

De nombreux auteurs dont KIENER et SPILMANN, 1969, 1972; TRABELSI, 1989; KARTAS et TRABELSI, 1990 ont montré que l'espèce *Atherina boyeri* (Risso, 1810) ne formait pas un ensemble morphologiquement homogène dans son aire de distribution.

Afin de contribuer à la connaissance du polymorphisme chez cette espèce, nous avons effectué des observations biométriques sur des lots récoltés dans le bassin de Thau (Sète) et sur le littoral des îles Lavezzi (Corse).

L'étude a porté sur 300 spécimens de longueur totale comprise entre 45 et 105 mm.

Les caractères méristiques et métriques pris en considération sont: le nombre de vertèbres (V), d'écaillies latérales (E), de branchiospines supérieures (Br.S), inférieures (Br.I), et totales (Br.T); la longueur standard (L), la hauteur du corps (H), la longueur de la tête (T), le diamètre horizontal de l'oeil (O), la distance interorbitaire (I) et la longueur de la base de la première nageoire dorsale (D1).

Il ressort de l'analyse statistique de ces caractères les points suivants:

- Dans le bassin de Thau, on note la présence de deux populations, l'une lagunaire (A) localisée dans la zone sud-ouest et l'autre marine (B) occupant la partie nord-est de ce bassin. Les différences interpopulationnelles portent exclusivement sur les caractères méristiques (Tab. 1).

- Les athérines des îles Lavezzi (C) se distinguent nettement de celles du bassin de Thau tant au niveau de la coloration que des caractères méristiques et métriques (Tab. 1). Ces athérines se singularisent par:

- * la présence d'une série longitudinale de tâches noires situées sous la bande argentée,
- * un corps robuste et trapu (H/L),
- * un oeil remarquablement grand (O/T),
- * une distance interorbitaire large (I/T),
- * une nageoire dorsale (D1) relativement courte (D1/O, D1/I),
- * un nombre moyen de vertèbres et d'écaillies latérales faible,
- * des valeurs moyennes du nombre de branchiospines (supérieures, inférieures et totales) intermédiaires à celles des deux populations de Thau.

Le calcul du coefficient de différence (C.D. = $x_1 - x_2 / s_1 + s_2$ avec x = moyenne des valeurs de la variable, s = écart type) permet d'envisager l'existence de divergences raciales (C.D. > 0,67) et même subsécifiques (C.D. > 1,28) entre les deux populations d'athérines de Thau et entre ces dernières et celle des îles Lavezzi (Tab. 2).

Tab. 1.- Paramètres statistiques des variables méristiques et métriques (n: effectif; x: moyenne; s: écart type; A: Thau, population lagunaire; B: Thau, population marine; C: Corse, population marine).

	V	E	Br.S	Br.I	Br.T	H/L	O/T	I/T	D1/O	D1/I
n	100	100	100	100	100	100	100	100	100	100
x	44,51	45,33	7,36	18,73	26,09	17,87	31,69	25,74	92,79	114,91
s	0,86	0,90	0,50	0,76	1,03	0,90	1,22	1,61	16,21	18,05
n	100	100	100	100	100	100	100	100	100	100
x	45,78	46,03	9,26	26,29	35,55	18,67	31,50	26,56	81,50	96,73
s	0,92	0,81	0,50	0,98	1,15	0,88	1,23	1,32	9,77	11,88
n	100	100	100	100	100	100	100	100	100	100
x	43,15	42,82	8,14	21,80	29,93	21,73	34,56	31,51	53,90	59,05
s	0,77	0,81	0,49	0,82	1,09	0,86	1,31	1,08	7,53	7,73

Tab. 2.- Coefficients de différences existant entre les variables méristiques et métriques des trois populations A, B et C. (différence raciale: +; différence subsécifique: ++)

	V	E	Br.S	Br.I	Br.T	H/L	O/T	I/T	D1/O	D1/I
	0,83	1,47	0,78	1,94	1,81	2,19	1,14	2,15	1,64	2,17
	*	**	*	**	**	**	*	**	**	**
	1,56	1,98	1,22	2,50	2,51	1,76	1,21	2,07	1,60	1,92
	**	**	**	**	**	**	*	**	**	**
	0,71	0,41	1,88	4,34	4,35	0,45	0,08	0,28	0,43	0,61
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Introduction

The Kalamas river delta lies in N.W. Greece (39° 32' N, 20° 05' E) very close to the Greek-Albanian border.

The delta area occupies 7.000 ha and consists of two estuaries which were formed after the initial bed was partially deviated for irrigation purposes. As a result, on the one hand, a large area of the Kalamas delta floodplain was converted into agricultural land, on the other, new coastal habitats developed. As a consequence nowadays there is a great habitat variety of lagoons, salt and brackish water marshes, wet meadows, remnants of riparian forests and reed-thickets as well as island-like hills with phryganic vegetation.

Description of the habitats

Old river estuary: The largest part of the old river estuary has been drained and cultivated. The remaining natural habitats include lagoons and salt marshes. The description of these types of habitats follows.

Lagoons: The lagoons lie in the old estuary region and are characterised by the presence of halophytic vegetation areas either along the banks or on islets in the lagoons. The main species are *Sarcocornia perennis* (Miller) A. J. Scott., and *Arthrocnemum macrostachyum* (Moric.) Moris. On the periphery of the lagoons and at sites of fresh water supply, plant communities of *Juncetum* and *Phragmitetum* are developing while in the lagoon interior the *Ruppitium* community is present.

New river estuary: The new river estuary was created 40 years ago. The pre-existing in the area *Tamarix* forest expanded and took over a large part of the new estuary.

At the newest deposits, plant communities of *Sarcocornia perennis* (Miller) A. J. Scott., *Arthrocnemum macrostachyum* (Moric.) Moris and *Salicornia europaea* L. have settled. These three halophytic communities interchange with each other as well as with the *Tamarix* community, depending on soil salinity and water flooding frequency. Thus, continuous ecotonic communities are created.

In the wider area of the new estuary, and in areas of saline soil which are flooded less frequently a community develops of which the characteristic species is *Halocnemum strobilaceum* (Pallas) Bieb.

At the river's mouth, there are reedbeds of *Phragmites australis* (Cav.) Trin., while in the inside of the river bed, there is a narrow zone of hydrophilous trees, remnants of riparian forests. This zone follows the *Tamarix* forest.

Salt and brackish marshes: The most widely expanded type of salt marshes is the one of *Arthrocnemum macrostachyum* (Moric.) Moris, *Sarcocornia perennis* (Miller) A. J. Scott., and *Limonium nabronense* Miller. This type either forms small islets at a short distance from the coast or is met in coastal areas. In zones close to irrigation channels lying at a slightly higher level, the communities of *Juncus acutus* L. of *Juncus maritimus* Lam. develop.

Another type of saltmarshes is the one described in the section about the new estuary, which consists of *Halocnemum strobilaceum* (Pallas) Bieb.

On the north of the new river bed, there are brackish marshes resulting from the inflow of fresh water in areas of previous salt marshes. Fresh water inflow was due to the installation of irrigation channels which followed a failing attempt at agricultural exploitation. Vegetation types present in this case are: a) Community of *Scirpus maritimus* L. in areas flooded until the end of spring. b) Reed thickets of *Phragmites australis* (Cav.) Trin. and/or *Typha domingensis* (Pers.) Steudel in areas where fresh water is present almost throughout the year c) *Tamarix* spp forests. *Juncus* strips are also mixed with these zones while in more saline areas there are remnants of *Sarcocornia*. Finally, in the old estuary area, there are remnants of fresh water marshes (*Phragmitetum-Juncetum*).

Riparian forests: Due to cultivation expansion there are only remnants of riparian forests in very narrow zones which widen significantly mainly at a small part of the new river bed.

In this small part, there is variety and alternations of tree thickets of different species like *Platanus orientalis* L., *Alnus glutinosa* (L.) Gaertner, *Ulmus minor* Miller, and *Salix alba* L. Frequently, on the river banks and among tree thickets, there are communities of *Phragmites australis* (Cav.) Trin. In the rest of the area, riparian forests-mainly of *Ulmus minor* Miller - have the form of hedges concentrated in zones between the cultivations and the hills.

Island-like hills: The hills are mainly covered with degraded (due to intense grazing) phryganic vegetation of which the principal species is *Phlomis fruticosa* L. In contrast to other areas, vegetation is well developed (high and dense) forming a type of maquis vegetation. The main species are *Quercus coccifera* L., *Olea europaea* L., and *Pistacia lentiscus* L. On certain hills (Mavro Oros, Mastillitsa) *Quercus ithaburensis* Decaisne subsp. *macrolepis* (Kotchy) Hedge & Yalt. is present to a greater or smaller extent. Finally, on certain hot and dry slopes, communities of *Euphorbia dendroidea* L. are located.

As is obvious from the above description Kalamas presents a variety of habitats which is also the reason why it is used as a stop-over by many migratory bird species. Therefore the area has already been proposed for inclusion in the list of Ramsar sites in Greece. This communication represents a small part of the initial stage of an ecological study aiming to prove that the Kalamas delta fulfils the criteria for identifying wetlands of International Importance under the Ramsar convention.

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