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A NEW NORTHERN LIMIT FOR THE DISTRIBUTION RANGE OF *LIPOPHRYS CANEVAE* (PISCES: BLENNIIDAE) IN THE ATLANTIC OCEAN

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Until recently *Lipophrys canevae* (VINCIGUERRA, 1880) was considered as an endemic species of the Mediterranean sea. It was first reported out of the Mediterranean by ALMEIDA & GOMES (1978) who collected some specimens in the southern coast of Portugal (Algarve). NIETO (1991) reported the occurrence of this species in the southwestern coast of Andalucía (Spain), near Cádiz.

In this paper we report the occurrence of this species at Arrábida (38°29'N, 8°59'W), (western coast of Portugal), near the mouth of the river Sado. This finding extends the range of this species 160 Km north, to an area that is not under direct influence of the Mediterranean sea.

The fishes were collected at low-tide, in April 1987 (n = 2) and in July 1990 (n = 2), from holes that during low-tide were out of water. The specimens were fixed in 5% formalin and preserved in alcohol. Meristic and morphometric data were compared with those from individuals caught at Algarve that

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are deposited at Museu Bocage, Lisbon ($n = 8$; MB 2464 A-H). All the morphometric measurements were taken following ALBUQUERQUE (1954-56). *Ad libitum* behavioural observations were conducted by scuba-diving during high-tide.

Specimens were identified as *L. canevae* according to the diagnostic characters presented by WIRTZ (1976), BAUCHOT & PRAS (1980), ALMEIDA (1985) and ZANDER (1986).

Tables I and II show the meristic counts and morphometric data of the specimens from Arrábida and Algarve.

TABLE I—Meristic characters of *L. canevae* collected at Arrábida (AR1-AR4) and Algarve (MBA-MBH); nd = not determined; D = dorsal fin rays; A = anal fin rays; P = pectoral fin rays; V = pelvic fin rays; C = caudal fin rays; TUJ = number of teeth in the upper jaw; TLJ = number of teeth in the lower jaw.

	Sex	D	A	P	V	C	TUJ	TLJ
AR1	♂	XIII + 15	II + 16	12	I + 3	IV + 13 + IV	26	nd
AR2	♀	XIII + 14	II + 15	12	I + 3	IV + 13 + IV	30	28
AR3	♂	XIII + 14	II + 15	12	I + 3	IV + 13 + IV	30	29
AR4	♀	XIV + 15	II + 16	12	I + 3	III + 13 + IV	26	27
MBA	♂	XIII + 14	II + 15	12	I + 3	IV + 13 + IV	28	26
MBB	♀	XIII + 15	II + 15	12	I + 3	IV + 12 + IV	30	26
MBC	♂	XIII + 15	II + 15	12	I + 3	IV + 13 + IV	29	26
MBD	♂	XIII + 15	II + 16	12	I + 3	IV + 13 + III	29	27
MBE	♂	XIII + 14	II + 15	12	I + 3	IV + 13 + IV	31	27
MBF	♀	XIII + 14	II + 14	12	I + 3	IV + 13 + IV	30	27
MBG	♂	XIII + 15	II + 16	12	I + 3	IV + 13 + IV	26	24
MBH	♂	XIII + 15	II + 16	12	I + 3	IV + 13 + IV	26	26

Discriminant analysis comparing biometric and meristic data between the fishes taken from Arrábida ($n_1 = 4$) and Algarve ($n_2 = 8$) did not reveal significant differences between the two groups. Mann-Whitney test for each meristic and morphometric variable taken separately also fail to reveal significant differences between the two groups except for the number of mandibular teeth ($n_1 = 3$; $n_2 = 8$; $Z = -2.141$; $p < 0.05$).

Although ZANDER (1986) refers the presence of a crest on the heads of the males of this species as a rare trait, in the specimens caught in Portuguese waters, six out of eight males possessed a crest. In two of them we observed a vestigial crest and on the remaining four it was fully developed. In this respect it is interesting to note that there is a significant correlation between

TABLE II — Summary statistics of the morphometric data of specimens of *L. canevae* from Arrábida and Algarve. All the measurements are in millimeters. TL — total length; SL — standard length; HL — head length; CP — caudal peduncle width; PD — pre-dorsal length; PA — pre-anal length; HH — head-height; PO — pre-orbital length; ED — eye diameter; IO — inter-orbital width.

	MALES (n = 8)				FEMALES (n = 4)			
	MEAN	SD	MAX	MIN	MEAN	SD	MAX	MIN
TL	48.43	4.26	53.15	41.33	49.36	5.33	57.21	45.36
SL	41.59	3.84	46.55	35.00	42.15	4.01	48.12	39.50
HL	10.04	0.84	11.39	8.87	9.85	0.93	11.23	9.23
CP	3.64	0.35	4.09	3.18	3.45	0.32	3.75	3.00
PD	10.40	0.96	11.63	9.06	10.83	1.35	12.85	10.01
PA	23.45	2.28	26.52	19.80	24.84	3.00	29.16	22.37
HH	8.80	1.22	10.60	6.80	8.2	1.02	9.80	7.47
PO	3.216	0.60	3.790	2.097	3.412	0.35	3.710	2.903
ED	2.107	0.05	2.177	2.016	2.177	0.00	2.177	2.177
IO	1.520	0.20	1.833	1.210	1.351	0.24	1.613	1.048

the degree of crest development (crest development was classified as: absent, vestigial (when only a slight skin fold was visible), and developed) and inter-orbital distance (IO) and head height (HH) after dividing the last two variables by standard length (SL) to avoid simple allometric effects of size (Spearman rank correlation: HH/SL x crest development, $n = 12$, $r_s = 0.793$, $p < 0.01$; IO/SL x crest development, $n = 12$, $r_s = 0.844$, $p < 0.01$; HH/SL x IO/SL, $n = 12$, $r_s = 0.895$, $p < 0.01$). Thus crested males have proportionally larger and wider heads compared with females and non-crested males. In about ten fishes (five males and five females) seen at Arrábida in 1993 during scuba-diving, all males possessed a fully developed crest, while all the females possessed a vestigial one.

Males of this species were seen guarding eggs in holes from April to July since 1987. In 1993, the first appearance of eggs in the holes was in April, and the last males guarding eggs were found in August. It is important to stress however that the holes were not inspected regularly throughout the year, and a low number of nests was visited, so the duration of the breeding season may be longer.

The nests occurred intertidally on vertical rock walls. They were found on the midlittoral zone often in the transition to the infralittoral (following the littoral zonation of PICARD (1957) and PÉRES & PICARD (1964)). They

were interspersed with nests of *Lipophrys pholis* (LINNAEUS, 1758) and *Coryphoblennius galerita* (LINNAEUS, 1758). The nests were narrow haptic holes that fitted the bodies of the males. The maximal aperture of the nest entrances ranged from 6 mm to 8 mm ($n = 4$). Both males and eggs remained out of water for several hours during low tide as described for the syntopic breeding population of *L. pholis* (ALMADA *et al.*, 1992).

Apart from the presence of a head-crest and a different head shape in most males, male secondary sex characters, namely the «facial mask» and the club like structures on the tip of the soft rays of the anal fin, correspond to those described by ZANDER (1975).

Courtship movements were similar to those described by ABEL (1964), the two main components being as follows: (i) when the males are in the nest «head-out» they react to the approach of a female with high-frequency lateral shaking movements; (ii) after this display the male may leave the nest and perform circle-swimming around it. «Hammering» a movement that ABEL (1964) reports as a courtship element that occurs only rarely, was not seen during our observations. This may be due to the low number of courtship sequences observed.

It is important to stress that the occurrence of this species at Arrábida is not occasional. In fact, inspections of the rock walls conducted from 1987 onwards consistently revealed the presence of some individuals (less than 10 along seven meters of coast line). Nests with guarding males and eggs were also found in all years. The small number of fishes may not reflect the population size since the inspections were not specifically oriented to this species.

Since the publication of «Ciofnam» (BATH, 1979) the number of blennioid species considered to be endemic of the Mediterranean decreased from nine to four (ZANDER, 1986) (actually five, since *Lipophrys sabry* was described by BATH (1982)). The range of some of these species is now known to extend well to the north of St. Vicente Cape (Portugal) thus reaching areas of the western coast of the Iberian Peninsula that are not under the direct influence of the Mediterranean waters (OLIVEIRA *et al.*, 1992). It is urgent to initiate regular surveys in the southwest coast of Europe in order to determine the extend to which these findings are due to previous lack of surveys in this area or to a faunal change that may be in progress.

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SUMMARY

In this note, the occurrence of *Lipophrys canevae* at Arrábida (Portugal) is reported, which extends 160 Km north the known range of this species in the Atlantic coast of the Iberian Peninsula. This species has been consistently found at Arrábida since 1987. The presence of a crest on the head of the males, which is considered a rare secondary sexual character in the Mediterranean populations, is very common in the specimens known from portuguese waters, even in the females, where it is vestigial. The meristic and morphometric data from the specimens known from portuguese waters are summarized. At Arrábida, the nests occur in the midlittoral zone, often in the transition to the sublittoral, and remain out of water for several hours during low tide. Breeding takes place during Spring and Summer.

SUMÁRIO

Na presente nota, descreve-se a ocorrência de *Lipophrys canevae* na costa da Arrábida (Portugal), o que estende 160 Km para norte a distribuição conhecida para esta espécie na costa atlântica da Península Ibérica. A ocorrência desta espécie na Arrábida tem sido registada regularmente desde 1987. A presença de uma crista na cabeça dos machos, que para as populações mediterrânicas é considerada um carácter sexual secundário raro, ocorre com grande frequência nos espécimens conhecidos das águas portuguesas, inclusive nas fêmeas, embora nestas seja vestigial. Resumem-se os dados merísticos e morfométricos para os exemplares até agora capturados na costa portuguesa. Na Arrábida, os ninhos ocorrem no médio-litoral, por vezes na transição para o infra-litoral, e permanecem emersos durante várias horas na baixa-mar. A reprodução tem lugar na Primavera e Verão.

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