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NOTE

Karyotype supporting *Mugil curema* Valenciennes, 1836 and *Mugil gaimardianus* Desmarest, 1831 (Mugilidae: Teleostei) as two valid nominal species*

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SUMMARY: In this study, we present the karyotypic features of two taxa, *curema* and *gaimardianus* (genus *Mugil*), supposed to be synonyms by some authors. Their cytogenetic differences are conspicuous and unambiguous, providing evidence that *Mugil curema* and *Mugil gaimardanus* are two valid nominal species.

Key words: karyotype, *Mugil curema, Mugil gaimardianus*, valid nominal species.

RESUMEN: EL CARIOTIPO CORROBORA A *MUGIL CUREMA* VALENCIENNES, 1836 Y *MUGIL GAIMARDIANUS* DESMAREST, 1831 (MUGILIDAE: TELEOSTEI) COMO DOS ESPECIES NOMINALES VÁLIDAS – En este estudio, presentamos las características del cariotipo de dos taxa, *curema* y *gaimardianus* (género *Mugil*), que algunos autores suponen son sinónimos. Sus diferencias citogenéticas son conspicuas e inequívocas, y proporcionan evidencia de que *Mugil curema* y *Mugil gaimardanus* son dos especies nominales válidas.

Palabras clave: cariotipo, *Mugil curema, Mugil gaimardianus*, especie nominal válida.

INTRODUCTION

The family Mugilidae is a complex taxonomic group of fish with a synonymy that includes 281 nominal species, among which 64 to 80 have been accepted as valid species (Nelson, 1984; Thomson, 1997). Most of the species in this family belong to the genera *Mugil* and *Liza*, which share a highly conservative external morphology.

It is very difficult to distinguish *M. gaimardianus* from *M. curema* morphologically because they coincide exactly in all meristic and morphometric characters, except for the scale number in lateral series (although this characteristic may also be blurred in juveniles). This has led Alvarez-Lajonchere (1975) and Thomson (1997) to consider these two species as synonyms. However, other studies performed on osteological traits (Cervigón, 1993) and measures of pectoral fin extension (Menezes, 1983) support the taxonomic separation of these species.

Nirchio and Cequea (1998) have reported the basic chromosome number of *M. curema* (2n=24) from the Caribbean Sea (Venezuela), which is different from that reported by Legrande and Fitzsi-

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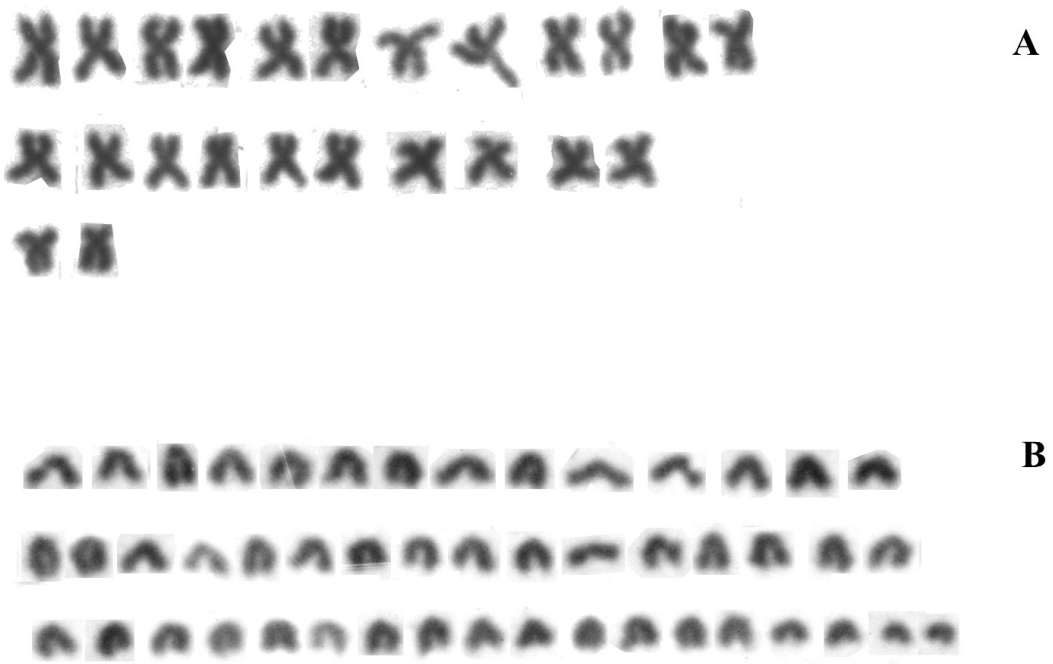

FIG. 1. – Conventional karyotype of *Mugil curema* (A) and *M. gaimardianus* (B) stained with Giemsa.

mons (1976) for *M. curema* (2n=28) from the Gulf of Mexico (Louisiana). In order to provide an additional element to contribute in clarifying the taxonomic status of these two supposed synonym taxa, we report here the karyotypes of the species *M. gaimardianus* (*sensu* Cervigón, 1993) and *M. curema* (Valenciennes, 1836).

MATERIAL AND METHODS

We analysed eight specimens (3 males and 5 females) corresponding to the form *¨gaimardianus¨* from Puerto Caimito, District La Chorrera, Panamá (08º49'53''N 79º35'32''W), plus 5 specimens of *M. curema* (immature) and 4 of *¨gaimardianus¨* (immature), from La Restinga Lagoon, Margarita Island, Venezuela (10º59´124´´N 64º 07´970´´W). The specimens have been catalogued into the fish collection at the Marine Museum of Margarita Island, Venezuela (MMM-100 to MMM-107, MMM-108 to MMM-112 and MMM-113 to MMM-117 respectively).

Mitotic chromosomes were prepared from head kidney, as described by Nirchio and Cequea (1998). Chromosomal morphology was analysed through high quality spread photographs according to Levan *et al.* (1964). The chromosomes in the karyotype are arranged in decreasing size.

RESULTS AND DISCUSSION

Mugil gaimardianus from Panama has 48 chromosomes (63% of cells). *M. curema* from Venezuela has 24 chromosomes (82% of cells) and *M. gaimardianus* from Venezuela has 48 (71% of cells).

As previously reported (Nirchio and Cequea 1998, Nirchio *et al*., 2001), *M. curema* has a karyotype formed by 24 metacentric-submetacentric (22m:2sm) chromosomes (Fig. 1A). *M. gaimardianus,* from both Venezuela and Panama has 48 acrocentric (48a) chromosomes (Fig. 1B). No heteromorphic sex chromosomes were found in the species for which sexually mature specimens were available (*M. gaimardianus* from Panama). In both species the arm number is 48.

The diversification in the genus *Mugil* may be the result of the centric fusion of acrocentric elements from an ancestor with a karyotype similar to *M. gaimardianus*, which may have given rise to that of *M. curema*. In fact, this proposal has already been discussed by Le Grande and Fitzsimons (1976), Nirchio and Cequea (1998) and Nirchio *et al*. (2001), who suggested that the karyotype of *M. curema* could be derived from any of the species of the genus *Mugil* by central fusion of 48 acrocentric chromosomes to form the 24 metacentric-submetacentric elements.

This point of view is supported first by the fact that, except for *M. curema*, a diploid complement constituted by 48 acrocentric chromosomes is a condition shared by the rest of the species of the genus *Mugil,* and also by the opinion that holds that deviations from the presumed ancestral karyotype 2n=48a (Gold, 1979; Ohno, 1974) tend towards the decrease in the chromosome number due to the fusion of acrocentric elements to form metacentric-submetacentric chromosomes (Doucette and Fitzsimons, 1988).

Taking into account that the karyotype features of the two taxa are very different, which allows us to strongly support their separation into two specific entities, we propose first that the supposed synonym *curema-gaimardianus* should not apply, and that it is valid to claim that there are two nominal species. Then, we propose to ratify *M. gaimardianus* (*sensu* Cervigón, 1993) as a valid species and to recognise its presence on the Pacific coast of Panama, among the other nine Mugilidae species already reported there, *Agnostomus monticola, Chaenomugil proboscidens, Joturus pichardi, Mugil curema, M. cephalus, M. galapagensis, M. hospes, M. setosus* and *Xenomugil thoburni* (Fischer *et al*., 1995, Allen and Robertson 1994). Finally, considering that the distribution of *M. curema* is recognised on both shores of the Atlantic and Pacific Oceans (Fischer *et al*., 1995), and that, as far as we can ascertain, *M. gaimardianus*, currently considered a synonym of *M. curema*, may not necessarily share the same geographical distribution, we also propose that the distribution range for both species should be thoroughly re-examined.

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