EUROFISH INTERNATIONAL ORGANISATION

API ASSOCIAZIONE PISCICOLTORI ITALIANI

REPUBLIC OF ESTONIA
MINISTRY OF REGIONAL AFFAIRS AND AGRICULTURE

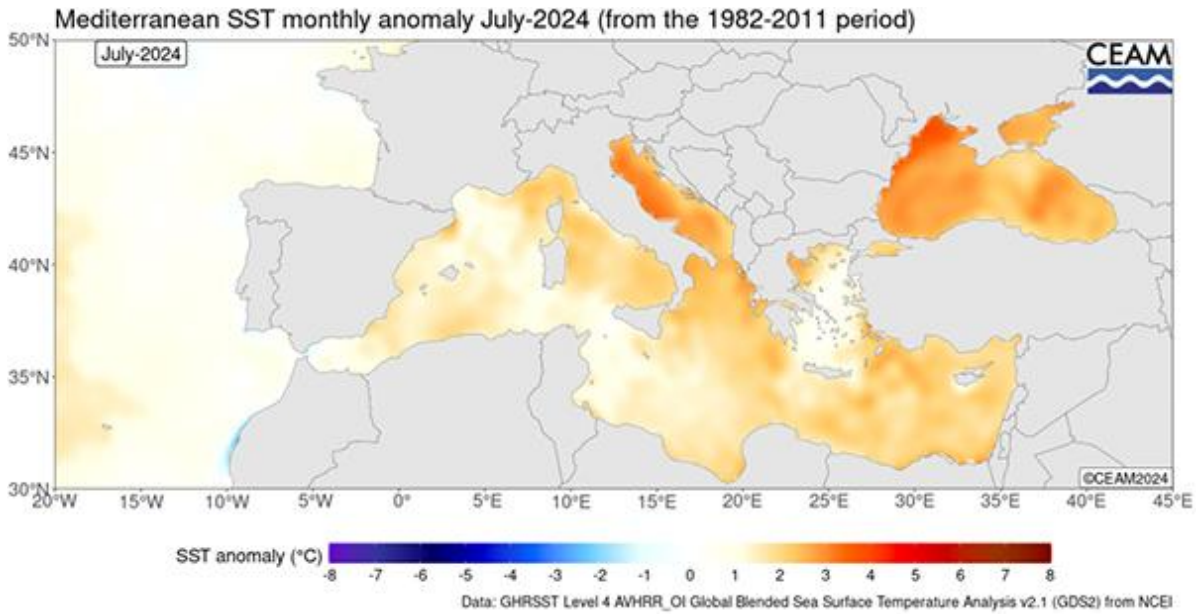
Invasive species in the Mediterranean Sea and surrounding inland waters

Mr Matteo Leonardi, President
Mr Andrea Fabris, Director

Italian Fish Farmers Association - API

Challenges for Mediterrranean aquaculture and fisheries

- ✓ **Climate change (drought, tropicalization, emerging diseases, alien species, …)**
- ✓ **Level Playing Field (competitiveness)**
- ✓ **AZA – Space for aquaculture (at sea and on land)**
- ✓ **Responsible use of resources**
- ✓ **Increase in production costs**
- ✓ **Animal health & welfare**
- ✓ **Food safety & food security**
- ✓ **Training of fishermen and aquaculture farmers**



Alloctonous (alien) Species in aquaculture

- The use of alloctonous species in aquaculture is widespread and is considered an important means of production diversification.
- In particular, Europe continues to introduce new species for aquaculture in order to remain competitive.
- At the same time, aquaculture is an important vector of voluntary and involuntary introduction of invasive aquatic species (especially fish) and other associated organisms worldwide. However, without blocking the development of aquaculture, preventive measures can be taken to prevent the introduction of potentially invasive alien species.

Reasons for using alien species in aquaculture:

- Diversification of production.
- Increase in production.
- Reduction of production costs.
- Increase in market competitiveness.

Risks associated with introducing alien species into aquaculture:

- Competition with native species.
- Spread of diseases and associated invasive organisms.
- Modification of ecosystems.
- Reduction of biodiversity.

Regulations and management:

EU regulations:

European legislation provides a regulatory framework for the management of alien species in aquaculture.

Reg. (CE) 708/2007, 506/2008, 535/2008 and Reg. (UE) 304/2011 and subsequent

National Rules and local rules on restocking on rivers and lakes with alloctonous species

Risk management:

Studies and initiatives are underway to assess the risk associated with the use of alien species in aquaculture and to adopt preventive measures.

Climate changes & alien species

The Mediterranean Sea is undergoing a process of “tropicalization,” which involves an increase in water temperature, mainly due to climate change. In addition, many species migrate through busy sea routes such as the Strait of Gibraltar or the Suez Canal, often attaching themselves to the hulls of ships or infiltrating ballast water. Infiltration into the Mediterranean comes from both the east and west – with Lessepsian species passing through the Suez Canal and fish and invertebrate species originating from the Atlantic expanding their ranges.

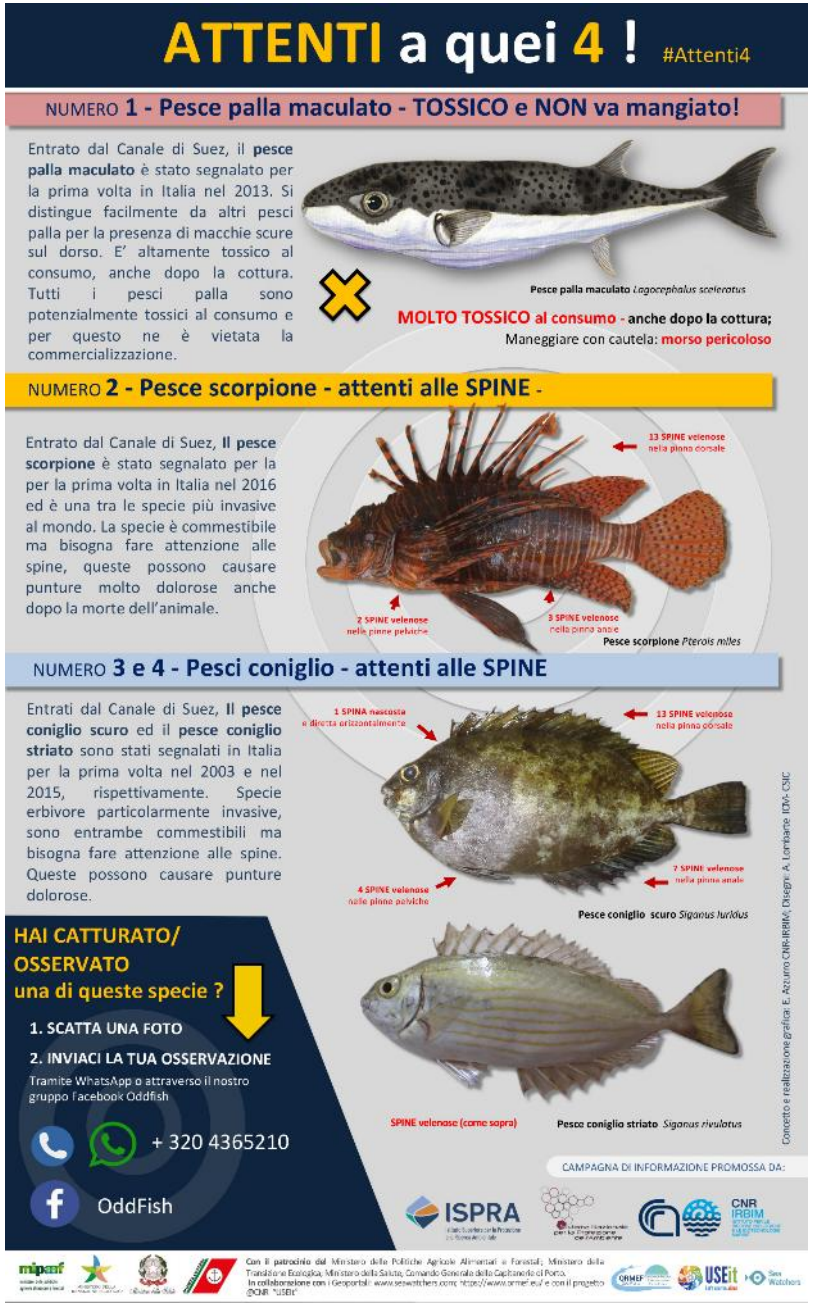
Climate changes & alien species (2)

Over 900 non-indigenous species have been reported in the Mediterranean and almost 300 in the Black Sea, with these numbers expected to rise in the future.

Numerous Lessepsian fishes are commercially relevant and have been absorbed into local markets, particularly in the eastern Mediterranean region, but many others are simply discarded due to a lack of value and there are even some, such as lionfishes, pufferfishes and several species of jellyfishes, that present immediate dangers to human health.

Beware of those 4!

The alien fishes in our seas to know and recognize



Effects of invasive fauna

Competition with local fauna: Invasive species can compete with native species for food, space and reproduction, causing a decline in native populations.

Ecosystem disturbances: Invasive species can alter the structure and function of ecosystems, changing the natural balance.

Human health risks: Some invasive species, such as the spotted pufferfish and the lionfish, are toxic or poisonous and can cause health problems if touched or consumed.

How to address the problem of invasive species?

Monitoring: It is essential to monitor the spread of invasive species and their interaction with local ecosystems.

Management: In some cases, commercial fishing can be a way to manage populations of invasive species, turning a threat into an opportunity.

Education and awareness: It is important to inform the public about the presence of invasive species and the risks they pose, so that people can avoid contact with these species and support management initiatives.

Some important invasive finfish species in the Mediterranean

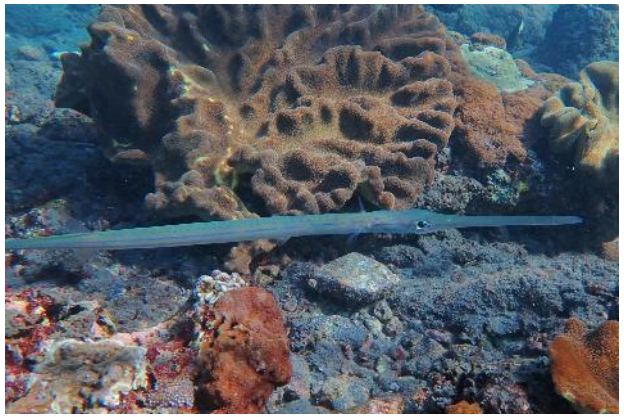
Spotted pufferfish (*Lagocephalus sceleratus*):a tropical species introduced from the Red Sea through the Suez Canal, highly toxic.

Scorpion fish (*Pterois miles*):a poisonous species that has successfully adapted to Mediterranean waters, also arrived through the Suez Canal.

Some important invasive finfish species in the Mediterranean (2)

Dusky rabbitfish (*Siganus luridus*) and **Striped rabbitfish** (*Siganus argenteus*):a tropical species that threaten local ecosystems.

Blue spotted cornetfish *(Fistularia commersonii)*: species that has expanded in the Mediterranean, competing with the indigenous fauna.



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Research Article

Alien marine fishes in Cyprus: update and new records

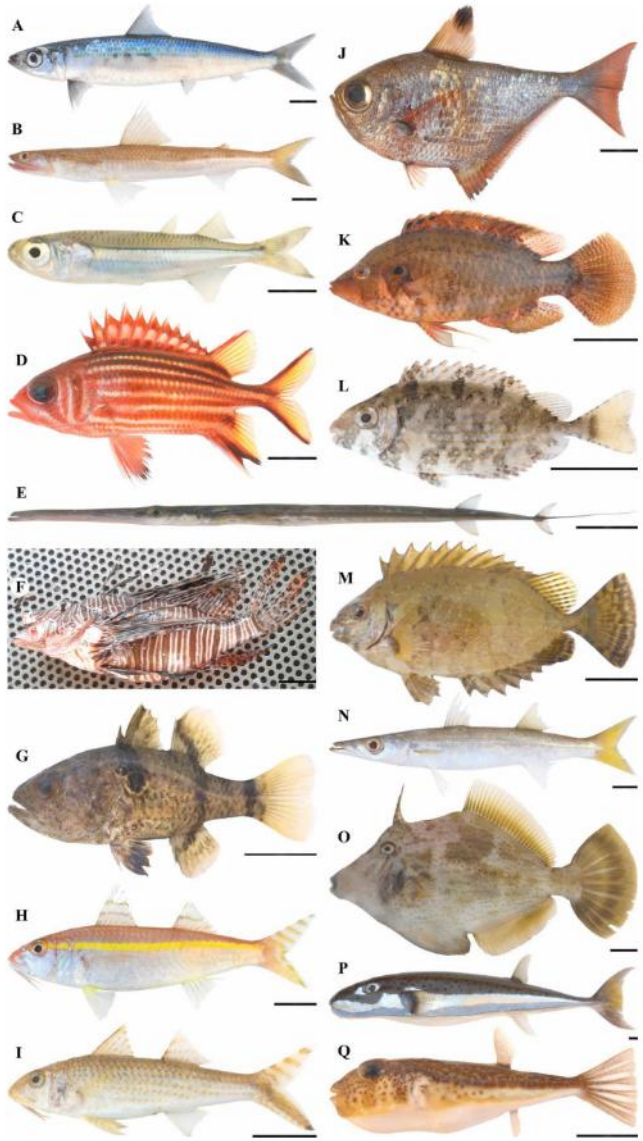


Figure 3. Additional records of alien marine fishes for Cyprus: **A**, *Etrumeus golanii*, MNHN 2014-2877, 237 mm TL, 17 Sep. 2014, off Pernera, 120 m depth; **B**, *Saurida lessepsianus*, MNHN 2014-2889, 256 mm TL, fishmarket PanFish at Limassol; **C**, *Atherinomorus forskalii*, MNHN 2014-2833, 122 mm TL, 122 mm TL, 10 Sep. 2014, Port of Agia Triada, 0.5 m depth; **D**, *Sargocentron rubrum*, MNHN 2014-2831, 127 mm TL, 09 Sep. 2014, Green Bay, 4 m depth; **E**, *Fistularia commersonii*, MNHN 2014-2920, 1001 mm TL, 22 Sep. 2014, Agia Triada, 1.5 m depth. **F**, *Pterois miles*, unpreserved, ~170 mm TL, 22 May 2014, off Ormidia, 10 m depth (photograph: A. Stavrinou); **G**, *Apogonichthyoides pharaonis*, MNHN 2014-2828, 83 mm TL, 08 Sep. 2014, Agia Triada, 1 m depth; **H**, *Upeneus moluccensis*, MNHN 2014-2900, 142 mm TL, 20 Sep. 2014, Morphou Bay; **I**, *Upeneus pori*, MNHN 2014-2870, 95 mm TL, Sep. 2014, Pernera, 1 m depth; **J**, *Pempheris rhomboidea*, MNHN 2014-2861, 156 mm TL, 14 Sept. 2014, Cape Greco, 1 m depth; **K**, *Pteragogus trispilus*, MNHN 2014-2824, 93 mm TL, 08 Sep. 2014, Agia Triada, 2 m depth; **L**, *Siganus rivulatus*, MNHN 2014-2921, 70 mm TL, 22 Sep. 2014, Agia Triada, 3 m depth; **M**, *Siganus luridus*, MNHN 2014-2845, 133 mm TL, 12 Sep. 2014, Omideia, 1 m depth; **N**, *Sphyraena pinguis*, MNHN 2014-2926, 236 mm TL, 26 Sep. 2014, Morphou Bay; **O**, *Stephanolepis diaspros*, MNHN 2014-2867, 239 mm TL, 15 Sep. 2014, Pernera, 6 m depth; **P**, *Lagocephalus sceleratus*, MNHN 2014-2875, 575 mm TL, 16 Sep. 2014, off Pernera; **Q**, *Torquigener flavimaculosus*, MNHN 2014-2827, 99 mm TL, 08 Sep. 2014, Agia Triada, 2 m depth. Scale bars = 100 mm for E and 20 mm for all others.

BioInvasions Records (2023) Volume 12, Issue 2: 339–369

Data Paper

Unpublished Mediterranean and Black Sea records of marine alien, cryptogenic, and neonative species

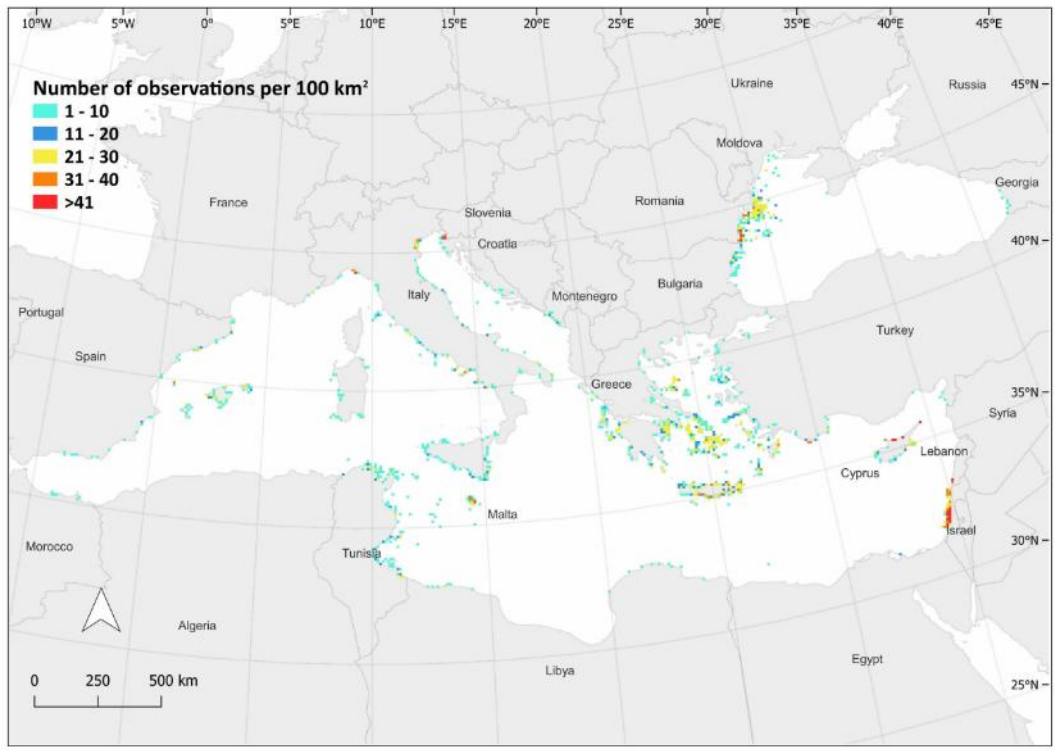


Figure 3. Number of alien, cryptogenic and neonative records per 10 km × 10 km grid cell, included in the dataset.

Callinectes sapidus **Blue crab**

It is a native species of the Atlantic coasts of the American continent. It has a slightly specialized omnivorous diet although highly efficient in the predation of bivalve molluscs.

It has been reported on the European Atlantic coasts since the beginning of the twentieth century, and in the eastern Mediterranean since the thirties and forties. Although it has already been present since the mid-twentieth century in the entire Mediterranean, the particularly rapid and invasive increase in its diffusion in the western sector starting from the second decade of the 2000s has raised alarm due to the ascertained ecosystem damage and above all on the populations of molluscs of economic interest, especially the clam

Is it also a possible resource for aquaculture or fisheries ?

Mnemiopsis leidyi – **Sea nut**

A ctenophore belonging to the Bolinopsidae family, it is easily mistaken for a jellyfish due to its transparency. It is a species native to the Atlantic introduced with the ballast water of tankers in the Black Sea.As regards the Mediterranean, it has also been reported in Italian seas, it has been reported sporadically since 2005 in the northern Adriatic, while in the Tyrrhenian Sea it has been reported at least since 2011.

It lives in shallow and eutrophic waters. The sea nut feeds on zooplankton, including larvae and fish eggs. In recent years, due to the strong proliferation in lagoon environments, it has caused negative impacts on “valliculture” (extensive farming in brackish areas) and on native biodiversity.

Aquaculture Research

Review Article

Italian aquaculture and the diffusion of alien species: costs and benefits

Benedetto Sicuro ✉ Martina Tarantola, Emanuela Valle

First published: 04 February 2016 | https://doi.org/10.1111/are.12997 | Citations: 11

- Wels catfish (*Silurus glanis*)
- Red swamp crayfish (*Procambarus clarkii*)

Wels catfish (*Silurus glanis*)

Wels catfish is not native to Italy, artificially introduced into various river basins.

Voracious predator: It feeds on a wide range of fish, reptiles, aquatic birds and even small mammals. It has remarkable size, It adapts well to various aquatic environments, including rivers and lakes.

Containment, not eradication: selective fishing aimed at capturing the catfish can be an effective method to contain its population.

Why is it a problem? The presence of catfish alters the natural balances in rivers and lakes, putting the survival of other native species at risk.

The spread of catfish contributes to reducing the diversity of fish species and aquatic ecosystems. An integrated approach is needed, which includes both the containment of the species and the promotion of sustainable management of aquatic environments.

Louisiana red shrimp - *Procambarus clarkii*

In the past, introductions into aquaculture were not regulated: unfortunately, the case of the Louisiana red shrimp is a perfect example.
It is a small freshwater crustacean, native to North America, introduced in the early 1990s for production purposes in Italy. Since the breeding site did not have effective escape containment systems, some shrimp accidentally escaped, settling and expanding in practically all the rivers and bodies of water in Italy.
Also known as the ''killer shrimp'', **it represents a threat to biodiversity and the hydraulic system of rivers.**

Red Shrimp feeds on native varieties and risks becoming the dominant species in certain areas due to its **indistinct feeding style that ranges from plant substances to animal ones** (crustaceans, fish, etc.). Another problem linked to its diffusion as a crustacean is constituted **by the burrows (2 to 5 meters deep) that it digs in the banks of watercourses, putting their stability and impermeability at risk.**

NEWSLETTER RARITY No. 01 - 10.2011

(pubblicazione trimestrale / quarterly publication)

REGIONE AUTONOMA FRIULI VENEZIA GIULIA

LIFE 10 NAT/IT/000239

R A R I T Y

ERADICATE INVASIVE LOUISIANA RED SWAMP AND PRESERVE NATIVE WHITE CLAWED CRAYFISH IN FRIULI VENEZIA GIULIA

ERADICAZIONE DEL GAMBERO ROSSO DELLA LOUISIANA E PROTEZIONE DELLA SPECIE NATIVA IN FRIULI VENEZIA GIULIA

LA NEWSLETTER RARITY

Questo primo numero della Newsletter RARITY esce in concomitanza all'avvio del progetto. La veste grafica è ancora provvisoria, e i contenuti illustrano semplicemente la natura e le attività del lavoro programmato, e curato dai diversi partner. I prossimi numeri avranno lo scopo di informare non solo sullo stato dell'arte del problema "gambero rosso" in Friuli Venezia Giulia, ma soprattutto su quello di avanzamento del progetto e sui risultati che nel corso del tempo si andranno delineando. La Newsletter avrà anche il compito di far conoscere e di promuovere le diverse azioni finalizzate all'innalzamento della consapevolezza del problema e attuate attraverso l'organizzazione di corsi di formazione (il primo dei quali è già previsto per la seconda settimana di novembre - vedi riquadro più sotto), meeting, workshop, conferenze, pubblicazioni, la realizzazione di un filmato, il networking con altri progetti, istituti e gruppi che si occupano di temi simili. Chi volesse ricevere regolarmente la Newsletter potrà farne richiesta seguendo la procedura disponibile a breve sul sito www.life-rarity.eu.

THE RARITY NEWSLETTER

This first number of the RARITY Newsletter is published and diffused in conjuction with the starting of the project. The graphic layout is still provisional, and contents simply illustrate the nature and the activities of the planned work, as well as the duties and the structure of actions carried out by different partners. Next Newsletter issues will be aimed not only to inform about the state of the art concerning the problem of the Louisiana red swamp crayfish in Friuli Venezia Giulia, but also about the state of progress of project works, and about project results which will become available during time. The Newsletter will also provide information and promote events to increase awareness and dissemination, such as training courses, meetings, workshops, conferences, production of a thematic movie, and networking with other groups and institutions. To receive the quarterly Newsletter on a regular basis let's follow the subscription procedure which will be soon available online at the URL www.life-rarity.eu.

Procambarus clarkii Girard, 1852.

Austropotamobius pallipes Lereboullet, 1858.

PRIMO CORSO DI FORMAZIONE PER IL PERSONALE ETP

Inizia la prossima settimana il primo corso di formazione destinato a personale dell'Ente Tutela Pesca. Il corso è rivolto ai collaboratori dell'ente che si occuperanno di cattura dei riproduttori, stabulazione presso gli impianti ittici, e produzione ai fini del ripopolamento di giovanili della specie nativa *Austropotamobius pallipes*. Sono previsti due giorni di lezioni in classe presso l'Acquario delle specie di acqua dolce di Ariis di Rivignano (http://www.entetutelapesca.it/pagine/acquario.htm) l'8 e il 9 novembre 2011, dalle 10:00 alle 13:00 e dalle 14:00 alle 17:00. Durante la settimana successiva saranno invece effettuate due visite con lezioni sul campo all'impianto (o agli impianti) per la produzione di novellame di A. pallipes e a una stazione di monitoraggio. L'obiettivo del corso è fornire informazioni di base sulle specie di crostacei d'acqua dolce oggetto delle azioni RARITY, e illustrare protocolli operativi che possano essere utilizzati con successo nelle fasi di:

- cattura, stabulazione e condizionamento dei riproduttori
- produzione di giovanili
- rilascio ai fini del ripopolamento

Venezia » Cronaca

"Attaccati giorno e notte dai gamberi killer"

La richiesta di aiuto lanciata dai residenti di via Forte Gazzera a Mestre. "I fossi infestati dai granchi americani. Ci rincorrono e nessun esperto sa cosa fare"

Associated alien species (pathogens, parasites) and other effects of climate change

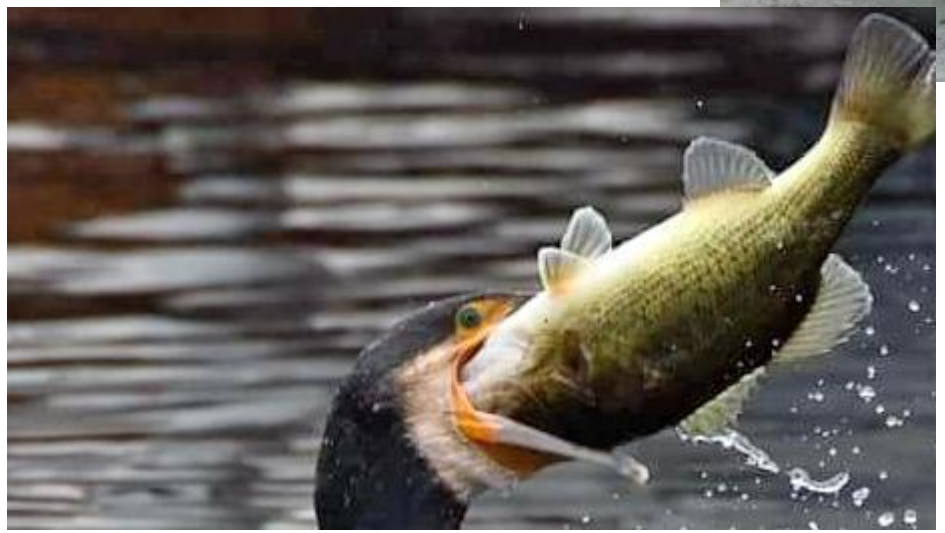
Among the effects observed by climate change, there are significant biophysical effects of change on fish species farmed or in nature, in particular for:

- exceeding the thermal tolerance of farmed species;
- hypoxic conditions of water;
- phenological changes of species (early maturation, early reproduction, early appearance of larval forms, etc.);
- problems of calcification of organisms (mollusc shell and development problems);
- **development of harmful (alien) organisms (algal blooms, jellyfish invasions, etc.);**
- **greater risk of disease spread and increased virulence of pathogens;**
- **introduction of new pathogens;**
- reduction of water quality and availability.

Other invasive predatory species, both alien and non-native (some even protected) that affect aquaculture activity

- Nutria /Coypu (Myocastor coypus)
- Cormorants

- Ichthyophagous birds,
- otters,
- gilthead bream,
- turtles,
- dolphins….



ASSOCIAZIONE PISCICOLTORI ITALIANI

Thank you!

www.acquacoltura.org