LEHODEY P., RICHER de FORGES B., NAUGES C., GRANDPERRIN R. & J. RIVATON, 1992. - Campagne BERYX 11 de pêche au chalut sur six monts sous-marins du Sud-Est de la Zone économique de Nouvelle-Calédonie (N.O. *Alis*, du 13 au 23 octobre 1992). *Rapp. Missions, ORSTOM Nouméa, Sci. Mer, Biol. Mar.*, 22: 1-93.
- OGILBY J.D., 1885. - Notes and description of some rare Port Jackson fishes. *Proc. Linn. Soc. N. S. W.*, 10(2): 199-223, 225-232, 445-447.
- SÉRET B., 1994. - Chondrichthyan fishes of New Caledonia. *Chondros*, 5(3): 6-9.
- ZEITZ A.H.C., 1908. - A synopsis of the fishes of South Australia. Part 1. *Trans. R. Soc. S. Australia*, 32: 288-293.

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