

Introduced marine Crustacea Decapoda and Stomatopoda in Syria: an overview and recent data.

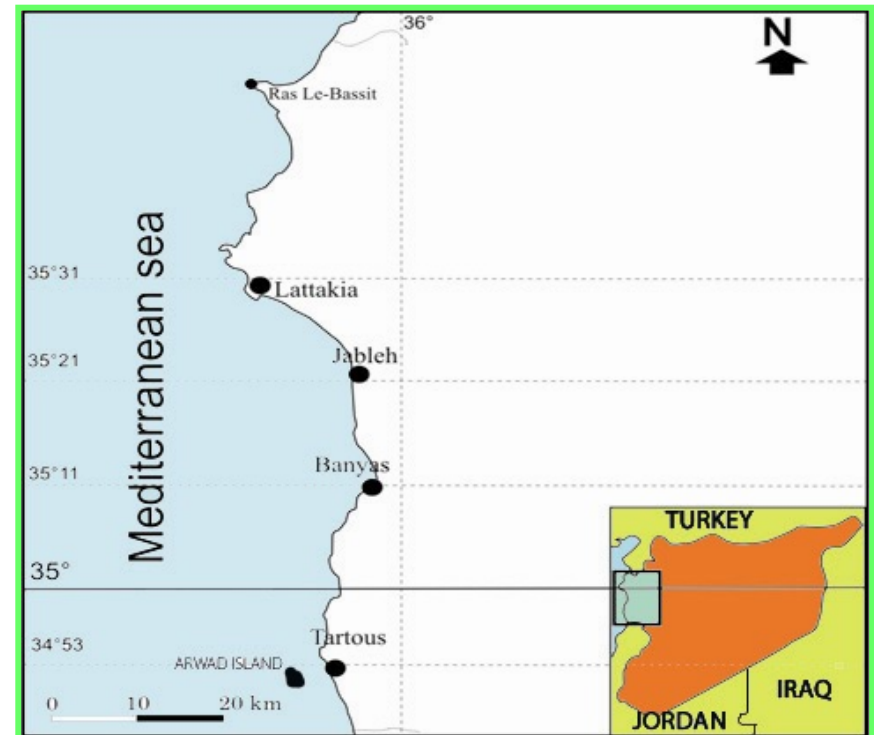
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Geographical location of the sector considered



Syria is a country in Southwest Asia, bordering the Mediterranean, between Lebanon and Turkey.

Along the Mediterranean, a narrow coastal plain stretches southward from the Turkish border to Lebanon. The flatness of this littoral, covered with sand dunes, is broken only by lateral promontories running down from the mountains to the sea. The littoral of Syria extends on 183 kilometers



Basic components of the decapods of Syria according to origin

COMPONENTS OF THE DECAPODS

ENDEMIC SPECIES

Species belonging exclusively to Mediterranean fauna, these purely Mediterranean forms (endemic) are represented by various species like Maja squinado and Macropodia longirostris

ATLANTIC-MEDITERRANEAN SPECIES

Species found at the same time in the Mediterranean and Atlantic Ocean because the majority of the species present in the Mediterranean are widely distributed in the Atlantic, e.g. Ocyrope cursor

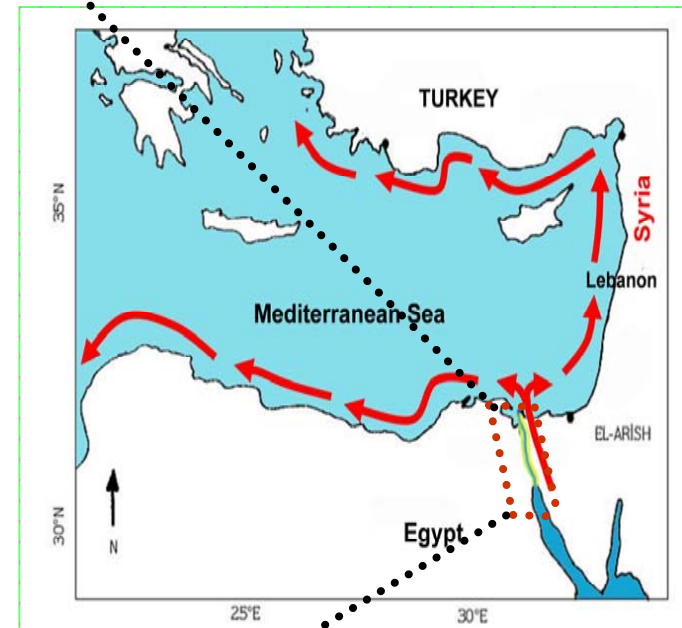
INTRODUCED SPECIES

Species from Indo-Pacific and Red Sea which penetrated in the Mediterranean by the Suez Canal after its opening in 1869 and colonized the coasts of Levantine

Colonization of the Mediterranean by species of the Red Sea via the Suez Canal

In 1869, waters of the Mediterranean and the Red Sea, which had been separated by the isthmus from Suez, came into direct contact

Species of the Red Sea colonized the Syrian coasts as all the coast of the Levantine. This is named « Lessepsian migration ». The first species arriving in Syria are: *Marsupenaeus japonicus* recorded in 1928
Penaeus semisulcatus recorded in 1928 and *Portunus pelagicus* recorded in 1930



The Lessepsian province

Some species decline west of Rhodes Island along the North African coast; Red Sea species have spread as far west as Sicily and Tunis

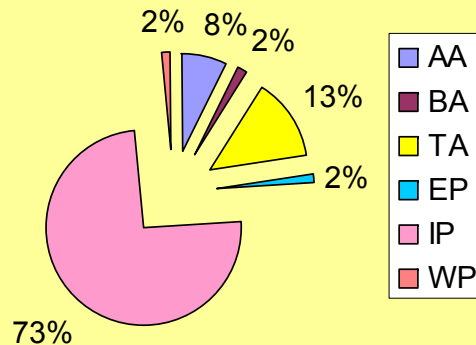


The favorable conditions in the basin of Levantine, like the temperature, salinity and the habitats contributed to the migrant species to build considerable populations.

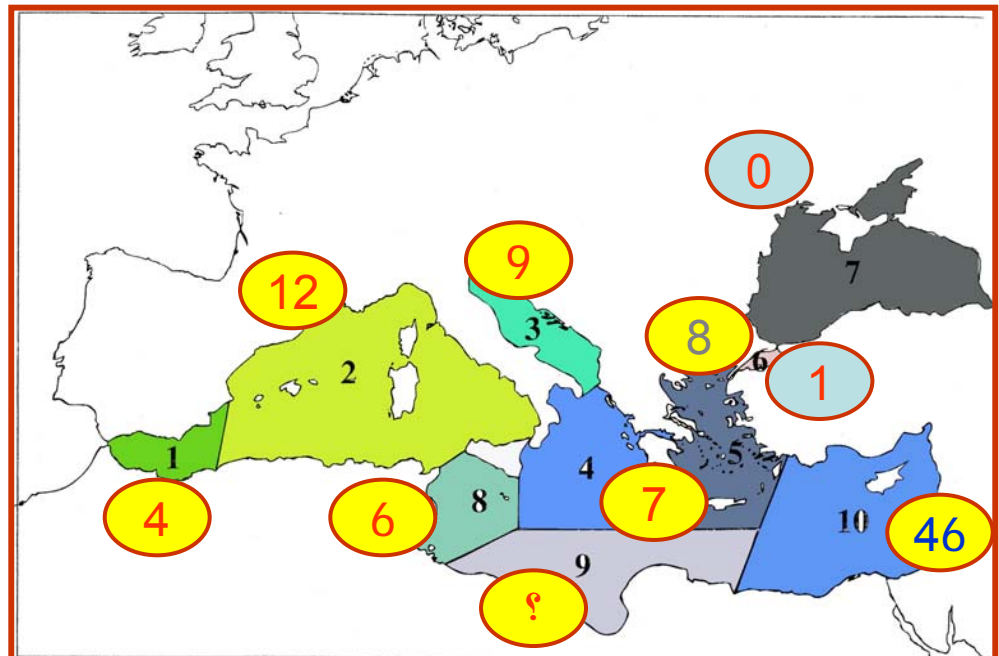
The origine of the introduced species in the Mediterranean

67 introduced species penetrated in the Mediterranean by various means, of which 46 in the Levantine.

The origin of the introduced speceis of Decapods and Stomatopods in the Mediterranean sea



AA = American Atlantic, BA = Boreal Atlantic, EP = Eastern Pacific, IP = Indo-Pacific, TA = Tropical Atlantic, WP = Western Pacific.



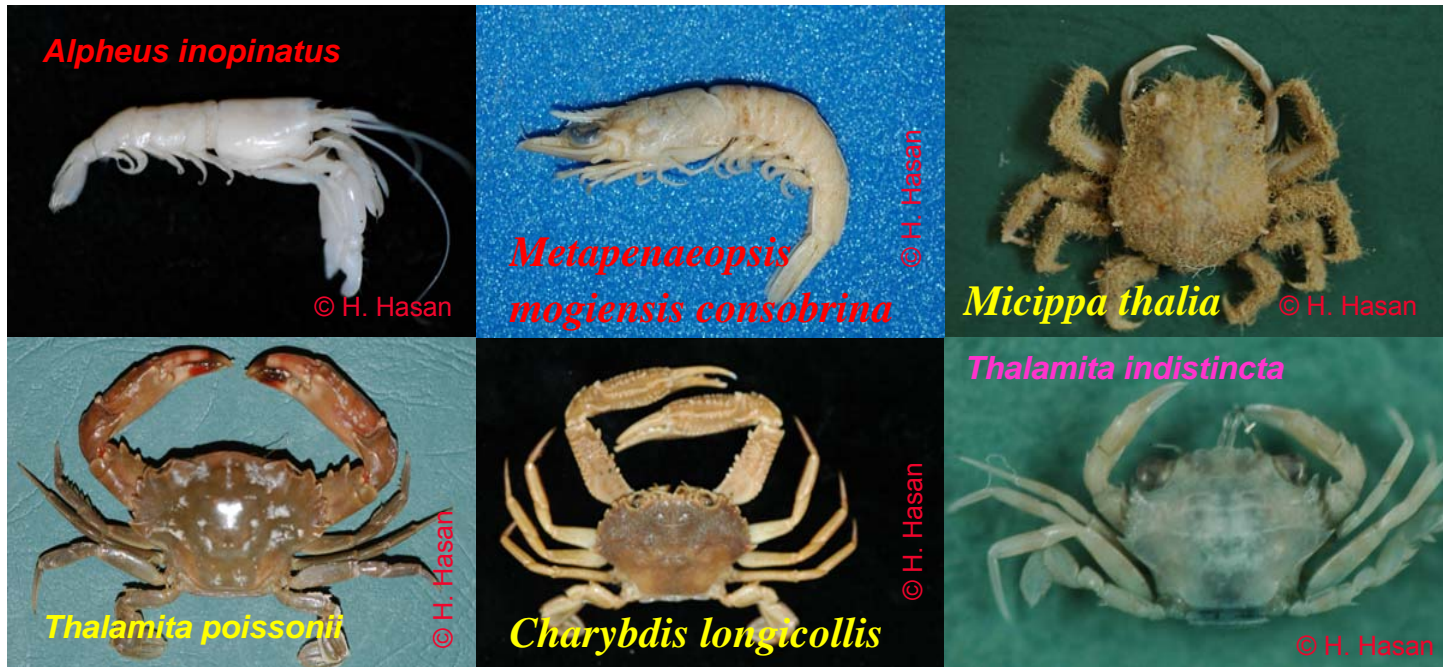
1) Alboran Sea -2) Occidental Mediterranean -3) Adriatic -4) Ionian Sea -5) Egean Sea -6) Marmara Sea -7) Black Sea -8) Sub-central Mediterranean -9) Lybia -10) Levantine

The majority of the species of the Levantine penetrated in the Mediterranean by the Suez Canal but there are other means of introduction for species in other parts of the Mediterranean

List of migratory species from the Red Sea recorded in
Syrian marine waters

- *Marsupenaeus japonicus*
- *Metapenaepsis mogiensis consobrina*
- *Metapenaeus monoceros*
- *Metapenaeus stebbigni*
- *Penaeus semisulcatus*
- *Trachysalambria palaestinensis*
- *Alpheus inopinatus*
- *Leptochela pugnax*
- *Leptochela aculeocaudata*
- *Micippa thalia*
- *Ixa monodi*
- *Cleusia signata*
- *Myra subgranulata*
- *Portunus pelagicus*
- *Charybdis (Charybdis) hellerii*
- *Charybdis (Goniohellenus) longicollis*
- *Thalamita poissonii*
- *Thalamita indistincta*
- *Atergatis roseus*
- *Heteropanope laevis*

Migratory species newly registered in the Syrian coast



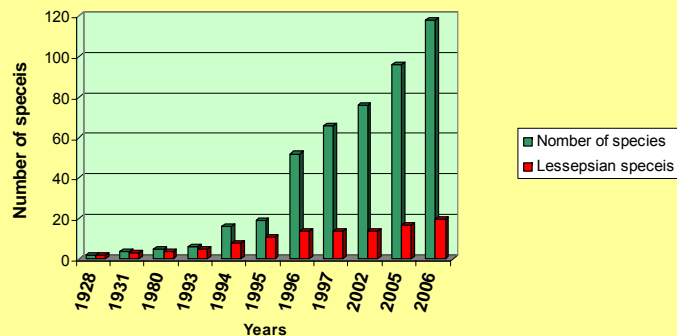
7 lessepsian species are reported for the first time from Syria in 2005 and 2006:

Metapenaeopsis mogiensis consobrina, *Alpheus inopinatus*, *Ixa monodi*, *Micippa thalia*, *Charybdis longicollis*, *Thalamita indistincta* and *Thalamita poissonii*



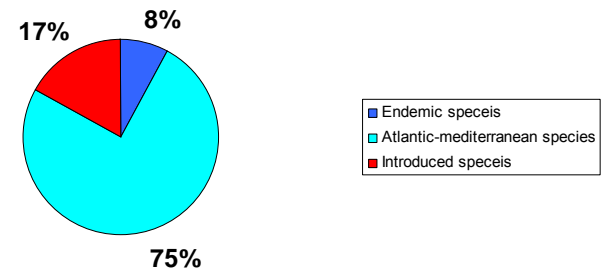
Numerical representation of decapoda migrating from the Red Sea in the Mediterranean and in Syria

Number of the mediterranean and lessepsian decapod species recorded in Syria between 1928 and 2006

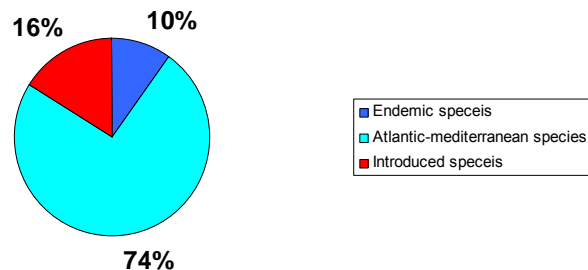


118 species of marine crustacean decapods were recorded in Syria between 1928 and 2006, of which 20 species are introduced in the Mediterranean by the Suez Canal.

The percentage of the basic component of decapoda in Syria



The percentage of the basic component of decapoda in the Mediterranean



The Lessepsian species account for 16% of the whole of crustacean decapods of the Mediterranean and 17% of decapods of Syria.

Types of lessepsian migrants

In marine waters of Syria, according to size population, three types of introduced species by the Suez Canal can be distinguished

Rare species

Species having established stable populations

Very common and abundant migrant species

Rare species

Metapenaeopsis mogiensis consobrina



Cleusia signata



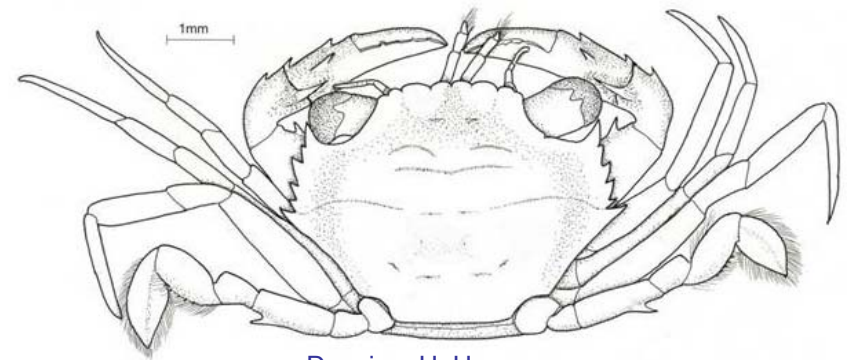
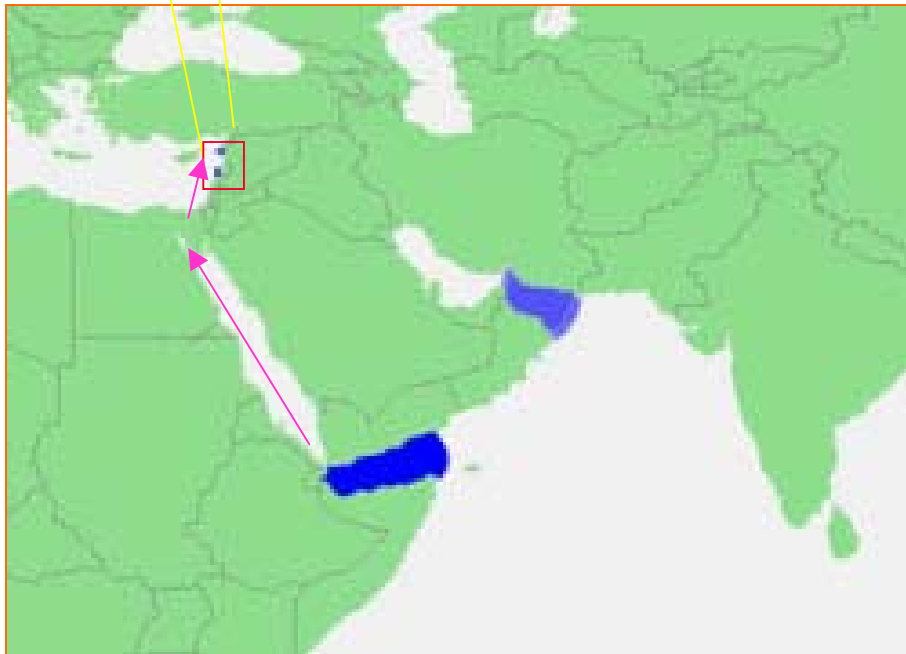
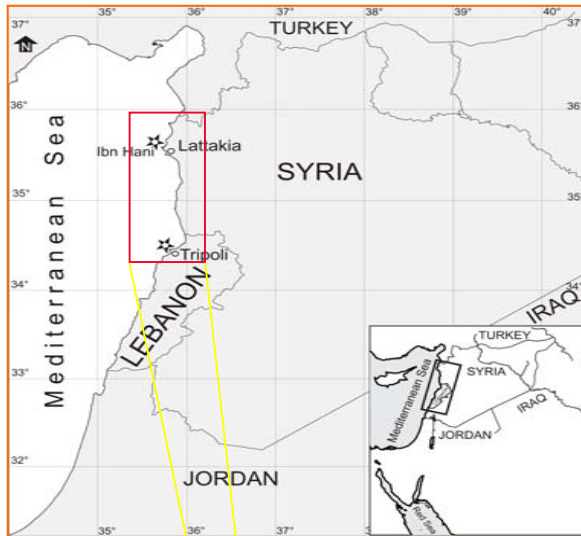
Micippa thalia



one specimen of this Lessepsian migrant, Micippa thalia was collected in April 1993 at Ibn Hani and had remained unidentified until now. This species was first reported from the Mediterranean in Turkey, in 1994 and later from Lebanon in 1999 (Galil et al. 2002)

Thalamita indistincta

Specimens of Thalamita indistincta were recorded for the first time from the eastern coast of the Mediterranean,



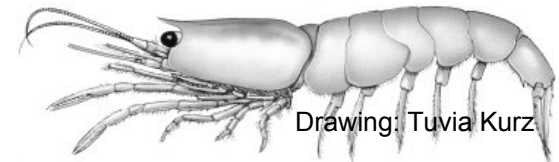
Drawing: H. Hasan

Species having established stable populations

Alpheus inopinatus



Leptocheila pugnax



Myra subgranulata



Atergatis roseus



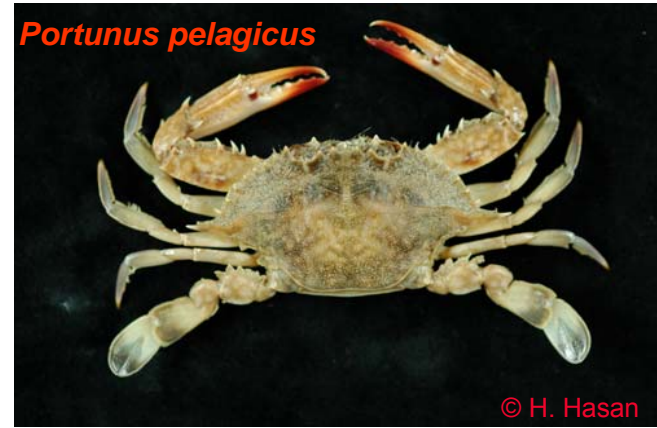
Ixa monodi



Migratory species that are able to establish large communities on the coast of Syria

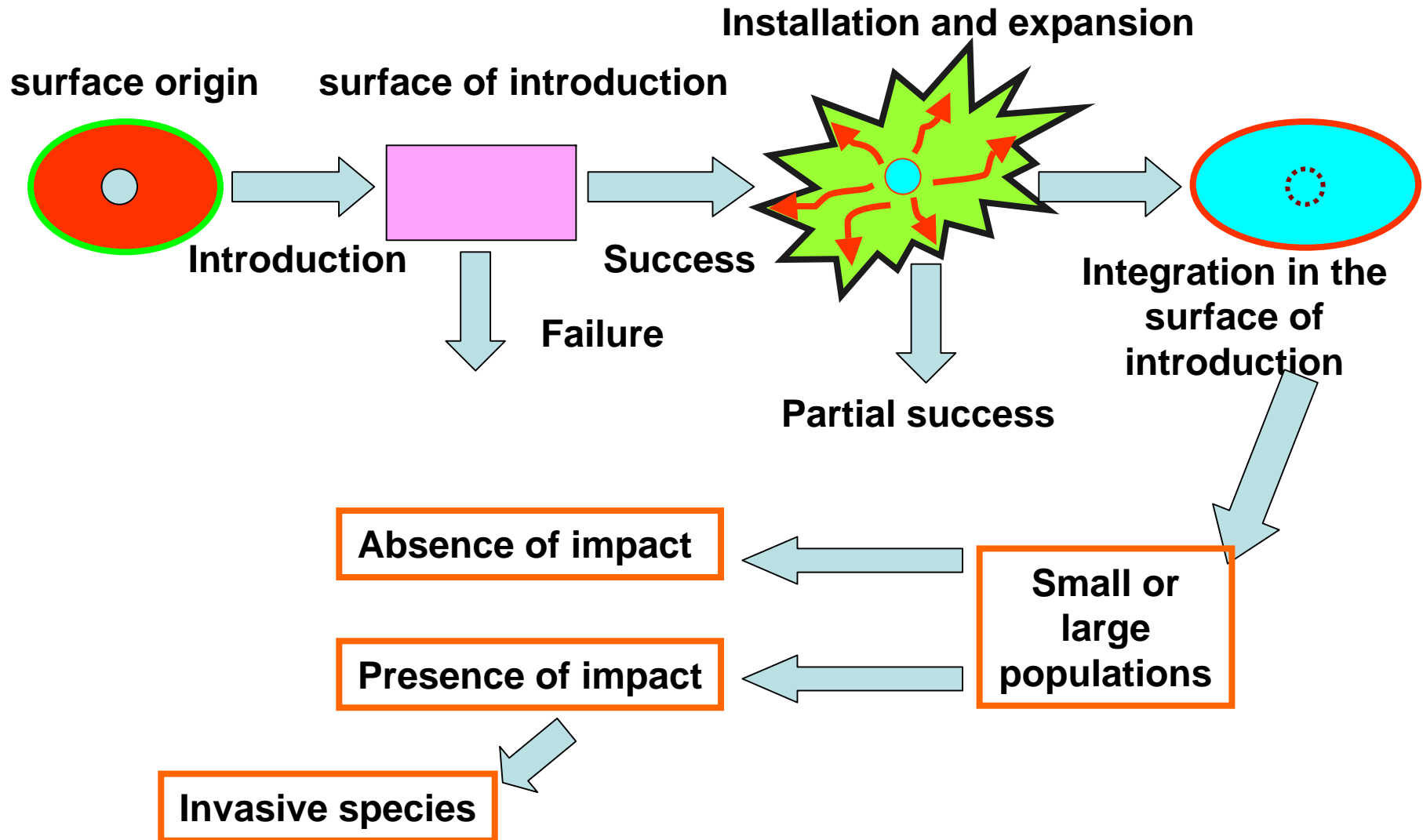


Four shrimp species



Four crab species

Phases of the process of installation of introduced species

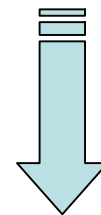
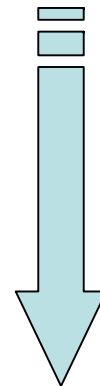


Consequences of the introduction of lessepsian immigrants in Syria

On average, on a worldwide scale, approximately 10% of the introduced species behave as invasive, (Williamson and Fitter, 1996; Boudouresque and Verlaque, 2002)

For most of the 20 species introduced in Syria, there is no real study of their ecological or economic impact, so that it is difficult to specify whether or not they must be regarded as “invasive”. This is the case, for example, of Thalamita poissonii, Atergatis roseus, Charybdis hellerii and Charybdis longicollis

Consequences of introduction of lessepsian decapods in Syria



Ecological consequences

Economic consequences

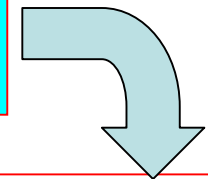
Ecological consequences

The ecological impact of the lessepsian species on indigenous species are numerous in marine waters of Syria:

Modification of the ecological niches



Replacement of the indigenous species



Modification of the functioning of the ecosystem

some species arrived and established large populations in waters of Syria like, *Charybdis hellerii*, *Thalamita poissonii*. Their abundance, probably modified the operation of the infralittoral ecosystems.

Replacement of *Melicertus kerathurus* by the lessepsian species; these lessepsians, especially penaeid shrimps, are very common at present and can be found in seafood restaurants

Economic consequences



Positive consequences

Arrival of species which have economic interest

Marsupenaeus japonicus

Metapenaeus monoceros

Metapenaeus stebbigni

Penaeus semisulcatus

Portunus pelagicus

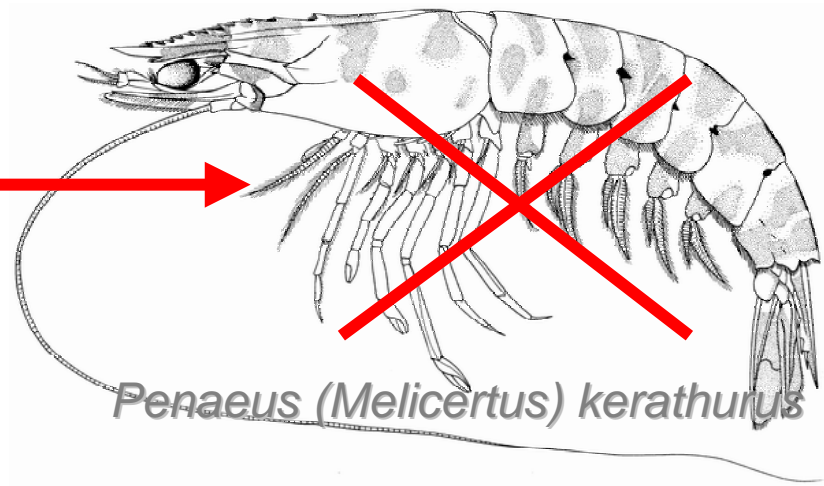


Negative consequences

Replacement of indigenous species with economic interest

Ecological and economic consequences

The shrimp *Marsupenaeus japonicus* entered to the Eastern Mediterranean by Suez Canal and replaced the indigenous species *Melicertus kerathurus*

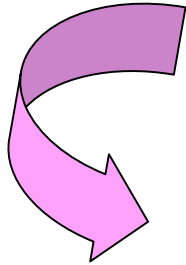


Marsupenaeus japonicus is very abundant in the syrian coasts and often appear in great number in local markets of Syria.

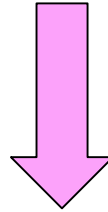
Melicertus kerathurus which it replaced was fished and had an identical abundance and economic interest.

For the last few years, *Melicertus kerathurus* is not seen in Syrian waters; it has completely disappeared

**Introduction of some lessepsian invasives
in Syria constitutes a serious menace ?**



Economic impact



Modification of the biodiversity



Change of ecosystem

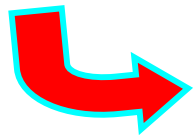
**Some lessepsian species are invasive but at the
same time have an economic importance**

The control of the lessepsian migration is necessary

Is it possible?

The control of Lessepsian migration is difficult because there are no physical borders between the Red Sea and the Mediterranean

For reducing the impact of lessepsian migration on biodiversity, it's necessary to have:



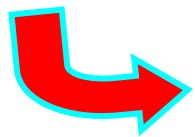
Good knowledge of the fauna of the Suez Canal, the Red Sea, and also of the Mediterranean










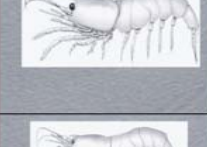
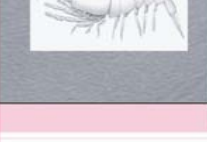
Good control of migrant species and study of their biological and environmental characteristics



Cooperation between the countries concerned



Investment of the invasive species of economic importance

Scientific name	record in Syria	Abundance	Ecological impact	Economic impact	Economic importance	Photo
<i>Marsupenaeus japonicus</i>	1928	Abundant	Yes	Yes	Yes	
<i>Metapenaeopsis mogiensis consobrina</i>	2006	Rare	None	None	None	
<i>Metapenaeus monoceros</i>	1980	Abundant	Yes	Yes	Yes	
<i>Metapenaeus stebbigni</i>	2002	Abundant	?	?	Yes	
<i>Penaeus semisulcatus</i>	1928	Abundant	?	?	Yes	
<i>Trachysalambria palaestinensis</i>	2002	abundant	Yes	Yes	None	
<i>Alpheus inopinatus</i>	2006	Common	?	None	None	
<i>Leptochela pugnax</i>	2002	Common	?	None	None	
<i>Leptochela aculeocaudata</i>	1996	Very Rare	?	None	None	

Scientific name	Record in Syria	Abundance	Ecological impact	Economic impact		Photo
<i>Micippa thalia</i>	1993	Rare	None	None	None	
<i>Ixa monodi</i>	1995	Common	None	None	None	
<i>Leucosia signata</i>	2002	Rare	None	None	None	
<i>Myra subgranulata</i>	2002	Common	?	?	None	
<i>Portunus pelagicus</i>	1930	Abundant	?	None	Yes	
<i>Charybdis (Charybdis) hellerii</i>	1993	Abundant	?	?	None	
<i>Charybdis (Goniohellenus) longicollis</i>	2005	Abundant	?	?	None	
<i>Thalamita poissonii</i>	2005	Abundant	?	?	None	
<i>Thalamita indistincta</i>	2006	Rare	None	None	None	
<i>Atergatis roseus</i>	2002	Common	?	?	None	
<i>Heteropanope laevis</i>	1996	Very Rare	None	None	None	

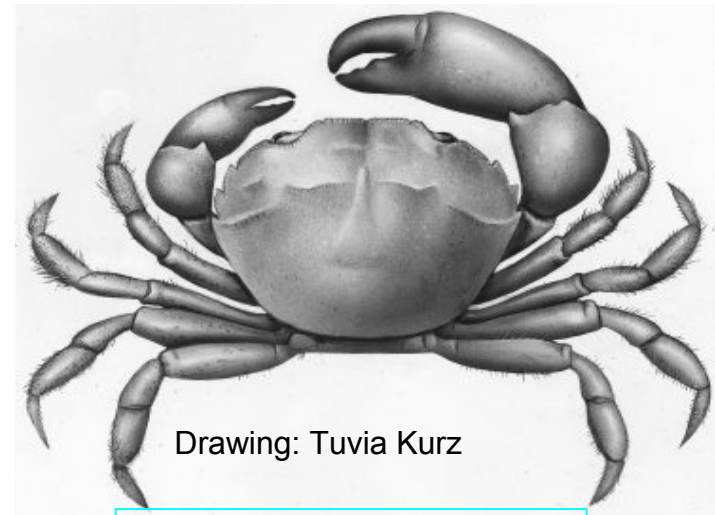
In Syria

- ★ **There is insufficient knowledge about the migrant species.**
- ★ **Until now most studies were inventories.**
- ★ **There is no effective control to detect new migrant species in the Syrian waters.**
- ★ **Information is scarce about alien species along the Syrian coasts and more investigations are needed for a better knowledge of their distribution in time and space.**



THANK YOU

- **Definition:** Migration across the Suez Canal (Planned by Ferdinand de Lesseps) ; generally from the Red Sea to the Mediterranean, rarely the other Way (Anti lesspsian migration).



Drawing: Tuvia Kurz

Heteropanope laevis