SHORT COMMUNICATION

Life goes on: *Oblada melanura* (Linnaeus, 1758) (Perciformes, Sparidae), the saddled seabream, expands its distribution range westwards to the Azores

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Azevedo, José M.N. and R.M.A. Neto 2020. Life goes on: *Oblada melanura* (Linnaeus, 1758) (Perciformes, Sparidae), the saddled seabream, expands its distribution range westwards to the Azores. Arquipelago. Life and Marine Sciences 37: 65 - 70.

A group of 10 individuals of the saddled seabream, *Oblada melanura* (Linnaeus, 1758), was photographed at Lajes do Pico Bay, on Pico Island, Azores. This finding represents a significant westward expansion of the known range of this species and may be linked to global warming. A call is therefore made for a monitoring program of the coastal fish fauna of the Azores which would improve the understanding of the effects of climate change and other anthropogenic stressors on marine communities.

Key words: *Oblada melanura*, new record, Azores

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On August 9th 2020 a school of 10 silver-grey fish, less than 20 cm in total length and with a conspicuous black spot surrounded by a white ring on the caudal peduncle, was observed inside Lajes do Pico bay (Pico Island, Azores, Portugal, approximately 38°23'55.8"N 28°15'21.2"W) (Fig. 1). The group was observed while the authors were snorkeling over a rocky bottom covered by a multispecific algal turf at about 2 m depth. The encounter lasted for several minutes which made it possible to take a number of pictures (Fig. 2) and make a short video.

Observation of the images suggested that the fish belong to the family Sparidae, with the following visible diagnostic features (Carpenter & Iwatsuki 2016): small size and fusiform body with a large head; silver-grey colouration with dark spots and lines; mouth small with the upper jaw not extending backward beyond a vertical line through middle of eye; long, continuous dorsal fin; forked caudal fin; single, well developed and continuous lateral line extending backward to base of caudal fin; pelvic fin inserted just behind a vertical line through base of pectoral fin, which is long and pointed. However, Haemulidae, Lethrinidae and Lutjanidae are fish families similar to Sparidae (Parenti 2019), and they cannot be distinguished by using only the features visible on the images we captured. Therefore, all these four families were included in searching for a species match. The procedure consisted of browsing in FishBase (Froese & Pauli 2019) and several other publications (see Table 1) for species with a silver-grey colouration and a dark spot on the caudal peduncle. The results are presented on Table 1.

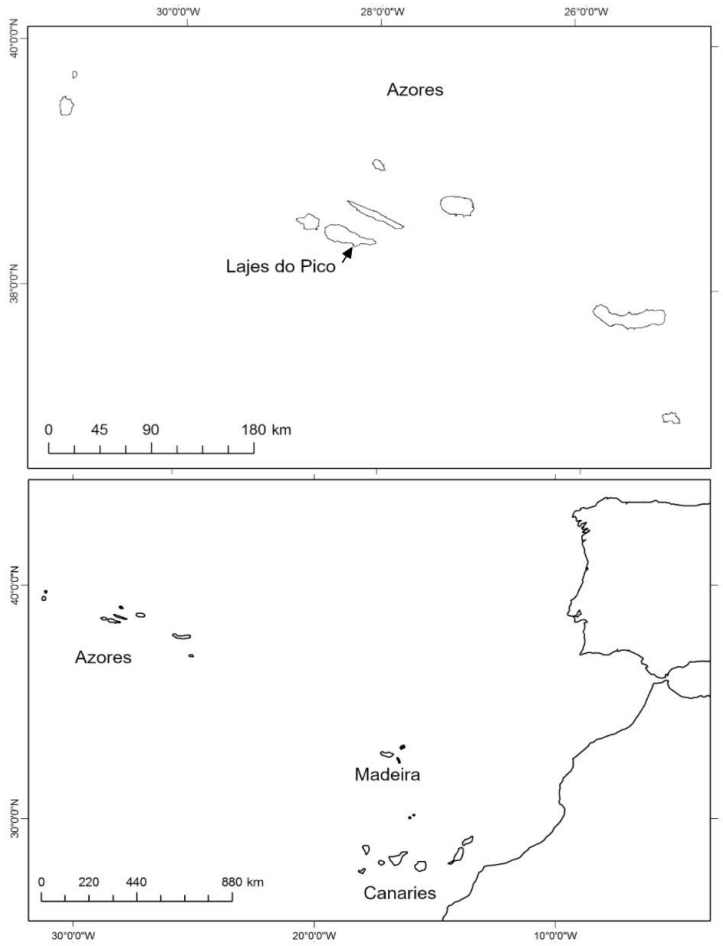

Fig. 1. Observation site on Pico Island (top); Azores (bottom).

We did not find any silver-grey species with a black spot on the caudal peduncle in the Lethrinidae and Lutjanidae families. In fact, no species of Lethrinidae has a black spot on the caudal peduncle, whereas the two Lutjanidae species which do have such a spot (one of them, the sailfin snapper *Symphorichthys spilurus*, even has a white ring surrounding it) are rather colourful fish, with conspicuous body ornamentations which were obviously not present in our individuals. Furthermore, the only three species belonging to the family Haemulidae which have a black spot lack a white ring surrounding it, and two of them have clear yellow longitudinal lines, not present on the observed individuals.

Therefore, the analysis shows that only the saddled seabream, *Oblada melanura*, belonging to the family Sparidae, has all the features visible in our images. In particular, the combination of a silver-grey general colouration with a white ring surrounding the large black spot on the caudal peduncle was found to be a diagnostic feature of this species among the families investigated.

The present record of *O. melanura* in the Azores represents a significant westward expansion of the species range. The species has a wide latitudinal distribution along the eastern Atlantic shores (from the Bay of Biscay, into the Mediterranean and southward to Angola), but it had not yet been recorded west of the Madeira Islands (Froese & Pauli 2019).

The continuous rise in anthropogenic greenhouse gas emissions is increasing global ocean temperatures (Pörtner et al. 2019). One of its effects is the tropicalization of temperate marine communities (Vergés et al. 2014), observable in the Northeastern Atlantic, from the UK coasts (Stebbing et al. 2002) down to the Iberian Peninsula (Encarnação et al. 2019), Madeira (Schäfer et al. 2019) and the Canary Islands (Espino et al. 2019). The Azores coastal fish fauna is also undergoing a process of tropicalization, characterized by the growing number of records of species with tropical or subtropical affinities, which have their northernmost distribution limit on this archipelago. (Afonso et al. 2013).

Fig. 2. Part of the *Oblada melanura* school observed (top) with detail of one of the indivudals (bottom).

However, the present record of *O. melanura* on these isolated islands does not fit this south to north tropicalization pattern because the species was already present at higher latitudes. Instead, it corresponds to a westward colonization process similar to that of several species with northeastern Atlantic and Mediterranean origin. Recent examples include new records of the roughtail tingray *Bathytoshia lata*, the golden grey mullet *Liza aurata*, and the two-banded seabream *Diplodus vulgaris* (Afonso et al. 2013).

Nevertheless, there may also be a link between this east to west expansion and climate change, exemplified by the colonization of *D. vulgaris*. This species was first caught in the Azores in 1997 (Afonso et al. 2013). However, Steffani et al. (2015), based on results from Approximate Bayesian Computation, indicated that *D. vulgaris* could have inhabited the archipelago over a century ago, and that its demographic expansion after the 1990s may have been facilitated by changing climatic conditions.

Table 1. Features of the observed specimens compared with world-wide species of Sparidae and similar families with silver-grey coloration and a black spot on the caudal peduncle, based on Fisher & Bianchi 1984 (1); Randall 1996 (2); Carpenter 2002 (3); Jiménez Prado & Béarez 2004 (4); Carpenter & Iwatsuki 2016 (5) and Froese & Pauli 2019 (6).

Species	**Features**				**Distribution**
Observed specimens	Caudal peduncule with a black spot surrounded by a white ring	Body oblong/ elongated, slightly ventrally compressed	Head profile straight	Faint dark longitudinal lines	Azores (this publication)
Sparidae					
Diplodus annularis	NO (5)	NO (5)	YES (5)	NO (5)	Eastern Atlantic: Canary Islands, from Portugal to the Bay of Biscay, Mediterranean. Black Sea and Sea of Azov. (6)
Diplodus capensis	NO (5)	NO (5)	NO (5)	NO (5)	Southeastern Atlantic and Western Indian Ocean: Angola to Mozambique and southern Madagascar. (6)
Diplodus holbrookii	NO (3)	NO (3)	YES (3)	NO (3)	Western Atlantic: Chesapeake Bay to Florida and northeastern Gulf of Mexico. (6)
Diplodus kotschyi	NO (1)	NO (1)	YES (1)	YES (1)	Western Indian Ocean: Persian Gulf and Oman to India. (6)
Diplodus noct	NO (1)	YES (1)	YES (1)	YES (1)	Red Sea. (6)
Diplodus sargus	NO (5)	NO (5)	NO (5)	NO (5)	West African coast, from Senegal to the Straits of Gibraltar; Madeira and Canary Islands; Bay of Biscay. (6)
Oblada melanura	YES (5)	YES (5)	YES (5)	YES (5)	Eastern Atlantic: Bay of Biscay, Mediterranean, and from the Strait of Gibraltar to Angola; Madeira, Cabe Verde Islands, and Canary Islands. (6)
Spicara melanurus	NO (5)	YES (5)	NO (5)	NO (5)	Eastern Atlantic: Cabe Verde Islands and Senegal. (6)
Haemulidae					
Haemulon aurolineatum	NO (3)	YES (3)	NO (3)	NO (3)	From Chesapeake Ba and Bermuda through tl Gulf of Mexico to Braz (6)
Haemulon	NO (4)	YES (4)	YES (4)	YES (4)	Eastern Pacific: Baja California,

Species	Features				Distribution
maculicauda					Mexico to Colombia [6]
Haemulon steindachneri	NO [2,4]	YES [2,4]	YES [2,4]	NO [2,4]	Western Atlantic: Panama to Santa Catarina, Brazil. Eastern Pacific: Mexico to Peru [6]

Given the current context of a climate emergency (Ripple et al. 2017), the MoniCO program to monitor coastal resources and habitats in the Azores (Afonso 2020) is particularly welcome. Considering Azores as a key point for the study of Atlantic biogeography (see the recent analysis by Freitas et al. 2019), a long term monitoring program would have more than local relevance; it would contribute (as emphasized, e.g., by Sandström et al. 2005) more detailed data to understand the effects on marine communities of climate change and other anthropogenic stressors.

REFERENCES

Afonso, P. 2020. MoniCo – a new program to monitor coastal resources, species and habitats in the Azores. Ocean Governance in Archipelagic Regions. International Conference 2019, 7-10 October 2019, Horta, Azores, Portugal. *Arquipelago*. Life and Marine Sciences. Supplement 11: 17.

Afonso, P., F.M. Porteiro, J. Fontes, F. Tempera, T. Morato, F. Cardigos and R.S. Santos 2013. New and rare coastal fishes in the Azores islands: occasional events or tropicalization process? *Journal of Fish Biology* 83(2): 272-294.

Carpenter, K.E. 2002. Sparidae. Pp. 1375-2127 in: Carpenter, K.E. (Ed.). *The living marine resources of the Western Central Atlantic*, vol. 3. Bony fishes part 2 (Opistognathidae to Molidae), sea turtles and marine mammals. FAO Species Identification Guide for Fishery Purposes and American Society of Ichthyologists and Herpetologists Special Publication No. 5. Rome, FAO. 2127 pp.

Carpenter, K.E. and Y. Iwatsuki 2016. Sparidae. Pp. 2343-3124 in: Carpenter, K.E. and N. De Angelis (Eds). *The living marine resources of the Eastern Central Atlantic*, vol. 4. Bony fishes part 2 (Perciformes to Tetradontiformes) and sea turtles. FAO Species Identification Guide for Fishery Purposes, Rome, FAO. 3124 pp.

Encarnação, J., P. Morais, V. Baptista, J. Cruz, M.A. and Teodósio 2019. New evidence of marine fauna tropicalization off the Southwestern Iberian Peninsula (Southwest Europe). *Diversity* 11, 48.

Espino, F., F. Tuya, A. del Rosario, N.E. Bosch, J. Coca, A.J. González-Ramos, F. del Rosario, F.J. Otero-Ferrer, Á.C. Moreno and R. Haroun 2019. Geographical range extension of the spotfin burrfish, *Chilomycterus reticulatus* (L. 1758), in the Canary Islands: A response to ocean warming? *Diversity* 11, 230.

Fischer, W. and G. Bianchi (Eds) 1984. *Western Indian Ocean (Fishing Area 51)*. FAO species 1984 identification sheets for fishery purposes. Prepared and printed with the support of the Danish International Development Agency (DANIDA). Rome, FAO, vols 1-6.

Freitas, R., M. Romeiras, L. Silva, R. Cordeiro, P. Madeira, J.A. González, P. Wirtz, J.M. Falcón, A. Brito, S.R. Floeter, P. Afonso, F. Porteiro, M.A. Viera-Rodríguez, A.I. Neto, R. Haroun, J.N.M. Farminhão, A.C. Rebelo, L. Baptista, C.S. Melo, A. Martínez, J. Núñez, B. Berning, M.E. Johnson and S.P. Ávila 2019. Restructuring of the 'Macaronesia' biogeographic unit: A marine multi-taxon biogeographical approach. *Scientific reports* 9 (15792).

Froese, R. and D. Pauly (Eds) 2019. *FishBase*. World Wide Web electronic publication. www.fishbase.org, version (12/2019).

Jiménez Prado, P. and P. Béarez 2004. Peces Marinos del Ecuador Continental / Marine fishes of continental Ecuador. SIMBIOE/NAZCA/IFEA. Tomo II. Quito.

Parenti, P. 2019. An annotated checklist of the fishes of the family Sparidae. *FishTaxa* 4(2): 47-98.

Pörtner, H.-O., D.C. Roberts, V. Masson-Delmotte, P. Zhai, M. Tignor, E. Poloczanska, K. Mintenbeck, A. Alegría, M. Nicolai, A. Okem, J. Petzold, B. Rama, and N.M. Weyer (Eds) *in press*. IPCC Special Report on the Ocean and Cryosphere in a Changing Climate.

Randall, J.E. 1996. *Caribbean reef fishes*. T.F.H.

Publications, Inc. Ltd., Hong Kong. 368 pp.
Ripple, W., C. Wolf, T. Newsome, P. Barnard, W. Moomaw and P. Grandcolas 2017. World scientists' warning to humanity: A second notice. *BioScience* 67: 1026–1028.
Sandström, O., Å. Larsson, J. Andersson, M. Appelberg, A. Bignert, H. Ek, H. and M. Olsson 2005. Three decades of Swedish experience demonstrates the need for integrated long-term monitoring of fish in marine coastal areas. *Water Quality Research Journal*, 40(3): 233-250.
Schäfer, S., J. Monteiro, N. Castro, G. Rilov and J. Canning-Clode 2019. *Cronius ruber* (Lamarck, 1818) arrives to Madeira Island: a new indication of the ongoing tropicalization of the northeastern Atlantic. *Marine Biodiversity* 49: 2699–2707.
Stebbing, A. R. D., S. M. T Turk, A. Wheeler and K.R. Clarke 2002. Immigration of southern fish species to south-west England linked to warming of the North Atlantic (1960–2001). *Journal of the Marine Biological Association of the United Kingdom* 82 (2): 177-180.
Stefanni, S., R. Castilho, M. Sala-Bozano, J.I. Robalo, S.M. Francisco, R.S. Santos, N. Marques, A. Brito, V.C. Almada and S. Mariani 2015. Establishment of a coastal fish in the Azores: recent colonisation or sudden expansion of an ancient relict population? *Heredity* 115: 527–537.
Vergés, A., P.D. Steinberg, M.E. Hay, A.G.B. Poore, A.H. Campbell, E. Ballesteros, K.L. Heck Jr, D.J. Booth, M.A. Coleman, D.A. Feary, W. Figueira, T. Langlois, E.M. Marzinelli, T. Mizerek, P.J. Mumby, Y. Nakamura, M. Roughan, E. van Sebille, A.S. Gupta, D.A. Smale, F. Tomas, T. Wernberg and S.K. Wilson 2014. The tropicalization of temperate marine ecosystems: climate-mediated changes in herbivory and community phase shifts. *Proceedings of the Royal Society B* 281 (1789): 20140846.

Submited 08 Nov 2020. Accepted 16 Dec 2020. Published online 14 Jan 2021.