

Lionfish Fishing Competitions: Why We Are Culling Lionfish?



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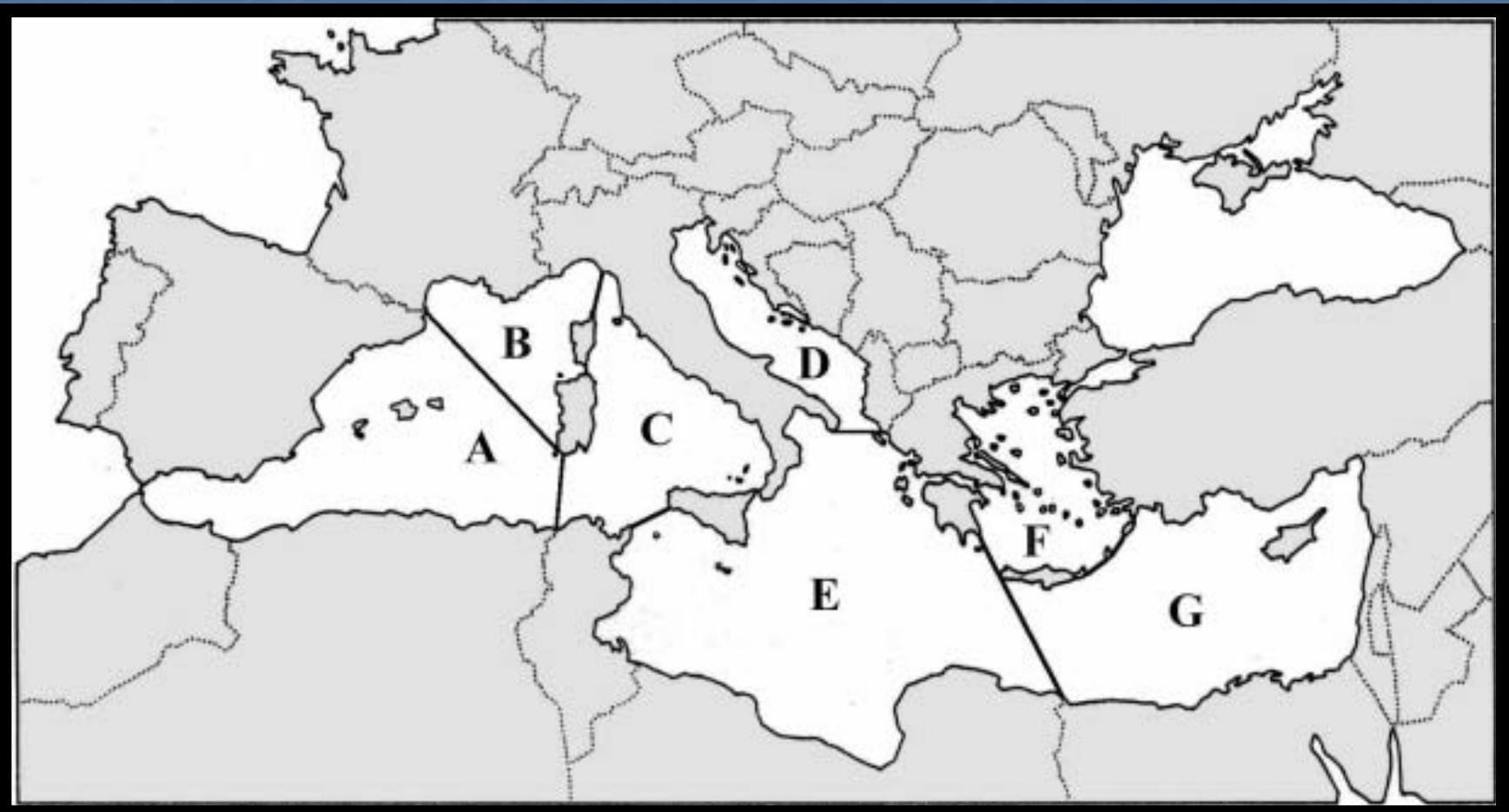
Cyprus

(Geology.com, 2006)



- 3rd biggest island in Mediterranean
- Weather: Dry, Mediterranean Climate, limited runoff

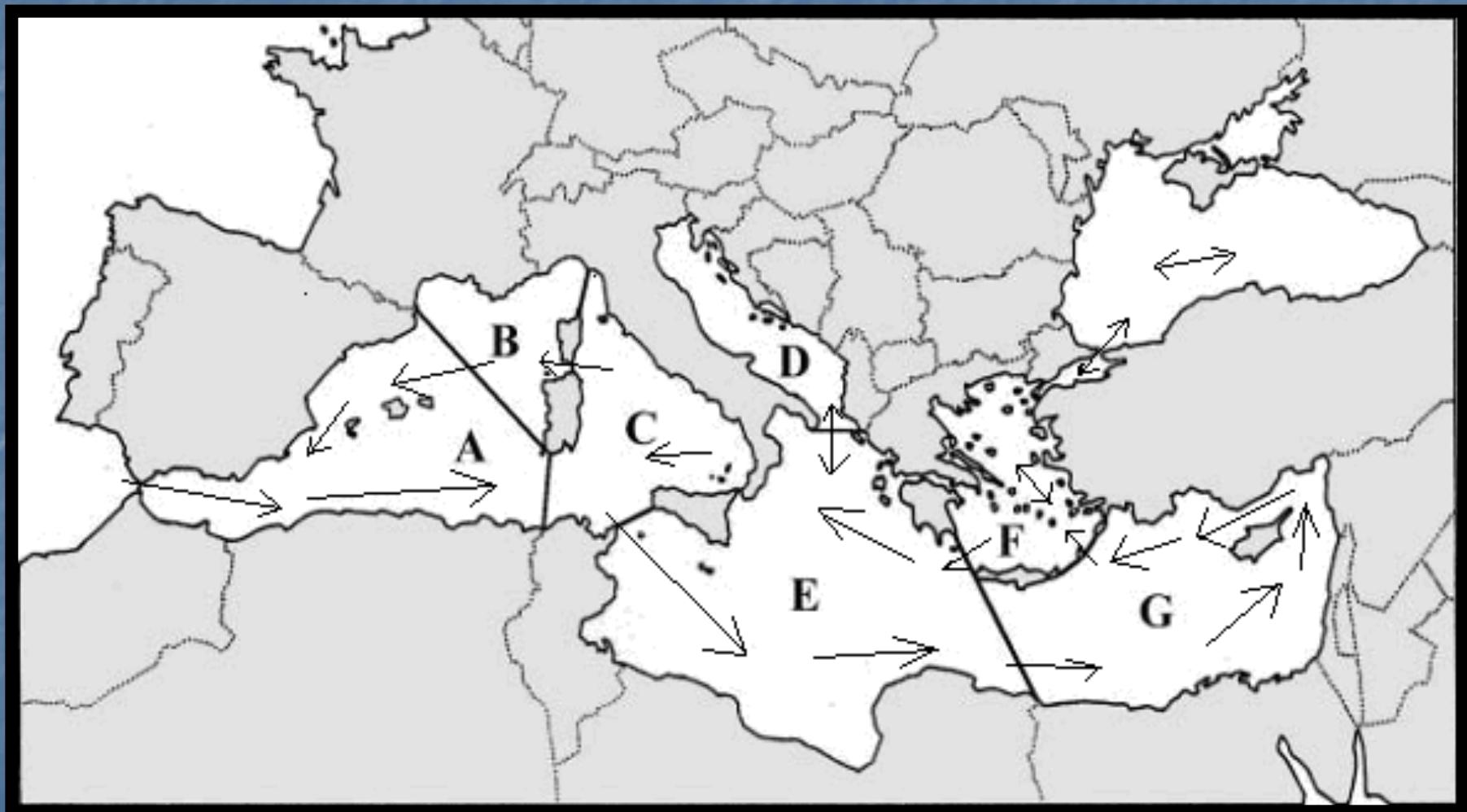
Sub-regions in Mediterranean (Notarbartolo di Sciara et al., 2003).



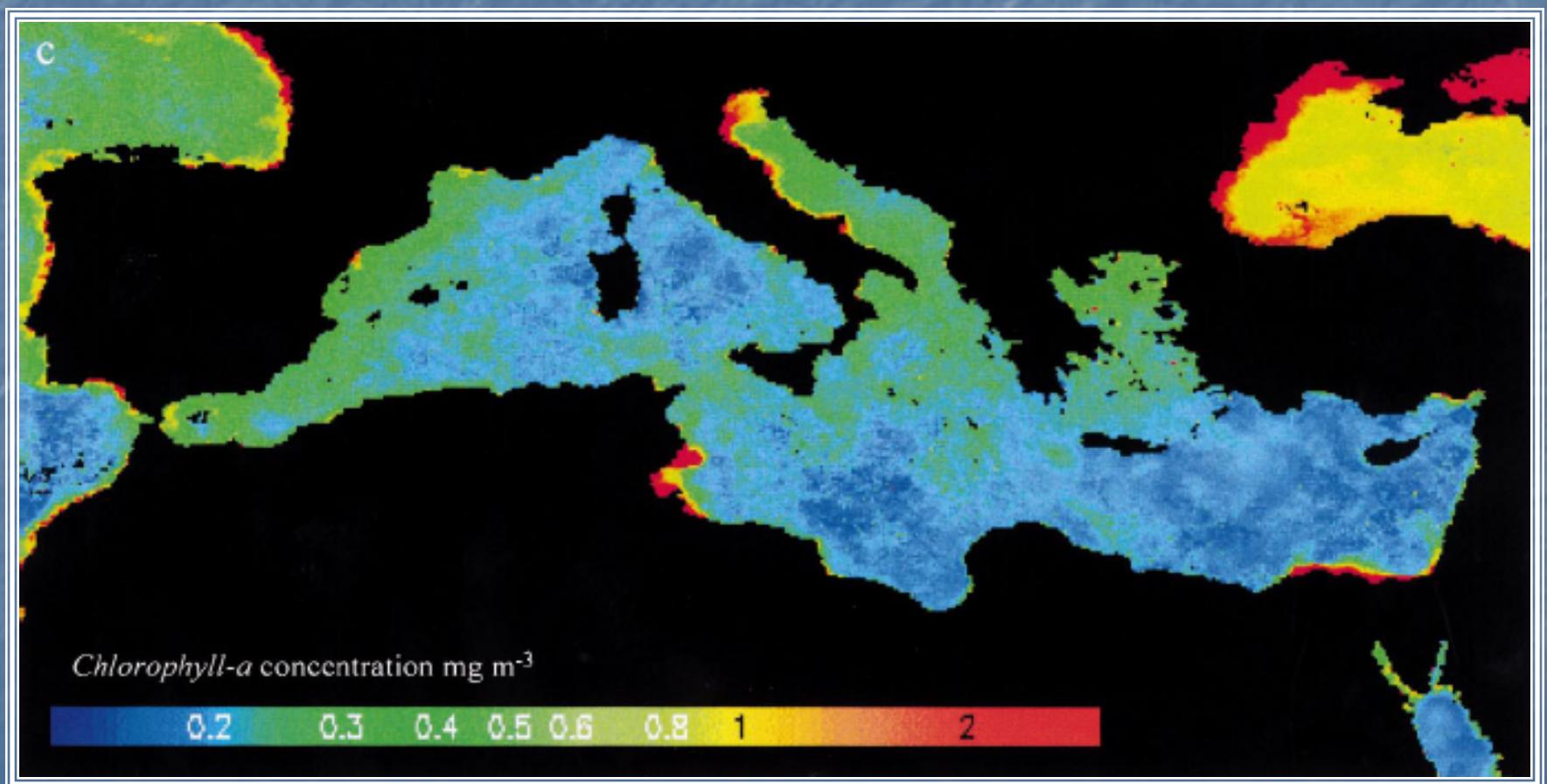
A: West, B: Corsica, C: Tyrrhenia, D: Adriatic, E: Ionian, F: Aegean ve G: Levant

Currents

(Çiçek, 2006 revised from Notarbartolo di Sciara et al., 2003).



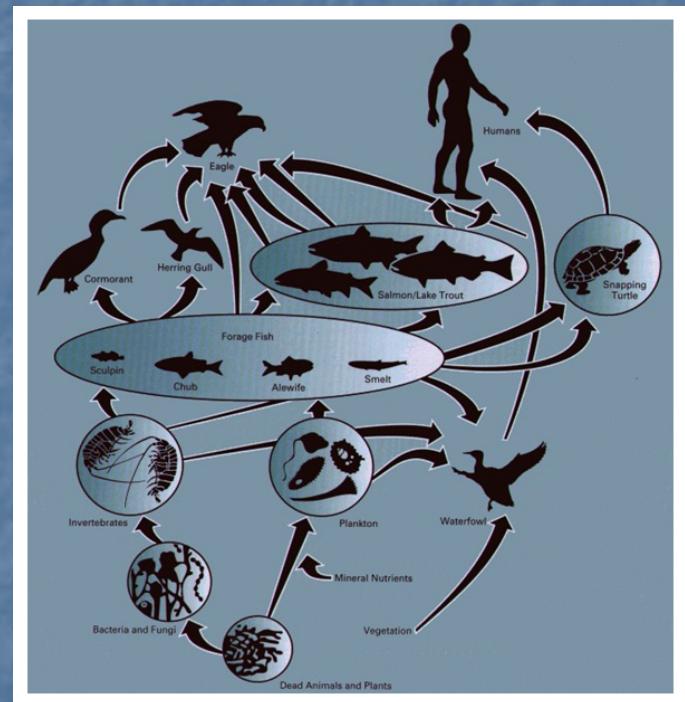
Klorofil – a concentration (NASA and Orbimage, 2009)



Basic ecological characteristics

Eastern Mediterranean

- Low nutrients
- High temperature
- High salinity
- Oligotrophy



The food web (Ritter, 2009)

Productivity (Turley, 1999).

Variables	West:East
Primary production	3.3:1
Bacterial production	1.8:1
Fisheries	2.7:1
Total suspended materials	9.1:1
Benthic biomass	46.1:1

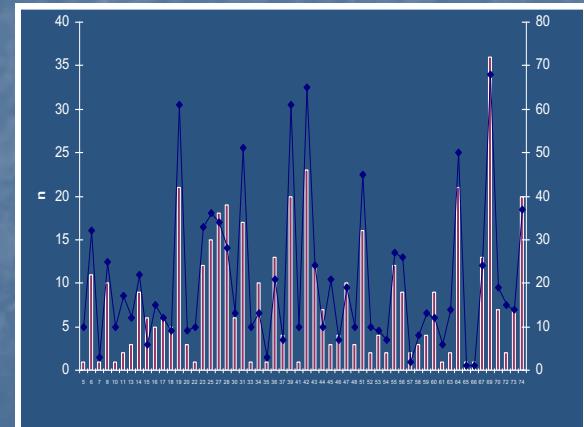
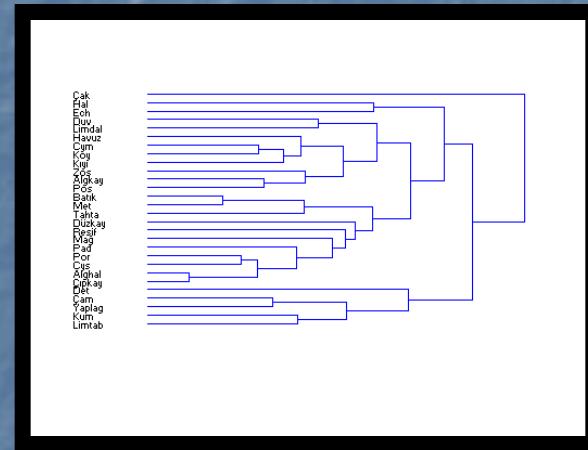
General Situation in Cyprus

- Low fish biomass (Benli et al., 1999).
- Low biodiversity (Hoşsucu et. al, 1998).

- Biotope effect:
- Geomorphology (Substratum types)
- Macrophytes and macroinvertebrates depending on biotopes
- HOT SPOTS

Biotope effect: Bray-Curtis cluster analysis for natural biotope types (Çiçek, 2006)

- Total 37 biotopes in coastal zone
- Low biodiversity and biomass in bare substratum types (sandy, muddy, rocky)
- High in other biotopes with different geomorphology, supported with macrophytes and macroinvertebrates



Hard Substratum - Reefs



- Reefs can be either biogenic concretions or of geogenic origin. They are hard compact substrata on solid and soft bottoms, which arise from the sea floor in the sublittoral and littoral zone. Reefs may support a zonation of benthic communities of algae and animal species as well as concretions and corallogenic concretions.
- *Cystoseira/Sargassum* beds with a mixture of other red algae (*Gelidiales, Ceramiales*), brown algae (*Dictyotales*) and greenalgae (*Siphonales, Siphonacladales*) support the system

Posidonia beds



- Listed in NATURA 2000 habitat types under strict protection as “1120 Posidonia beds (*Posidonia oceanicae*)”
- High biodiversity, habitat stability, breeding, nursery and feeding grounds for many species.

Bare substratum types



- Sandy, muddy, rocky
(gravel, cobble or flat bedrock with no relief)

Artificial reef and unintended artificial reefs



Kyrenia -JCEE's
AR project
(Çatal, 2009)



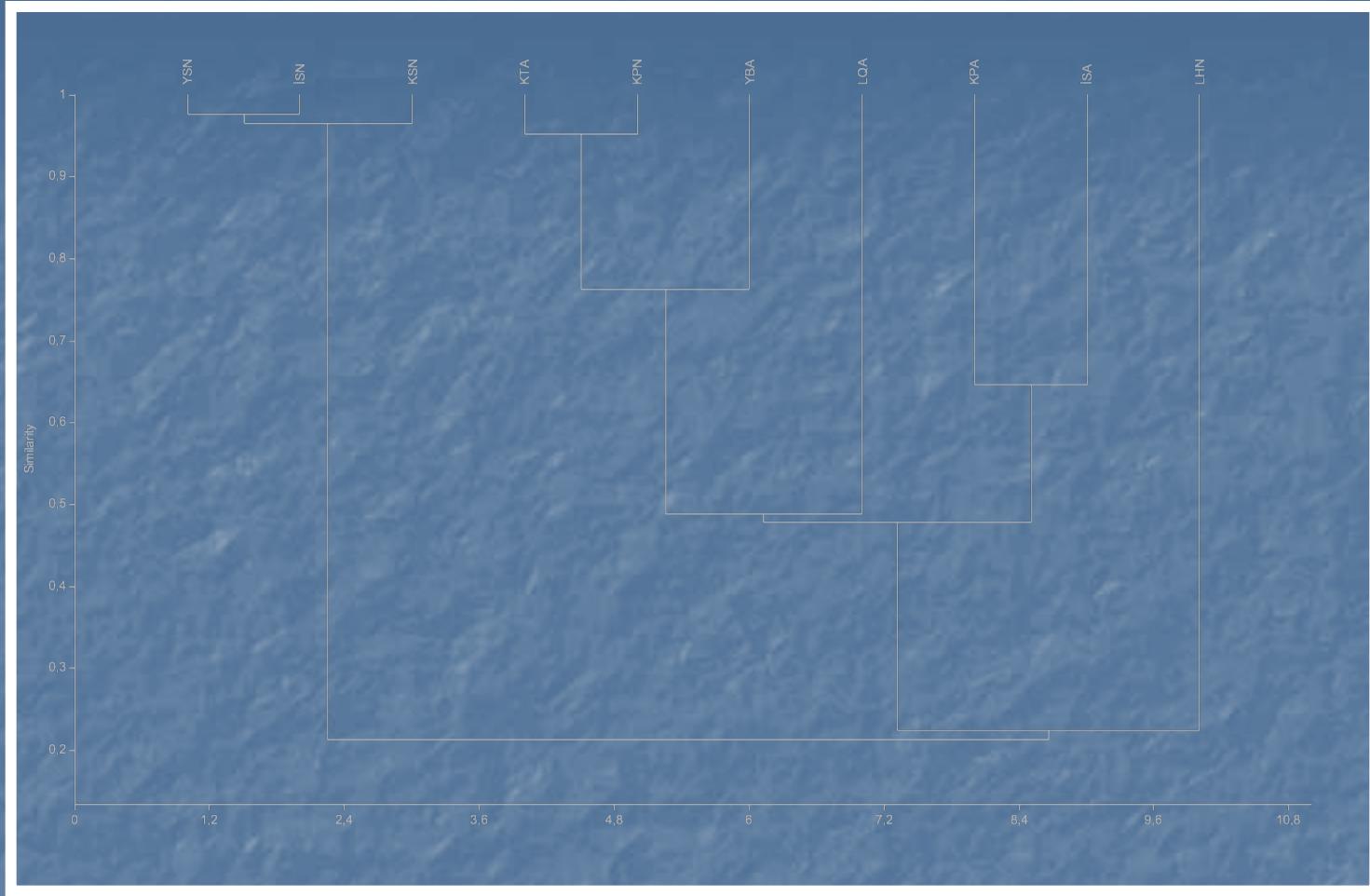
İskele



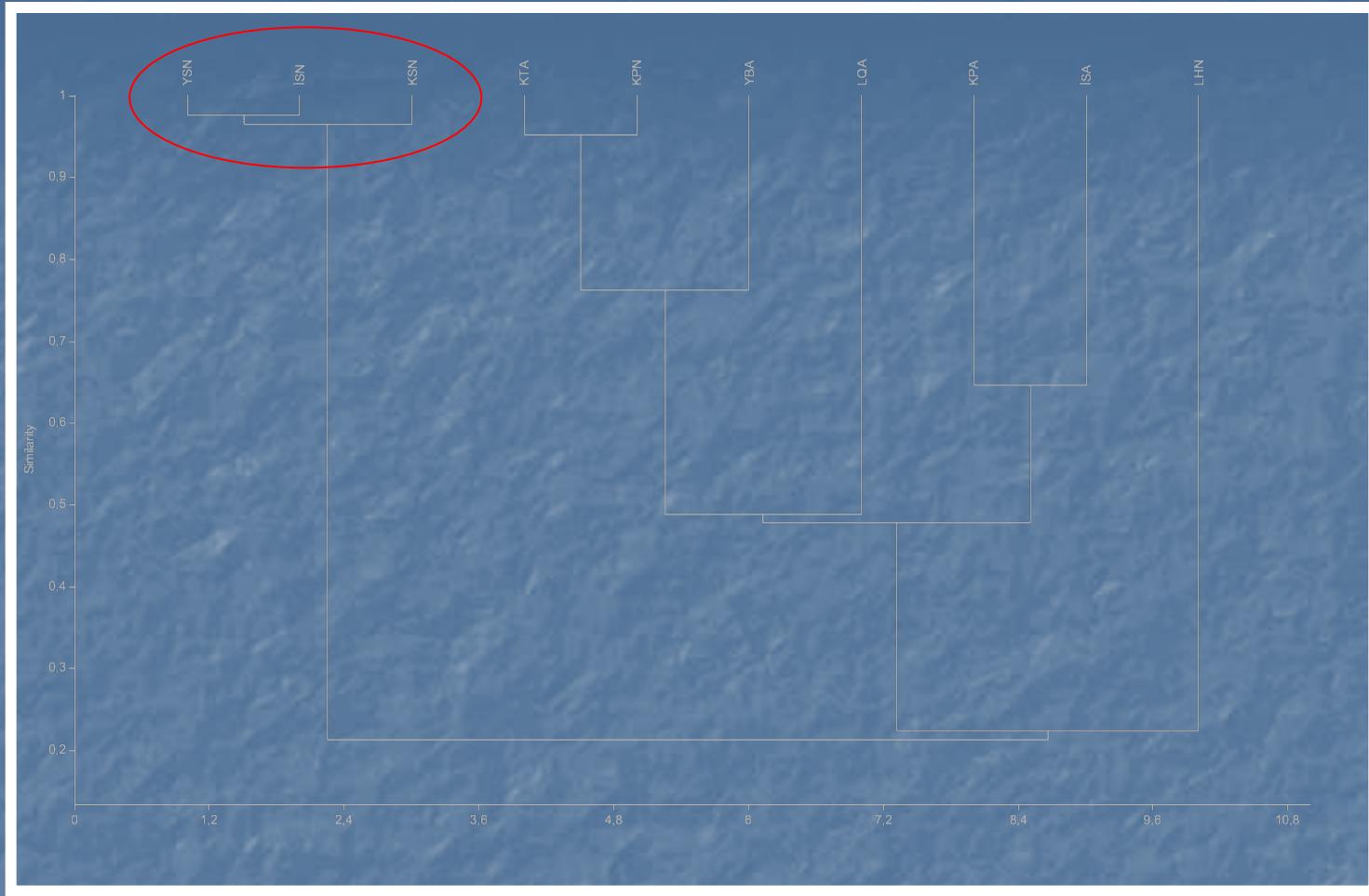
Kalecik



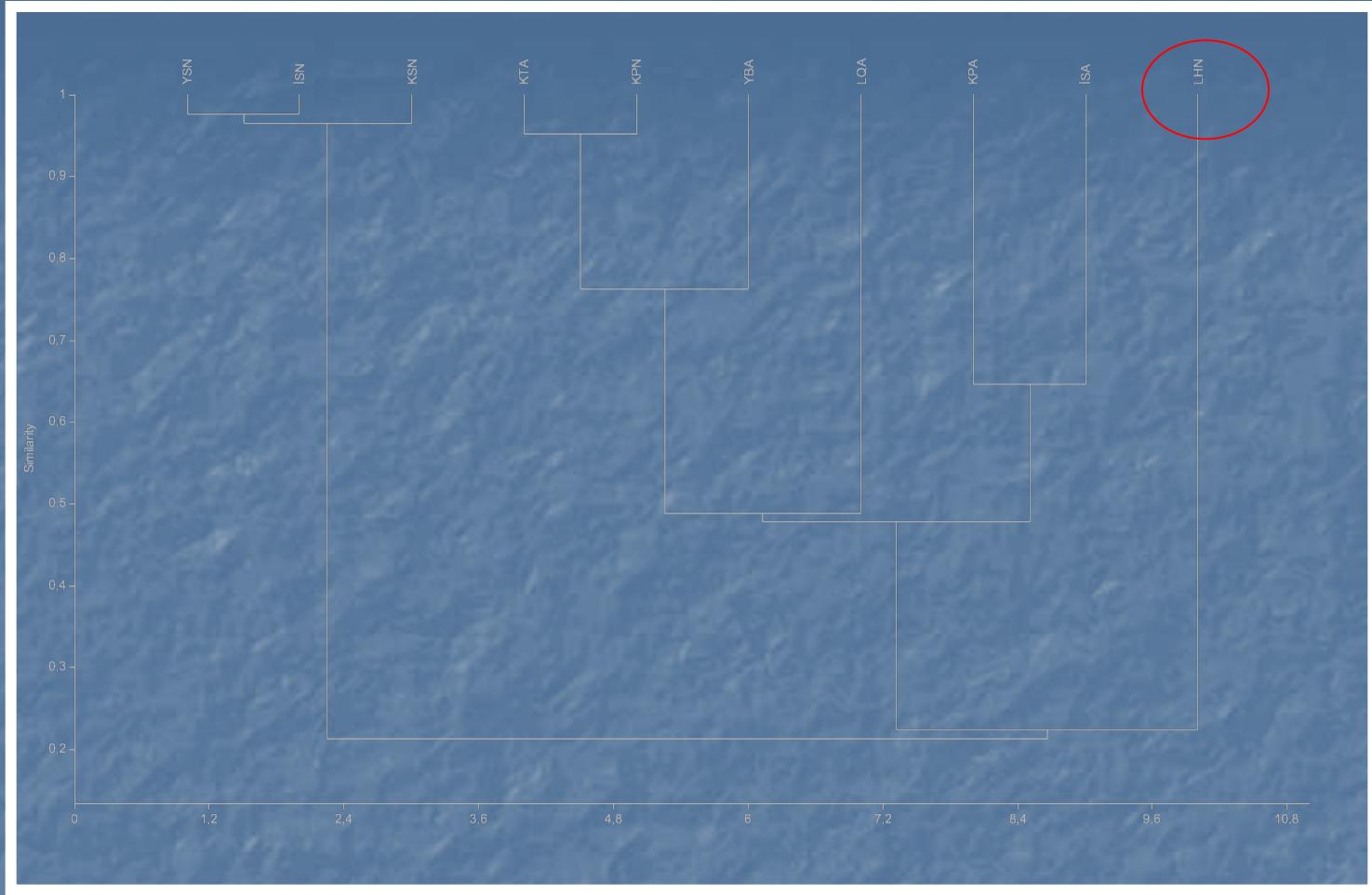
Lefke



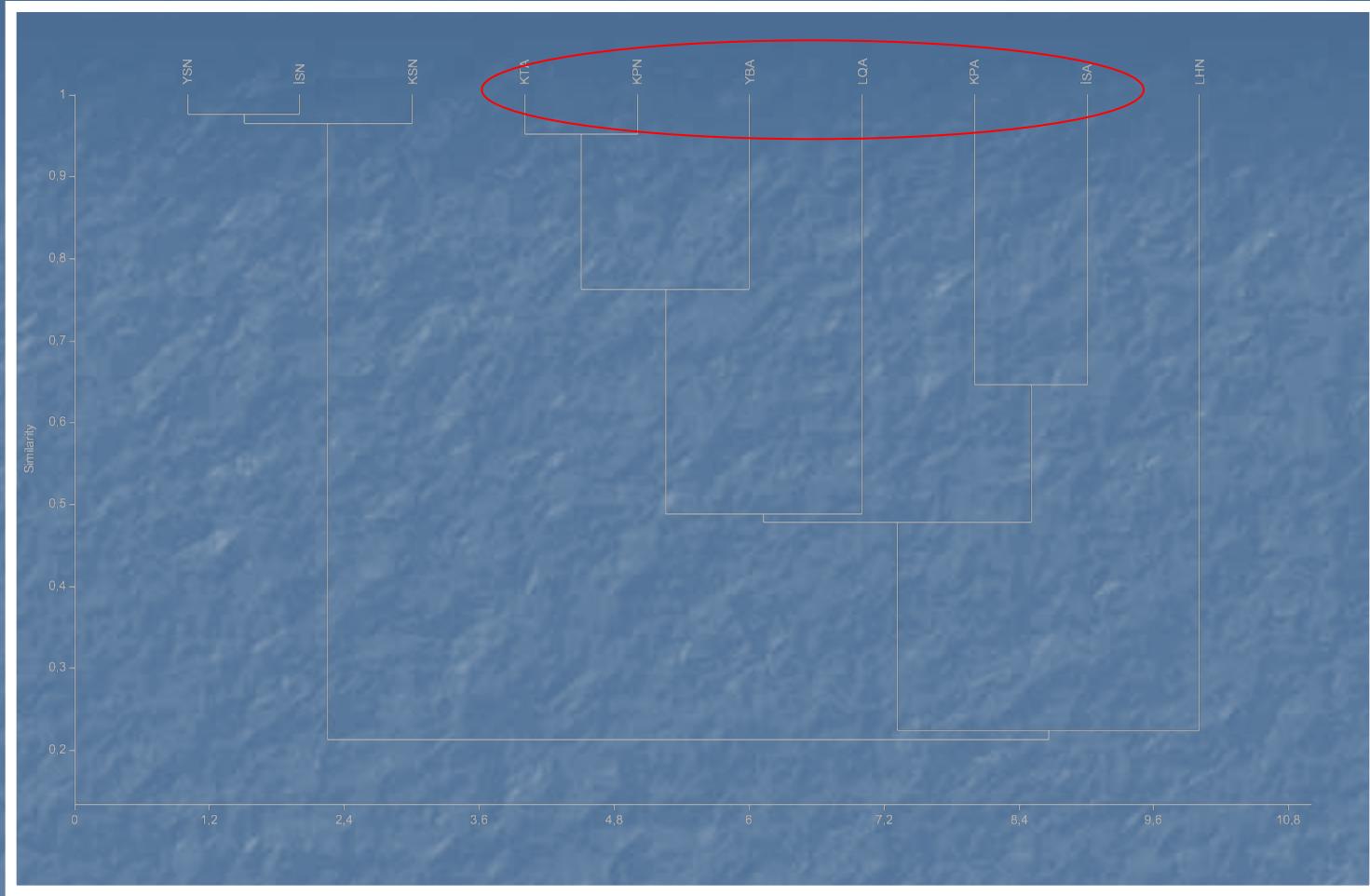
- The cluster analysis was conducted using the PAST package program. Bray-Curtis similarity analysis was used to identify the similarity levels and the results were drawn using the “Bray-Curtis Dendogram” (Hammer et al., 2004)



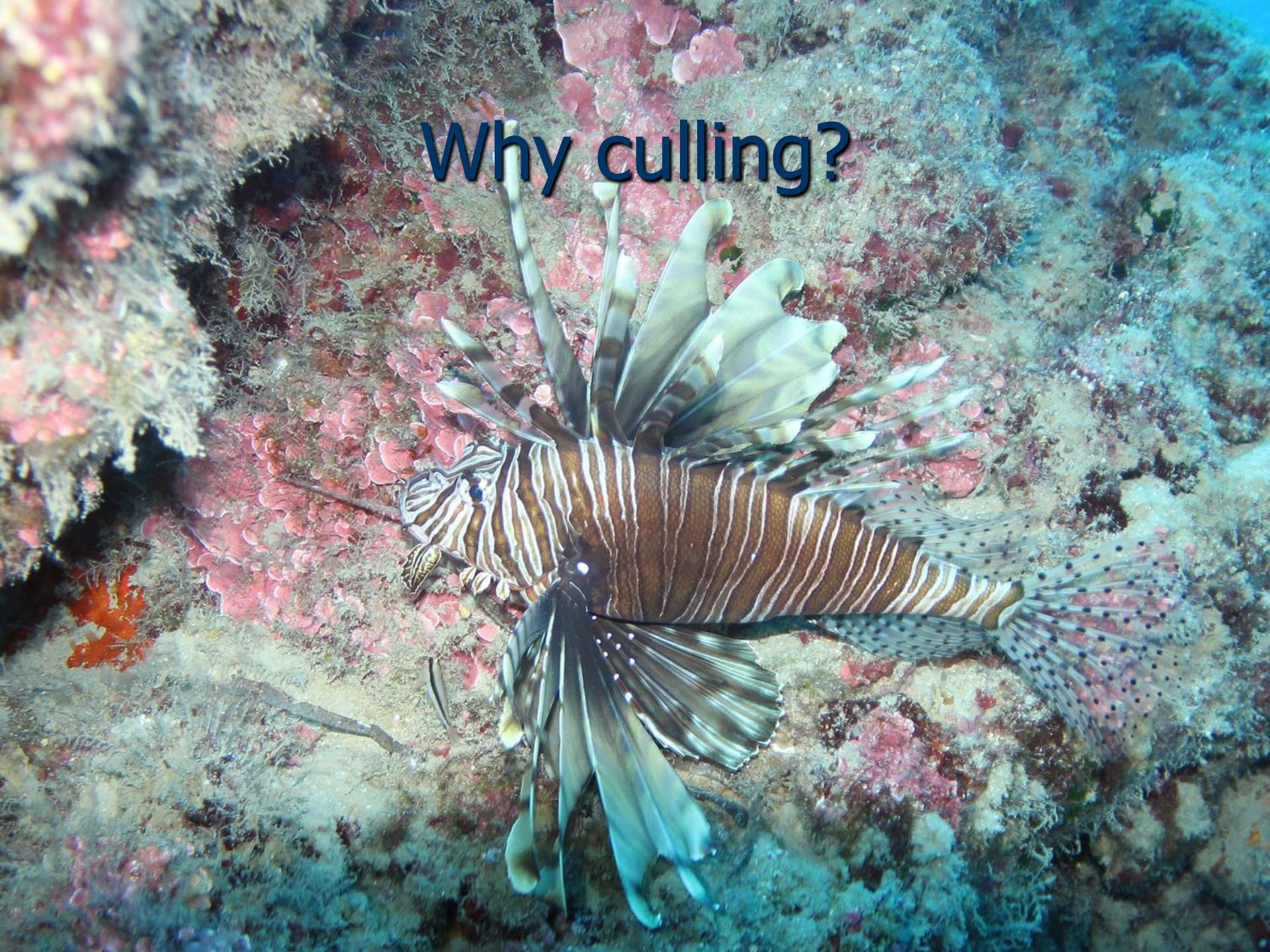
- Soft substratum types



■ *Posidonia oceanica*



- Reef (high, low, artificial)

A large, vibrant lionfish is the central focus, swimming gracefully over a coral reef. Its body is covered in distinct brown and white stripes, and its long dorsal fin is spread wide, displaying a translucent, iridescent quality. The lionfish is positioned diagonally across the frame, moving from the bottom left towards the top right. The background consists of a variety of coral and rock formations in shades of red, orange, and grey, creating a natural underwater setting.

Why culling?

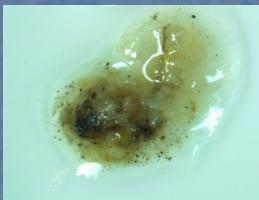
Aliens (n:35, 15 well adapted, 2 declining)

Species	Very rare	Rare	Prevalent	Common	Very common	Observation	Observation Method
<i>Hippocampus fuscus</i> Rüppell, 1838	X					S	U
<i>Nemipterus randalli</i> Russell, 1986				X		X	UF
<i>Ostorrhinchus fasciatus</i> (Shaw, 1790)		X				X	UF
<i>Parupeneus forsskali</i> (Fourmanoir & Guézé, 1976)	X					X	UF
<i>Pomadasys stridens</i> (Forsskål, 1775)		X				X	U
<i>Sphyraena obtusata</i> Cuvier, 1829			X			X	UF
<i>Spratelloides delicatulus</i> (Bennett, 1832)				X		X	UF
<i>Pterois miles</i> (Bennett, 1803)					X	X	UF
<i>Acanthurus coeruleus</i> Bloch & Schneider, 1810	X					S	-
<i>Scarus ghobban</i> Forsskål, 1775		X				X	U
<i>Torquigener flavimaculosus</i> Hardy & Randall, 1983				X		X	UF
<i>Sillago suezensis</i> Golani, Fricke & Tikochinski, 2014	X					X	UF
<i>Scomberomorus commerson</i> (Lacepède, 1800)				X		X	F
<i>Lagocephalus suezensis</i> Clark & Gohar, 1953			X			X	UF
<i>Lagocephalus guentheri</i> Miranda Ribeiro, 1915			X			X	UF
<i>Dussumieria elopsoides</i> Bleeker, 1849			X			X	UF
<i>Lagocephalus sceleratus</i> (Gmelin, 1789)					X	X	UF
<i>Upeneus pori</i> Ben-Tuvia & Golani, 1989				X		X	UF
<i>Parexocoetus mento</i> (Valenciennes, 1846)	X					X	UF
<i>Etrumeus golani</i> DiBatista, Randall & Bowen, 2012	X					X	UF
<i>Fistularia commersonii</i> (Rüppell, 1835)				X		X	UF
<i>Pteragogus trispilus</i> Randall, 2013			X			X	UF
<i>Pempheris rhomboidea</i> Kossmann & Räuber, 1877					X	X	U
<i>Alepes djedaba</i> (Forsskål, 1775)				X		X	U
<i>Apogonichthyooides pharaonis</i> (Bellotti, 1874)					X	X	U
<i>Hemiramphus far</i> (Forsskål, 1775)			X			X	UF
<i>Siganus luridus</i> (Rüppell, 1829)					X	X	UF
<i>Sphyraena pinguis</i> Günther, 1874				X		X	UF
<i>Upeneus moluccensis</i> (Bleeker, 1855)					X	X	UF
<i>Equulites kyunzingeri</i> (Steindachner, 1898)			X			X	UF
<i>Sargocentron rubrum</i> (Forsskål, 1775)					X	X	UF
<i>Saurida lessepsianus</i> Russell, Golani & Tikochinski, 2015				X		X	UF
<i>Stephanolepis diaspros</i> Fraser-Brunner, 1940			X			X	UF
<i>Atherinomorus forsskali</i> (Rüppell, 1838)					X	X	U
<i>Siganus rivulatus</i> Forsskål & Niebur, 1775					X	X	UF

Findings

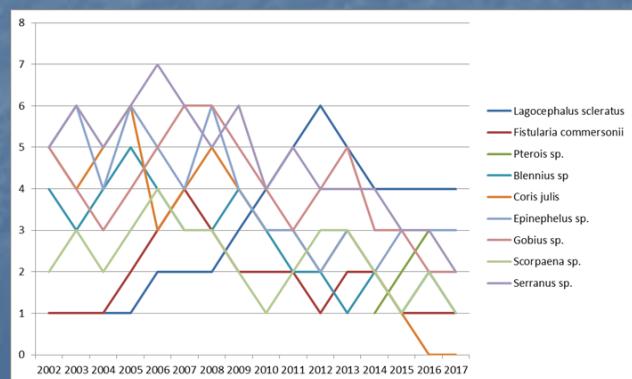
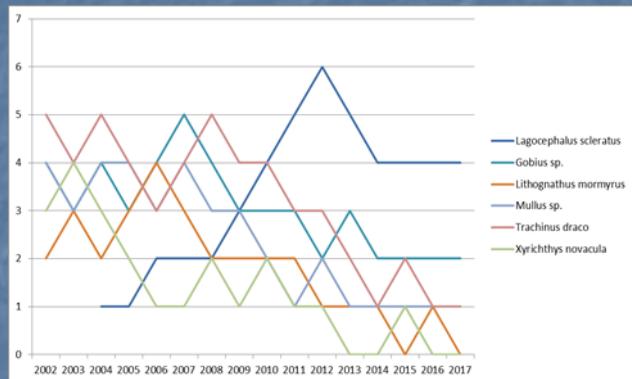
■ Laboratory work

- Stomach content
 - TL, sex, etc.



■ Field work

- ## ■ Hard/Soft



Culling – Research Locations



Fishing Competitions



- With Permission of Ministry of Natural Sources and Agriculture; Animal Husbandry Department
- In collaboration of:
 - Hunters Federation
 - Diving Centers
- 2018, 2019
 - SCUBA and Free Diving Categories
 - Teams
 - Individuals
 - Categories: Total/Biggest/Smallest



Fishing Competitions

- 325 fish in 2018
 - 13 Free Diver Teams with boats
 - 10-25 m depth
 - 3 Divers per team
 - 3 SCUBA Team
 - 20-30 m depth
 - 2 Divers per team
- 1025 fish in 2019
 - 12 Free Diver Teams
 - 4 SCUBA Teams



The good things and the bad things...

- 2018
 - 3 injured, no fatalities
- 2019
 - No injuries



Conclusions - Discussion

- Manual eradication?
 - Protection of local species: Groupers?
 - Por (2010): Tropicalisation
 - Climate change (Yeruham et. Al, 2015)
 - Katsanevakis et al, 2014

Impact on marine ecosystem services (<i>sensu</i> Liqueite et al. 2013)						
Provisioning		Regulating and maintenance			Cultural	
Food (fisheries, aquaculture etc)	Water storage and provision	Water purification	Air quality regulation	Coastal protection	Ocean nourishment	Impact on biodiversity
	Biotic materials and biofuels			Climate regulation		
				Weather regulation		
					Lifecycle maintenance	Multiple-species impact
					Biological Regulation	Impact on keystone species or species of high conservation value
					Symbolic and aesthetic values	
					Recreation and tourism	
					Cognitive benefits	
					Little/Unknown	Affects entire ecosystem processes / wider ecosystem functioning
					Single-species impact	Ecosystem engineer - creator of novel habitat

The background image shows a vibrant underwater scene. A lionfish with distinct red, white, and black stripes is the central focus, swimming gracefully over a rocky seabed. The seabed is covered with various types of coral, including soft corals in shades of pink and red, and harder corals in shades of brown and tan. Sunlight filters down from the surface, creating a dappled light effect on the rocks and the fish's body.

Teşekkürler! Thank you!

Animal Husbandry Department

Deep Dive Diving Center

Erol Adalier

Hunters federation

Diving Centers

Fishermen