A new redescription of *Galeus atlanticus* (Vaillant, 1888) (Chondrichthyes: Scyliorhinidae) based on field marks

by

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ABSTRACT. - The Atlantic sawtail catshark, *Galeus atlanticus*, has long been synonymous with the blackmouth catshark, *Galeus melastomus*, until the validity of *G. atlanticus* was resurrected by Muñoz-Chapuli and Ortega (1985). Despite this resurrection, the two species are still often confused because of their close resemblance. Consequently, field characters are proposed to distinguish the two sibling species. In particular, the internal colour of the labial furrows is easily observable on fresh specimens and also on preserved ones in museum collections, since it is blackish in *G. atlanticus* as opposed to white in *G. melastomus*. The two Atlanto-Mediterranean species are also compared to the West-African species *G. polli*.

RÉSUMÉ. - Nouvelle description de *Galeus atlanticus* (Vaillant, 1888) (Chondrichthyes : Scyliorhinidae) basée sur des caractères d'identification de terrain.

Le chien espagnol atlantique, *Galeus atlanticus*, a longtemps été mis en synonymie avec le chien espagnol *Galeus melastomus*, jusqu'à ce que la validité de *G. atlanticus* soit reconnue par Muñoz-Chapuli et Ortega (1985). Mais, malgré cette résurrection de *G. atlanticus*, les deux espèces sont encore souvent confondues du fait de leur grande ressemblance. Des caractères "de terrain" sont proposés pour différencier les deux espèces voisines. Parmi ses caractères, la couleur interne des sillons labiaux est facilement observable sur les spécimens frais, mais également sur les spécimens conservés dans les collections muséologiques ; elle est noirâtre chez *G. atlanticus* versus blanche chez *G. melastomus*. Les deux espèces atlanto-méditerranéennes sont aussi comparées à l'espèce ouest-africaine *G. polli*.

Key words. - Scyliorhinidae - *Galeus atlanticus* - *Galeus melastomus* - *Galeus polli* - ANE - MED - Taxonomy - Anatomy.

The Atlantic sawtail catshark, *Galeus atlanticus*, was described by Vaillant (1888) from a specimen caught off Cape Espartel (Atlantic NW coast of Morocco). Its resemblance to the blackmouth catshark *Galeus melastomus* (Rafinesque, 1810) has led it to be confused with this sympatric and common species, which, in fact, caused Springer (1973) to consider *G. atlanticus* as being synonymous with *G. melastomus*. This synonymy was commonly accepted (e.g. Cadenat and Blache, 1981) or admitted with question (Compagno, 1984), until a taxonomic revision was undertaken by Muñoz-Chapuli and Ortega (1985), who resurrected the name *G. atlanticus*. Despite this resurrection, the two species are often confused mainly because the distinctive characters selected by Muñoz-Chapuli and Ortega (1985) are not easily observable in the field, during fishing operations for instance, since they were based mainly on morphometric ratios and meristic values.

In his original description of *G. atlanticus*, Vaillant (1888) himself recognized that the morphological differences with *G. melastomus* were weak when the characters were considered separately, but that all the small differences provided a "particular physiognomy" to the newly described catshark.

Recently, this taxonomic question has been considered again during scientific trawling surveys carried out in the Alboran Sea (Mersel and Medits surveys series) and due to observations aboard commercial fishing vessels, mainly deep water longliners and deep water trawlers, along the South Portuguese coast. *Galeus melastomus* is the most abundant fish species on the Alboran slope (Rey *et al.*, 2005) where its biomass and abundance index are the highest for the whole Mediterranean Sea (Bertrand *et al.*, 2000). Certain biological and spatial distribution observations during these surveys identified the presence of the two species. Moreover, further analysis of morphometric measurements and 'field characters' was carried out in order to provide data for a comparison of the two species and to propose a new taxonomic character which could allow quick and easy separation of these catsharks in the field and which would still be generally observable on preserved specimens kept in muse-

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um collections. In addition, these two species are compared to the West African *Galeus polli* (Cadenat, 1959) since its synonymy with *G. atlanticus* has been questioned (Compagno, 1984).

MATERIAL AND METHODS

The samples of *G. melastomus* and *G. atlanticus* were collected from a total of 438 hauls during a series of exploratory trawling cruises performed in the Alboran Sea and off the southeastern coast of Spain (Fig. 1). Three cruises were undertaken within the framework of the European programme Medits and they were performed every spring between 2000 and 2003 with the R.V. "Cornide de Saavedra". Three other cruises (Mersel) were performed in summer 2001, autumn 2001 and winter 2002, with the R.V. "Francisco de Paula Navarro". Another cruise called Reinban was performed during the winter of 1997 around the Island of Alboran. The trawling operations were carried out on the continental shelf and slope between depths of 40 and 796 m. The GOC 73 type trawl net was used with 16.4 and 2.8 m horizontal and vertical openings, respectively, and with a cod mesh size of 20 mm. The sampling was randomly carried out according to the methods defined for the demersal fishing operations of the Medits programme (Bertrand *et al.*, 1997).

The holotype of *G. atlanticus* deposited by Vaillant (1888) in the collection of the Muséum national d'Histoire naturelle, Paris, (MNHN 1884-0387, female 411 mm TL) and two syntypes of *G. polli* (MNHN 1959-0044 and MNHN 1959-0045) were also examined. No type of *G. melastomus* is known.

Morphometric measurements were taken with dial callipers and they were categorised according to Compagno (1984). All the measurements were expressed as a percentage of the total length (TL). Vertebral counts were taken from radiographs.

RESULTS

Biometrical characters

Table I gives the morphometric measurements expressed as percentages of the TL for the three studied species of *Galeus*. Some measurements were selected for plotting in pairs in order to determine which were the most distinctive.

In figure 2, the internarial distance expressed as a percentage of the TL is plotted against the prenarial length. The specimens of *G. atlanticus* had a shorter internarial width and prenarial length than those of *G. melastomus*. The internarial width was less than 3% of the TL in *G. atlanticus*

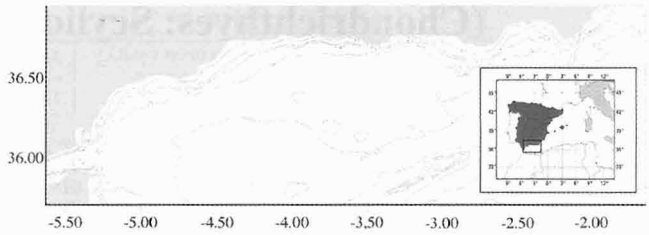

Figure 1. - Alboran Sea (southwestern Mediterranean). *[Mer d'Alboran (sud-ouest de la Méditerranée).]*

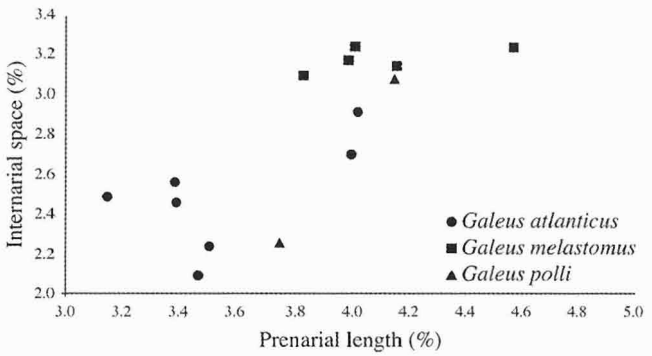

Figure 2. - Graph of internarial width against prenarial length as a percentage of TL for *Galeus atlanticus*, *G. melastomus* and *G. polli*. *[Graphique montrant la relation entre la largeur internasale et la longueur prénasale exprimées en pourcentage de la LT chez* Galeus atlanticus, G. melastomus *et* G. polli.*]*

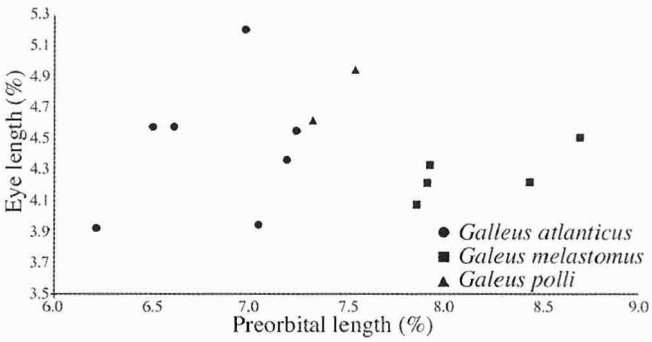

Figure 3. - Graph of eye length against preorbital length as a percentage of TL for *Galeus atlanticus*, *G. melastomus* and *G. polli*. *[Graphique montrant la relation entre la longueur de l'œil et la longueur préorbitaire exprimées en pourcentage de la LT chez* Galeus atlanticus, G. melastomus *et* G. polli.*]*

and greater than 3% in *G. melastomus*, and the prenarial length was mostly less than 4% of the TL in *G. atlanticus* and greater than 4% in *G. melastomus*. The two types of *G. polli* had intermediate values.

In figure 3, the eye length is plotted against the preorbital length. The latter was shorter in *G. atlanticus* (less than 7.5% of the TL) than in *G. melastomus* (greater than 7.5% of the TL). *G. polli* was closer to *G. atlanticus* for this character.

In figure 4, the mouth width is plotted against the preoral length. The latter tended to be shorter in *G. atlanticus* (usu-

Table I. - Biometrical measurements expressed as a percentage of TL in *Galeus atlanticus*, *G. melastomus* and *G. polli*. *[Mesures biométriques exprimées en pourcentage de la LT chez* Galeus atlanticus, G. melastomus *et* G. polli.*]*

	Galeus atlanticus 6 specimens 271 to 410 mm TL from MEDITS cruises		*Galeus atlanticus* Holotype female 411 mm TL MNHN 1884-387	*Galeus melastomus* 5 specimens 315 to 542 mm TL from MEDITS cruises		*Galeus polli* Paratype male 289 mm TL MNHN 1959-44	*Galeus polli* Paratype female 288 mm TL MNHN 1959-45
Measurements :	MIN % TL	MAX % TL	% TL	MIN % TL	MAX % TL	% TL	% TL
Tip of snout to first dorsal origin	44.28	47.53	47.45	44.44	46.46	46.02	45.14
Tip of snout to second dorsal origin	60.80	66.23	65.09	61.90	64.02	49.31	61.98
Tip of snout to upper caudal lobe	72.09	77.40	76.52	69.84	72.88	61.07	73.09
Tip of snout to pectoral orgin	19.19	20.78	19.22	18.63	20.63	20.59	20.83
Tip of snout to pelvic origin	35.24	39.20	35.28	37.64	38.73	38.41	37.67
Tip of snout to anal origin	48.17	52.99	50.85	52.06	56.09	52.60	50.35
Tip of snout to lower caudal lobe	50.18	71.69	68.61	68.89	72.79	71.97	68.75
Tip of snout to cloaca	39.80	42.86	39.90	41.90	43.17	42.91	42.36
Preorbital length	6.22	7.24	6.98	7.86	8.70	7.54	7.33
Eye length	3.93	5.21	5.21	4.08	4.51	4.95	4.62
Eye height	0.97	2.13	0.97	1.40	1.68	0.93	1.22
Interorbital space	6.38	7.93	7.83	6.72	7.79	6.82	6.94
Prespiracular length	11.57	12.82	12.55	12.45	13.49	13.32	13.44
Spiracle diameter	0.54	1.11	0.54	0.57	1.05	0.83	0.63
Prenarial length	3.15	4.02	3.50	3.83	4.57	4.15	3.75
Nostril length	2.73	3.14	3.09	2.27	2.89	2.70	2.33
Internarial space	2.09	2.92	2.24	3.10	3.24	3.08	2.26
Nasal flap length	0.83	1.04	0.83	0.76	0.96	0.83	0.69
Preoral length	7.20	8.27	7.20	7.88	9.01	8.13	7.95
Mouth width	6.41	7.61	7.30	6.26	7.02	6.71	6.98
Mouth length	3.39	4.28	4.28	4.05	4.33	4.64	4.65
Upper labial furrow length	1.00	1.64	1.29	1.62	1.97	1.66	2.26
Lower labial furrow length	1.43	2.07	1.70	1.66	1.94	2.25	2.22
Pre-first gill slit length	14.97	17.22	15.45	16.54	17.78	16.54	15.69
Pre-fifth gill slit length	19.34	21.48	19.34	20.76	21.43	21.56	21.28
First gill slit height	1.69	2.29	2.04	1.84	2.44	1.45	2.19
Fifth gill slit height	0.90	1.62	0.90	1.50	1.62	1.14	1.25
First dorsal anterior margin length	7.86	8.27	8.15	8.79	9.46	8.51	11.25
First dorsal base length	4.28	5.71	5.04	5.02	6.09	5.29	6.98
First dorsal height	2.92	3.87	2.92	2.73	4.22	2.73	2.64
First dorsal inner margin length	2.16	3.23	2.36	2.70	3.09	3.36	3.72
First dorsal posterior margin length	2.51	3.09	2.65	2.35	3.25	1.87	2.15
Interdorsal space	11.48	13.47	13.04	11.37	12.44	11.07	9.27
Second dorsal anterior margin length	8.07	10.71	10.71	8.44	9.38	9.07	10.63
Second dorsal base length	5.31	6.71	6.25	5.65	6.32	5.50	7.08
Second dorsal height	2.99	3.64	3.33	3.10	3.33	2.39	2.60
Second dorsal inner margin length	2.49	3.07	2.82	2.45	2.89	2.46	3.54
Second dorsal posterior margin length	2.87	3.30	2.87	2.79	3.19	1.97	2.33
Pectoral anterior margin length	11.22	15.17	13.82	11.76	12.31	12.46	13.47
Pectoral base length	7.45	8.77	7.47	7.59	8.83	7.85	7.08
Pectoral inner margin length	6.37	8.44	8.44	6.44	7.45	7.72	6.88
Pectoral posterior margin length	8.87	11.98	9.76	9.75	12.12	7.34	7.22
Pectoral insertion to pelvic origin	9.71	12.02	9.71	10.79	12.95	9.79	9.24
Pelvic anterior margin length	5.13	7.10	7.10	5.17	6.79	3.98	4.38
Pelvic base length	8.04	9.77	9.71	9.83	11.53	8.58	9.20
Pelvic length	11.03	13.24	13.24	12.27	13.58	10.87	13.99
Pelvic inner margin length	2.99	4.35	3.82	2.58	3.84	3.56	3.26
Pelvic posterior margin length	6.28	8.89	6.28	8.92	10.79	8.48	8.92
Pelvic insertion to anal origin	5.45	7.38	5.69	5.49	7.53	6.85	3.99
Anal anterior margin length	6.59	7.66	7.66	6.88	8.29	7.20	6.70
Anal base length	15.46	16.66	16.20	14.23	16.72	15.40	15.94
Anal length	17.46	18.10	17.74	15.70	18.29	17.79	17.88
Anal inner margin length	1.65	2.25	1.65	1.42	1.78	1.94	1.67
Anal posterior margin length	11.85	13.07	11.85	11.33	12.29	11.18	12.60

Table I. - Continued. *[Suite.]*

	Galeus atlanticus 6 specimens 271 to 410 mm TL from MEDITS cruises		*Galeus atlanticus* Holotype female 411 mm TL MNHN 1884-387	*Galeus melastomus* 5 specimens 315 to 542 mm TL from MEDITS cruises		*Galeus polli* Paratype male 289 mm TL MNHN 1959-44	*Galeus polli* Paratype female 288 mm TL MNHN 1959-45
Measurements :	MIN % TL	MAX % TL	% TL	MIN % TL	MAX % TL	% TL	% TL
2nd dorsal insertion/ upper caudal lobe	3.68	5.35	4.57	2.61	3.75	4.98	3.68
Anal insertion to lower caudal lobe	1.05	2.62	1.05	1.10	1.81	2.60	1.91
Caudal peduncle heigth	4.55	5.17	4.55	3.36	4.73	4.33	3.99
Caudal peduncle width	1.78	2.39	1.78	1.75	2.20	2.11	1.56
Upper caudal lobe length	27.99	29.37	29.20	28.36	32.03	29.07	26.74
Lower caudal lobe length	17.14	26.83	25.79	23.47	25.97	24.57	25.35
Subterminal caudal lobe length	3.95	5.50	4.09	4.56	5.16	4.29	4.55

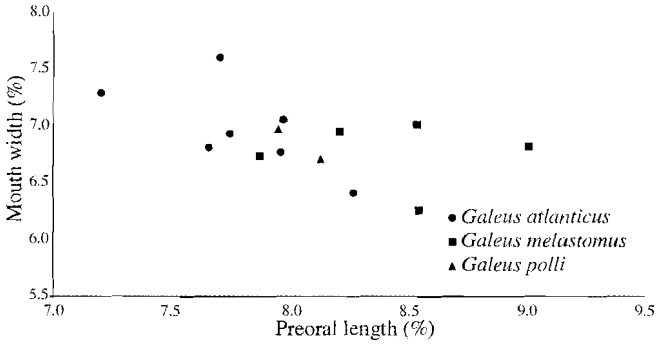

Figure 4. - Graph of mouth width against preoral length as a percentage of TL for *Galeus atlanticus*, *G. melastomus* and *G. polli*. *[Graphique montrant la relation entre la largeur de la bouche et la longueur préorale exprimées en pourcentage de la LT chez* Galeus atlanticus, G. melastomus *et* G. polli.*]*

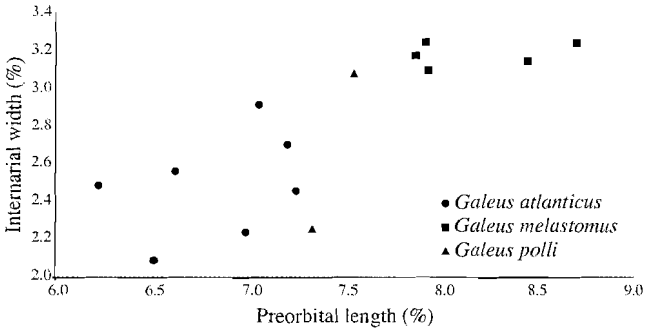

Figure 6. - Graph of internaral width against preorbital length as a percentage of TL for *Galeus atlanticus*, *G. melastomus* and *G. polli*. *[Graphique montrant la relation entre la largeur internasale et la longueur préorbitaire exprimées en pourcentage de la LT chez* Galeus atlanticus, G. melastomus *et* G. polli.*]*

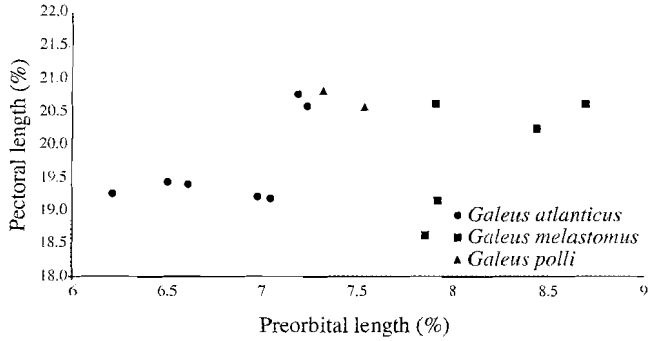

Figure 5. - Graph of prepectoral length against preorbital length as a percentage of TL for *Galeus atlanticus*, *G. melastomus* and *G. polli*. *[Graphique montrant la relation entre la longueur prépectorale et la longueur préorbitaire exprimées en pourcentage de la LT chez* Galeus atlanticus, G. melastomus *et* G. polli.*]*

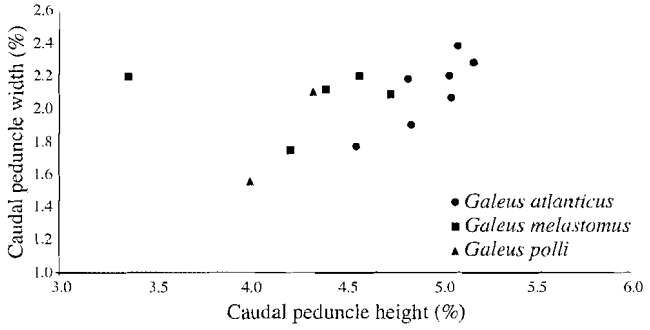

Figure 7. - Graph of caudal peduncle width against its height as a percentage of TL for *Galeus atlanticus*, *G. melastomus* and *G. polli*. *[Graphique montrant la relation entre la largeur du pédoncule caudal et sa hauteur exprimées en pourcentage de la LT chez* Galeus atlanticus, G. melastomus *et* G. polli.*]*

ally less than 8% of the TL) than in *G. melastomus* (mostly greater than 8% of the TL). *G. polli* was intermediate for this character.

In figure 5, the prepectoral length is plotted against the preorbital length. There was a clear difference between *G. atlanticus* and *G. melastomus* in preorbital length, which was less than 7.3% and greater than 7.7% of the TL, respectively. *G. polli* was intermediate for this character.

In figure 6, the internarial width is plotted against the preorbital length. There was a distinct separation between *G. atlanticus* and *G. melastomus* in the preorbital length, which was less than 7.3% and more than 7.8% of the TL, respectively. *G. polli* was intermediate for this character.

In figure 7, the width of the caudal peduncle is plotted against its height. There was a trend for *G. atlanticus* to have a higher peduncle, which was greater that 4.5% of the TL

Table II. - Vertebral counts in *Galeus atlanticus*, *G. melastomus* and *G. polli*. *[Nombres de vertèbres chez* Galeus atlanticus, G. melastomus *et* G. polli.*]*

	Galeus melastomus						*Galeus atlanticus*				*Galeus polli*					
	Springer & Wagner 1966	Krefft, 1968	Capapé 1984	Munoz-Chapuli & Ortega 1985	MNHN specimens	Range	Holotype MNHN 1884-387	MNHN specimens	Munoz-Chapuli	Range	Paratypes MNHN 1959-44 MNHN 1959-45	MNHN specimens	Springer & Wagner 1966	Krefft	Springer, 1979	Range
	n = 1	n = 3	n = 3	n = 26	n = 1	n = 34		n = 2	n = 26	n = 28	n = 2	n = 6	n = 5	n = 5	n = 56	n = 74
Monospondylous vertebrae (trunkal)	37	40 41	39 40	37 39 (38)	39	37 41	33	34 34	33 34	33 34	34 - 35	32 36	33 35	33 35	32 35	32 36
Diplospondylous vertebrae		45 50	42 44		43	42 50	44	43 43		43 44	46 - 42	39 43		38 43		38 46
Precaudal vert. = mono- + diplos. vertebrae	80	86 90	82 83	78 81 (80)	82	78 90	77	75 76	70 73 (72)	70 76	77 80	71 78	71 75	71 77		71 80
Caudal vertebrae	61	60 61	58 60		56	56 61	48	51 53		48 - 53	43 52	40 53	51 54	51 54		40 54
Total number of vertebrae	141	146 151	141 143		138	138 151	125	127 128		125 128	123 129	110 129	123 128	124 131	127 137	110 131

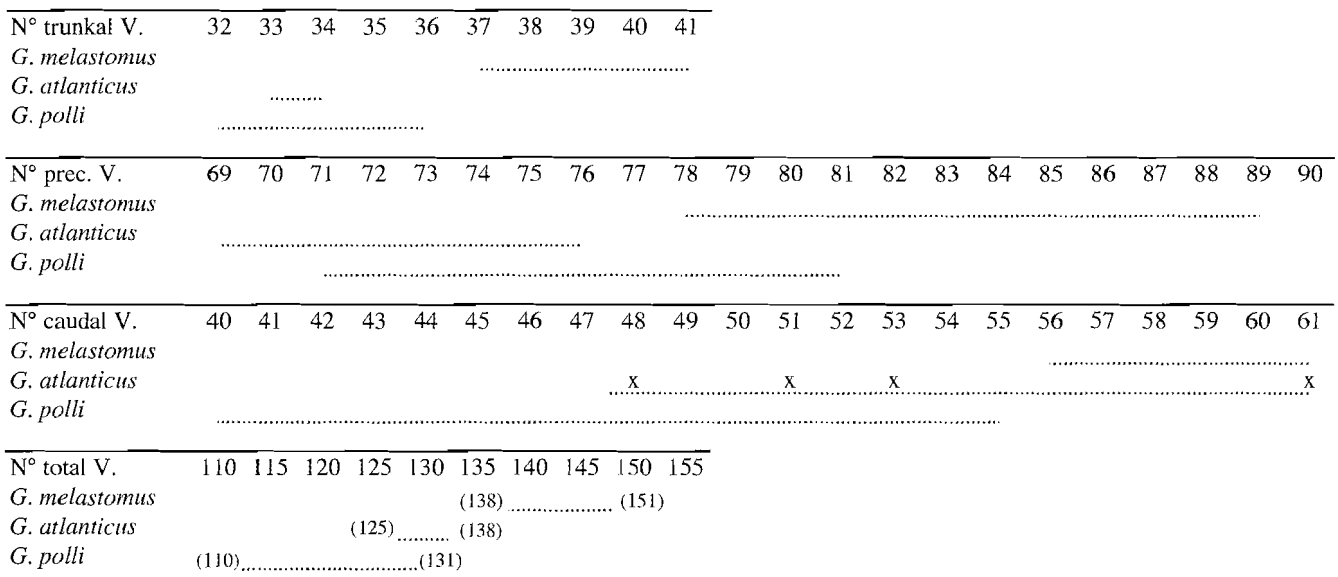

Figure 8. - Ranges of vertebral counts in *Galeus atlanticus*, *G. melastomus* and *G. polli*. *[Gammes de variation du nombre de vertèbres chez* Galeus atlanticus, G. melastomus *et* G. polli.*]*

and less than 4.5% for the two species, respectively. *G. polli* was closer to *G. melastomus* for this character.

Morphological "field" characters

In addition to the biometrical ratios and percentages, direct observations allowed certain distinctive features to be identified, which could be useful in the field. In observing the snout and head of these sharks (Figs 9 to 11), it was noticed that *G. atlanticus* had a bell-shaped snout while that of *G. melastomus* was typically uniformly rounded, and it looked more bulbous than that of *G. atlanticus*. These differences in snout shape were observed in the dorsal, ventral and lateral views, but they were more conspicuous in specimens in good condition, such as those recently caught. In *G. polli*,

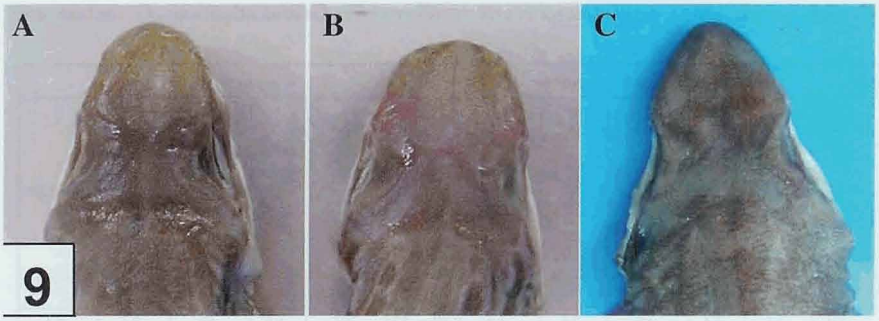

Figure 9. - Dorsal view of heads of *Galeus atlanticus* (**A**), *G. melastomus* (**B**) and *G. polli* (**C**). *[Vue dorsale de la tête de* Galeus atlanticus *(**A**),* G. melastomus *(**B**) et* G. polli *(**C**).]*

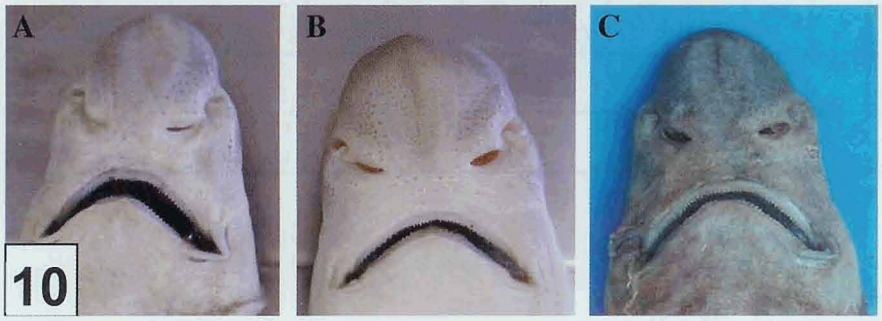

Figure 10. - Ventral view of snouts of *Galeus atlanticus* (**A**), *G. melastomus* (**B**) and *G. polli* (**C**). *[Vue ventrale du museau de* Galeus atlanticus *(**A**),* G. melastomus *(**B**) et* G. polli *(**C**).]*

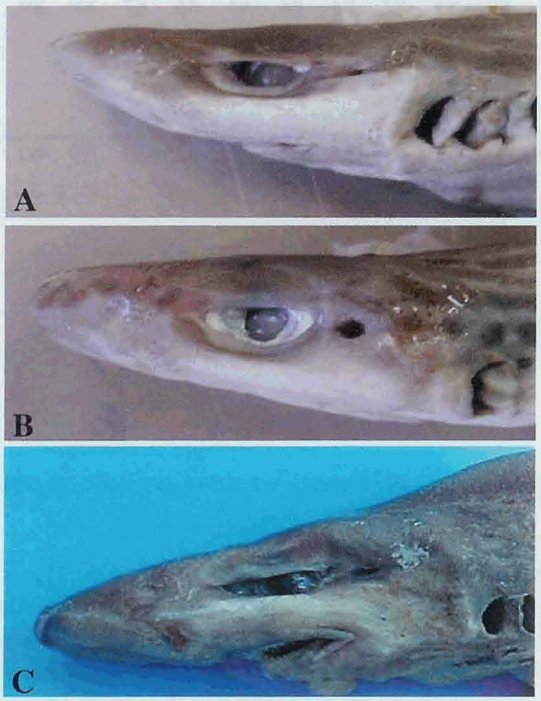

Figure 11. - Lateral view of heads of *Galeus atlanticus* (**A**), *G. melastomus* (**B**) and *G. polli* (**C**). *[Vue latérale de la tête de* Galeus atlanticus *(**A**),* G. melastomus *(**B**) et* G. polli *(**C**).]*

the snout was uniformly rounded in its lateral view, like that of *G. melastomus* (Fig. 11B), but even sharper than *G. atlanticus* in its dorsal and ventral views (Figs 9A, 10A).

General colour pattern (Fig. 12)

The general ground colour was greyish brown in *G. melastomus* and *G. atlanticus*. Both showed a pattern of dark brown blotches but with distinct differences. In *G. melastomus*, the dark blotches were more numerous, up to about 20, arranged as saddles on the back or in a line along the upper flanks. The number of dark blotches was smaller in *G. atlanticus*, up to 10, arranged as saddles on the back and with no, or only a few, isolated dark blotches on the upper flanks above the pectoral fins. In *G. polli*, there were only eight saddle-like dark blotches on the back, and only rarely on the body.

Colour of the tail (Fig. 13)

The lower lobe of the caudal fin in *G. atlanticus* had a distinct colour pattern. It consisted of two elongated black blotches separated by a small gap, as if a long dark band ran along the ventral margin of the lobe, which was interrupted only in the middle. In *G. melastomus*, there were also two dark markings but they appeared as real blotches, not bands. They were not elongated, since they were limited to the ventral corner of the lobe and to about the middle of the lobe (at the same level as the small gap in *G. atlanticus*). In *G. polli*, the blotches of the lower caudal lobe were elongated and much wider, extending well into the centre of the caudal lobe.

Colour of the labial furrows (Fig. 14)

A very distinctive character that differed between *G. atlanticus* and *G. melastomus* was the colour of the groove formed by the labial furrows. It was blackish in *G. atlanticus* and pure white in *G. melastomus*. A great number of specimens were examined and this character was found consistently. It was observable even on preserved specimens from museum collections. The grooves of the labial furrows of *G. polli* were pale (white-grey).

Vertebral counts

Table II and figure 8 give the vertebral counts for the three studied species. *G. melastomus* was distinct from *G. atlanticus* and *G. polli* by its higher counts: 37-41 trunk ver-

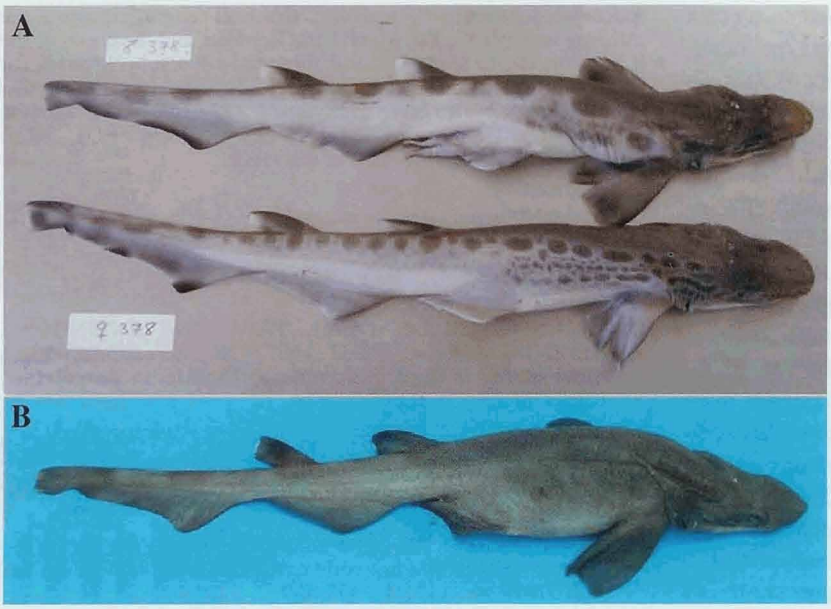

Figure 12. - General colour patterns of *Galeus atlanticus* (**A**, top), *G. melastomus* (**A**, bottom) and *G. polli* (**B**). *[Coloration générale de* Galeus atlanticus *(**A**, en haut),* G. melastomus *(**A**, en bas) et* G. polli *(**B**).]*

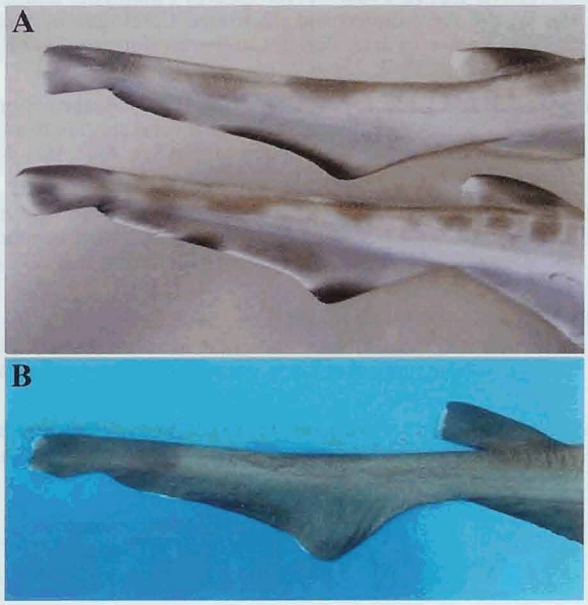

Figure 13. - Tails of *Galeus atlanticus* (**A**, top), *G. melastomus* (**A**, bottom) and *G. polli* (**B**). *[Queue de* Galeus atlanticus *(**A**, en haut),* G. melastomus *(**A**, en bas) et* G. polli *(**B**).]*

tebrae *versus* less than 36 for the other two species; 78-90 precaudal vertebrae *versus* 69-76 for *G. atlanticus* and 71-80 for *G. polli*; 56-61 caudal vertebrae *versus* 48-61 for *G. atlanticus* and 40-54 in *G. polli*; 138-151 total number of vertebrae in *G. melastomus versus* less than 131 for the other two species. All the vertebral counts of *G. atlanticus* and *G. polli* overlapped to a large degree, and these species could not be distinguished by these criteria.

DISCUSSION

As mentioned in the introduction, the taxonomic status of *G. atlanticus* has varied. The species was considered as a synonym of *G. melastomus* by some authors and as a valid species by others. However, due to morphological studies, it is now well established that *G. atlanticus* is a valid species distinct from its sibling congener *G. melastomus*. Nevertheless, genetic analysis is currently being carried out and the results will be presented in another paper.

Besides the morphometric differences, the colour of the groove formed by the labial furrows was shown to be a simple and quick way to separate the two species, both on board during fishing operations, as well as in the laboratory after preservation of the specimens.

The identification of *G. polli* is more difficult as this West African species often exhibits intermediate values for the observed characters. Since the comparisons were made with the two syntypes and a few additional specimens from collections, they should be completed with observations on preserved material in good condition or even better on freshly caught material.

These species present ecological differences. *G. melastomus* has a larger geographical distribution, since it occurs in the whole Mediterranean Sea and in the north-eastern Atlantic from the Faeroe Islands to Senegal. On the other hand, *G. atlanticus* has a much more restricted geographical distribution, since it occurs mainly in the Alboran Sea

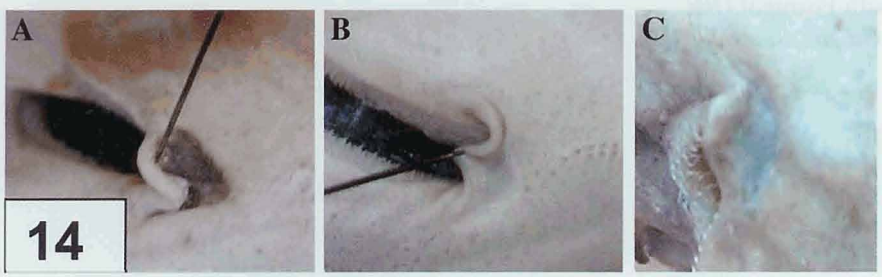

Figure 14. - Labial furrows of *Galeus atlanticus* (**A**), *G. melastomus* (**B**) and *G. polli* (**C**). *[Sillons labiaux de* Galeus atlanticus *(**A**),* G. melastomus *(**B**) et* G. polli *(**C**).]*

between Gibraltar and Cape Gata on the south-eastern coast of Spain, with the western most record being the type locality, off Cape Espartel (northwest coast of Morocco). *Galeus atlanticus* also occurs in the NE Atlantic off South Portugal, with the western most record being Cape São Vicente, on the southwest tip of the Iberian Peninsula. It should be noted that the records from France (Gulf of Lion and southern Corsica, areas 121a and 131b, respectively, of the Medits program), as they appeared in table 4 in Bertrand *et al.* (2000), are errors since only one *G. atlanticus* was caught (as shown in table I), probably from area 111, i.e. southeastern Spain.

In the same way, the bathymetric distribution of *G. melastomus* is quite large, since its depth range extends from 55 to 1200 m, with the species occurring commonly between 200 and 500 m. On the contrary, *G. atlanticus* has a more limited bathymetric distribution, ranging from 330 to 710 m.

G. polli is apparently confined to the tropical and subtropical eastern Atlantic, from off southern Morocco to the west coast of South Africa. It occurs on the outer shelf and upper slope, between 100 and 700 m. It has an uncommon mode of reproduction for a catshark, since it is ovoviviparous, whereas the other species lay eggs. Biological observations on *G. atlanticus* and *G. melastomus* made during these studies will be presented in a specific separate paper.

Identification field key

1a. Groove of labial furrows clear (white or greyish)

2a. Groove of labial furrows clear (white or greyish) (Fig. 13C). Colour pattern uniform grey-brown, with very few blurred spots if any. Caudal pattern; homogeneous and smooth grey-brown, with less evident spots (Fig. 12B). Ovoviviparous ..... ***Galeus polli***

2b. Groove of labial furrows white (Fig. 13B) Colour pattern; up to 20 dark distinct blotches on the back and upper flanks (Fig. 11A, bottom). Caudal pattern; two or three dark spots along the bottom edge (Fig. 12A, bottom). Maximum size 64 cm in the Alboran Sea (Mediterranean) and 90 cm in South Portugal (NE Atlantic). Oviparous ..... ***Galeus melastomus***

1b. Groove of labial furrows black (Fig. 13A). Colour pattern; up to 10 dark blurred blotches on the back (Fig. 11A, top). Caudal pattern; one or two black lines along the bottom edge (Fig. 12A, top). Maximum size 45 cm both in the Alboran Sea (Mediterranean) and South Portugal (NE Atlantic). Oviparous ..... ***Galeus atlanticus***

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