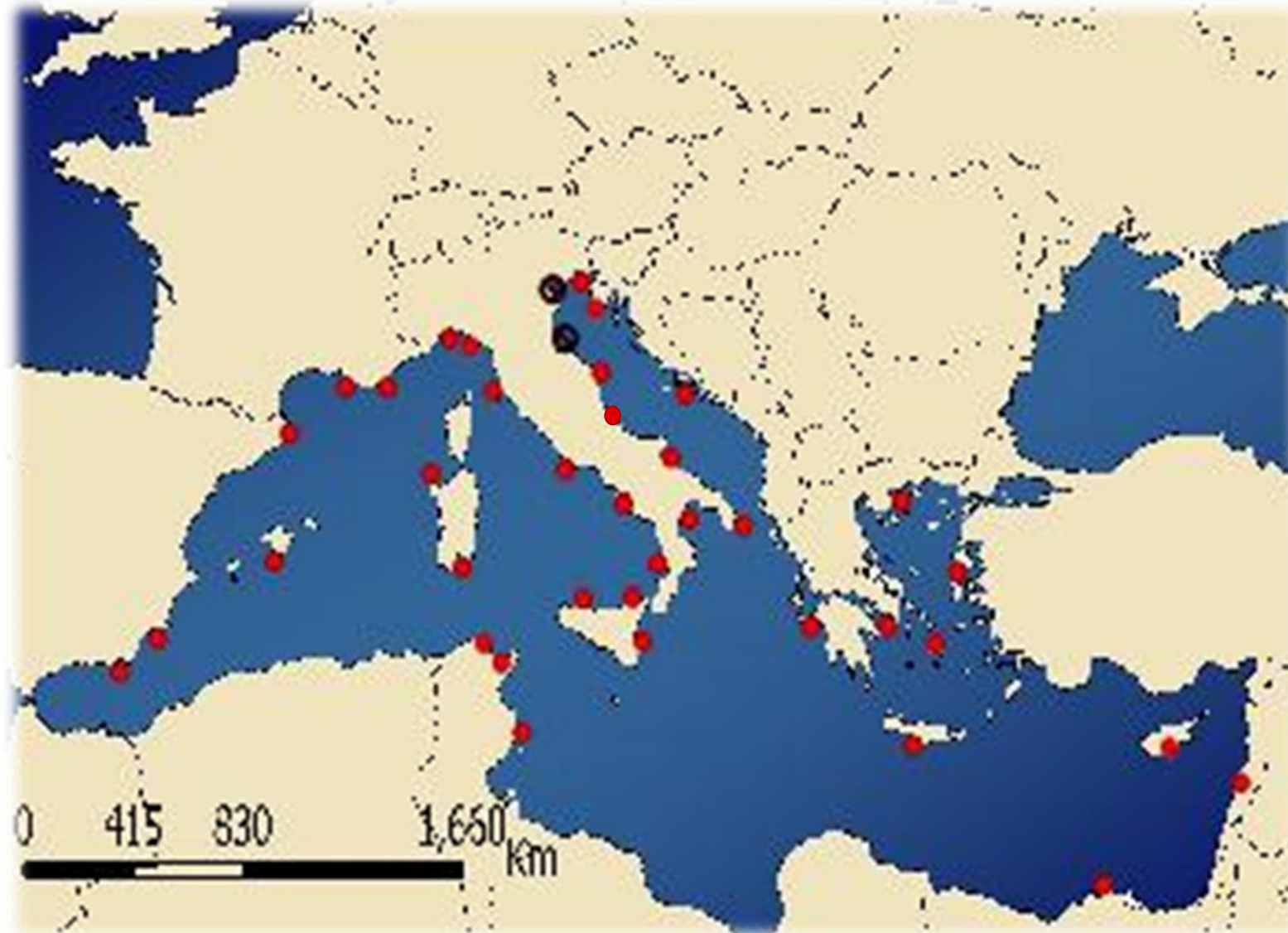# M3-HABs
Risk Monitoring, Modeling and Mitigation
of Benthic Harmful Algal Blooms along Mediterranean coasts

Asnaghi V. [1], Abboud-Abi-Saab M.[2], Accoroni S.[1], Bertolotto R.[3], Casabianca S. [1], Fricke A.[4], Giussani V.[1], Jauzein C.[5], Lemée R.[5], Mangialajo L.[4,5], Minetti D.[3], Moretto P.[3], Ottaviani E.[6], Pedroncini A.[7], Penna A.[1], Sbrana F.[8], Totti C.[1], Turki S.[9], Vassalli M.[8], Chiantore M.[1]

[1] CoNISMa — Consorzio Nazionale Interuniversitario per le Scienze del Mare
[2] CNRS 50 1962-2012
[3] ARPAL — Agenzia Regionale per la Protezione dell'Ambiente Ligure
[4] Université Nice Sophia Antipolis
[5] OBRE OCEANOLOGIQUE VILLEFRANCHE
[6]
[7] DHI
[8]
[9] INSTM

A threat for Mediterranean coasts...

0   415   830   1,660 km

...a challenge for a EU Project!

The pan-Mediterranean project M3-HABs regarding monitoring of harmful algal blooms, with particular reference to the benthic dinoflagellate *Ostreopsis*, started in 2014 in the framework of the ENPI-CBCMED Programme .

WP1: Management
WP2: Communication

❖ Production of flyers, brochures and informative videos
❖ Web site: **http://www.m3-habs.net/** and social media
❖ Dedicated section on the web TV TRIWù:
http://www.triwu.it/sezione-ostreopsis-nel-mediterraneo
❖ informative panels displayed along the coastline of the Partners Countries

WP3: Capitalization

❖ Summer School in Batroun, Lebanon, June 2014: "Taxonomy, Phylogeny and Ecology of the *Ostreopsis* genus"
❖ Summer School in Tunisia, May 2015: "*Ostreopsis* bloom modeling"
❖ Students mobility grants
❖ *Ostreopsis* network at the Mediterranean level
❖ Best practice manuals and protocols

### WP4: Opto-electronics system and algorithm for cell identification and counting
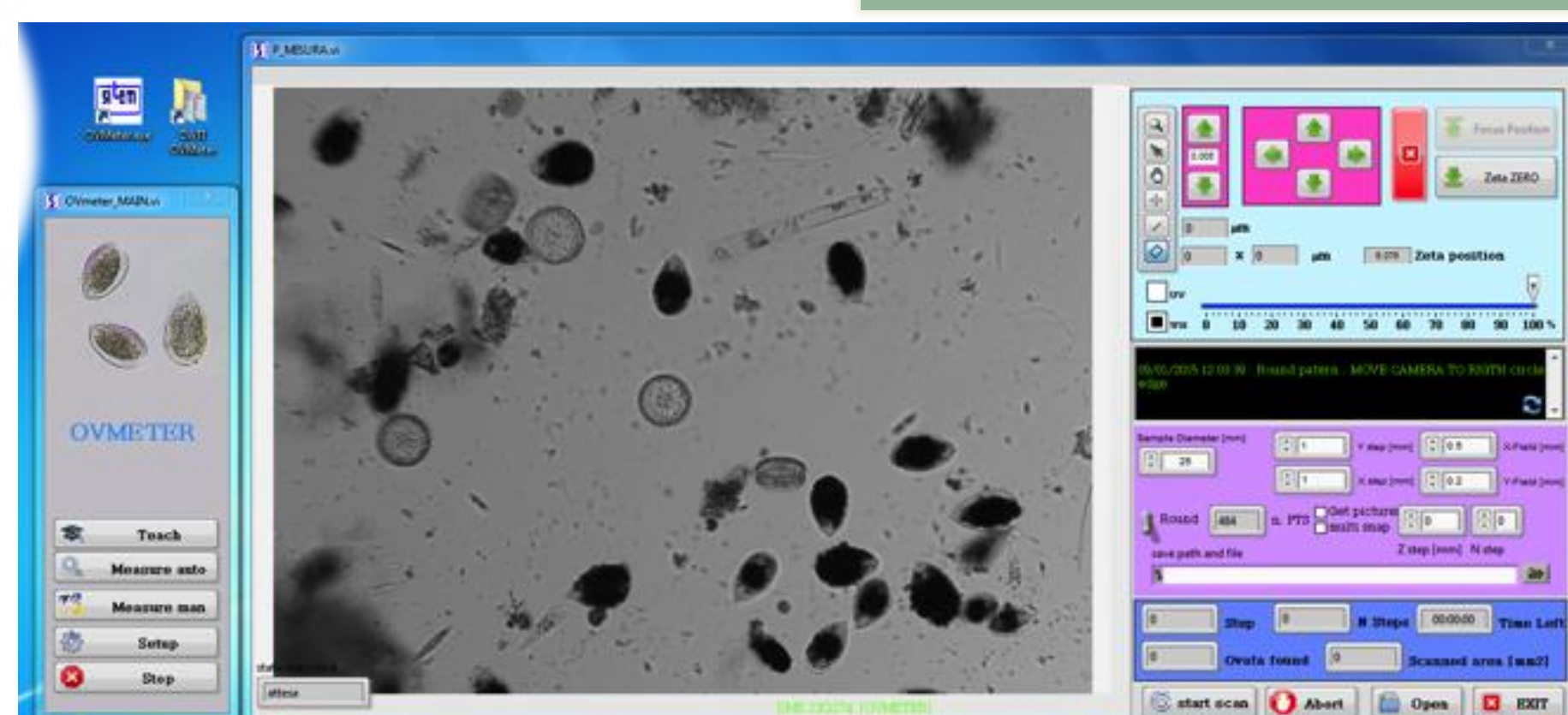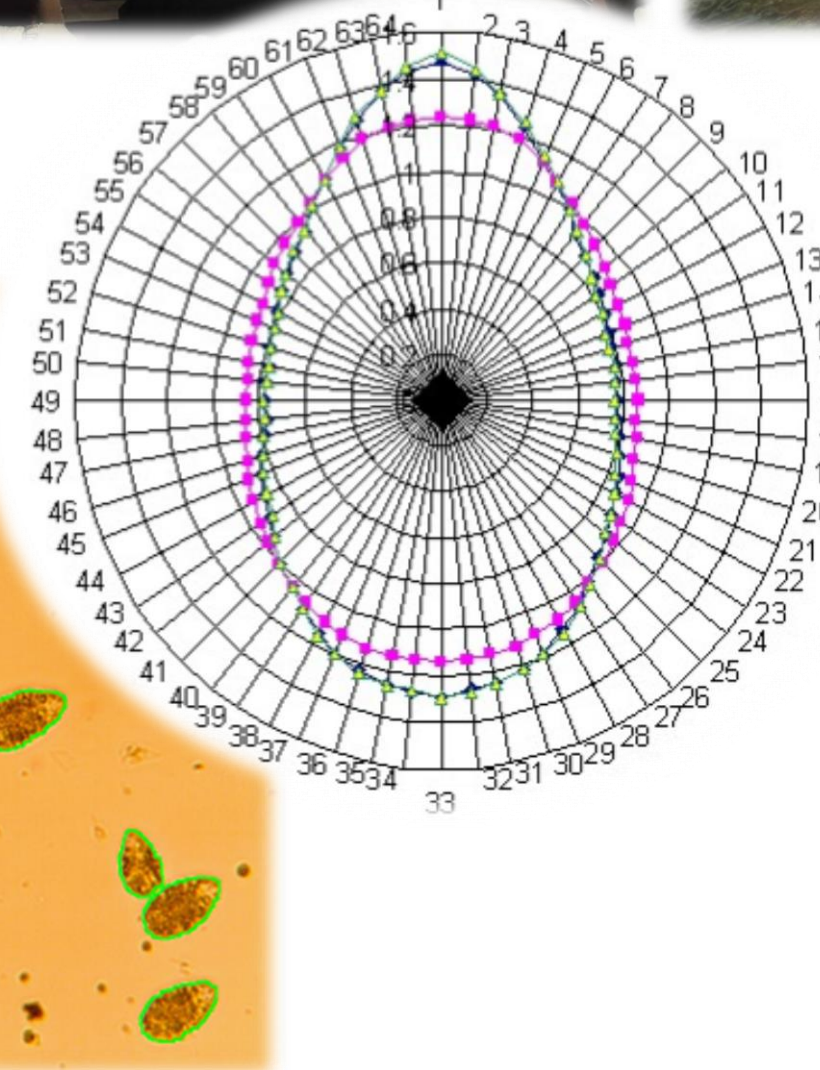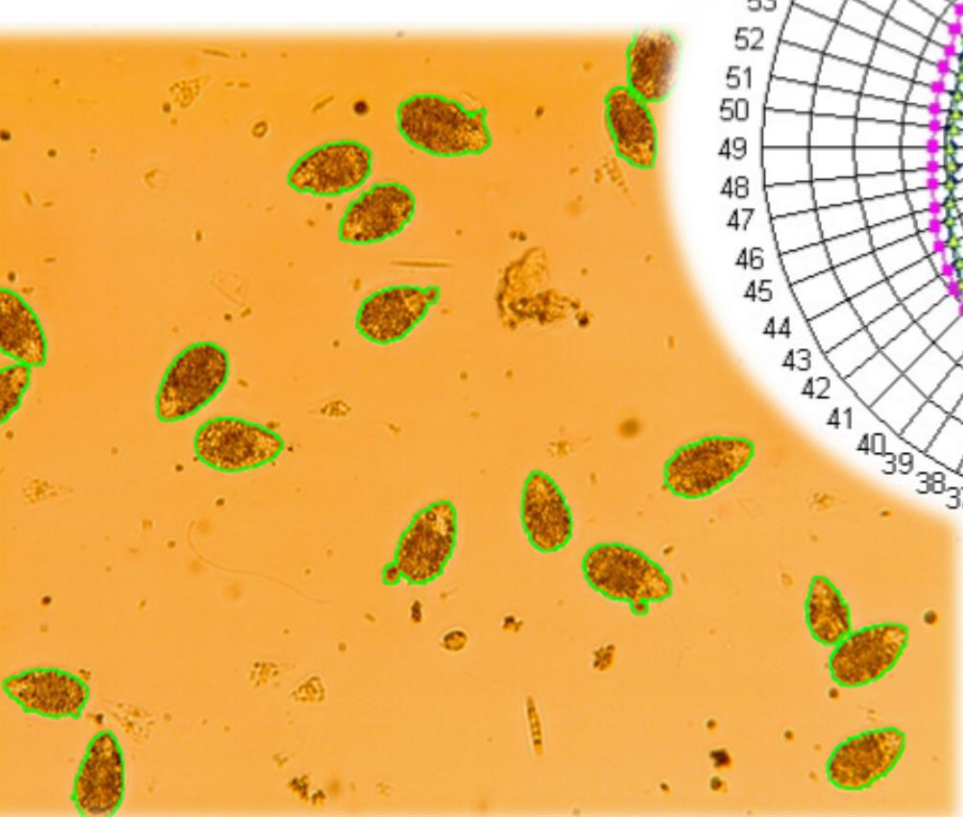
❖ optical set-up and acquisition engine to obtain multi-focal images
❖ segmentation procedure to automatically extract morphometric indicators
❖ identification of specific objects based on a learning system
❖ real time quantitative PCR (qPCR) applied as additional tool to identify toxic algae more rapidly and accurately and to confirm morphological species

Expected results development of new technologies for species-specific identification and counting

WP5: Predictive tool for *Ostreopsis* blooms

❖ Identification of correlations between the algal bloom and the main chemical-physical-meteomarine parameters
❖ development of a 3D model of meteomarine, physical and parameters
❖ predictive tool for *Ostreopsis* blooms for the pilot area
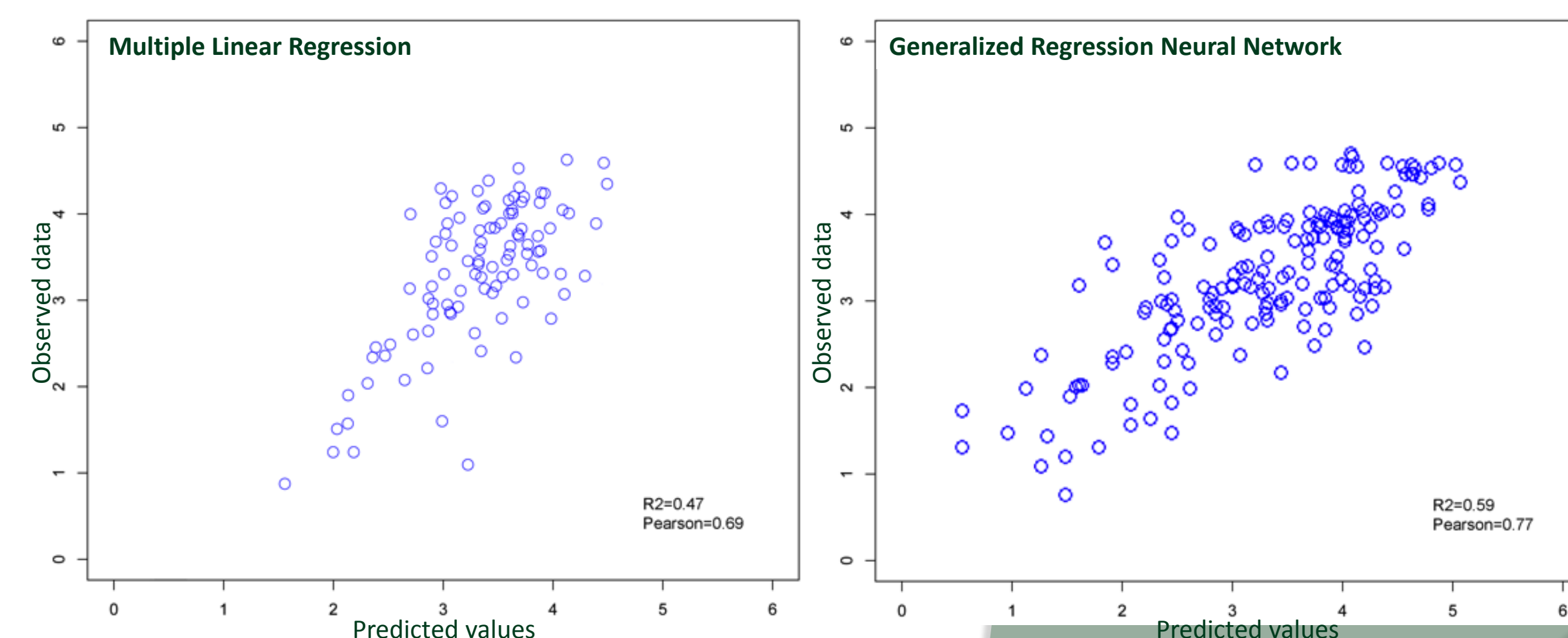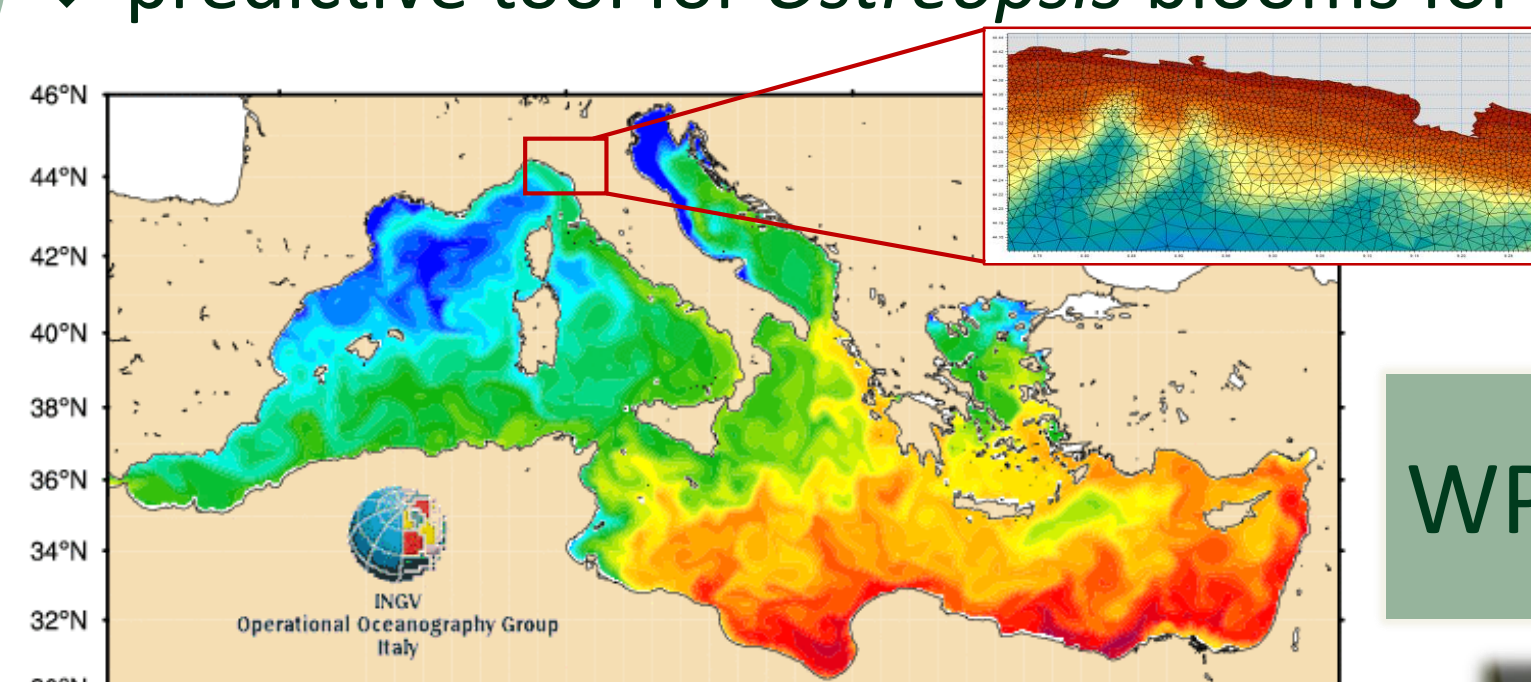
Expected results increased knowledge on environmental drivers affecting *Ostreopsis* blooms and translate this into a forecasting tool

Multiple Linear Regression

R2=0.47 Pearson=0.69

Generalized Regression Neural Network

R2=0.59 Pearson=0.77

WP6: Common and inter-calibrated sampling strategies and protocols

❖ Sampling strategy   ❖ Fixing samples and sieving   ❖ Counting methods

COUNTING CELL
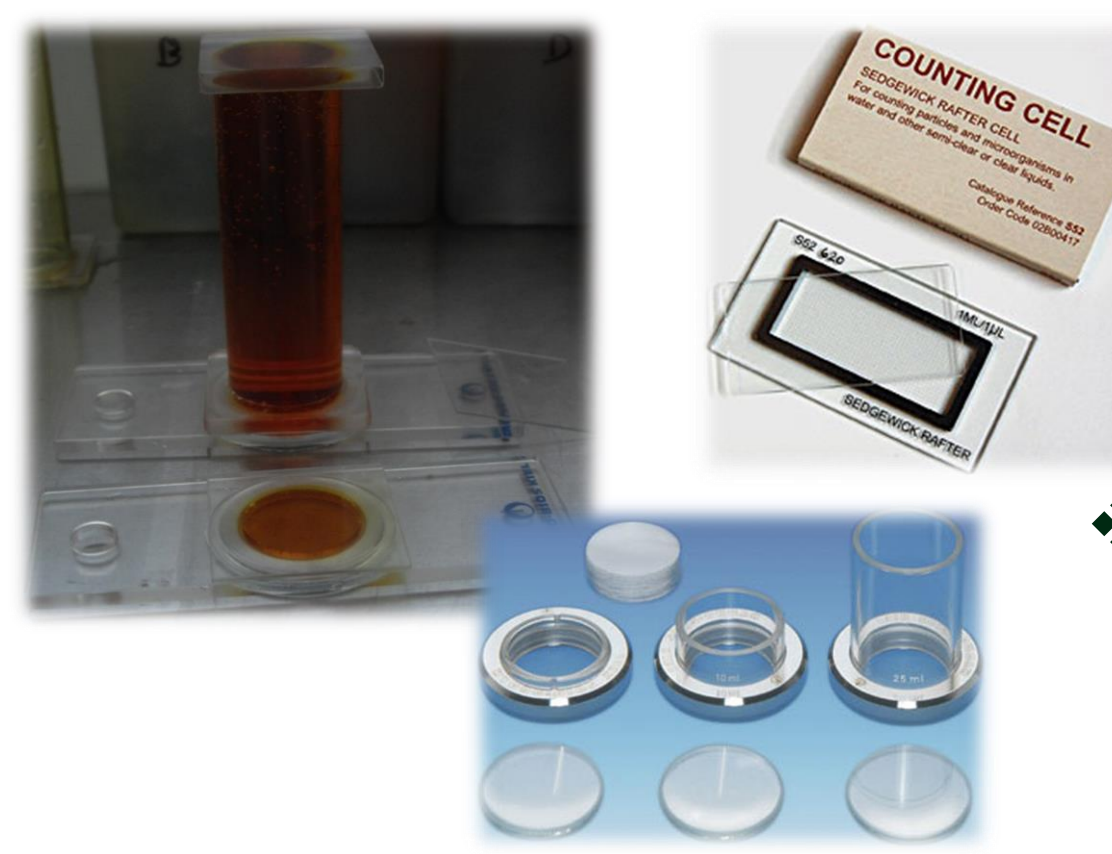
Expected results Improved and common protocols for *Ostreopsis* sampling and sample processing
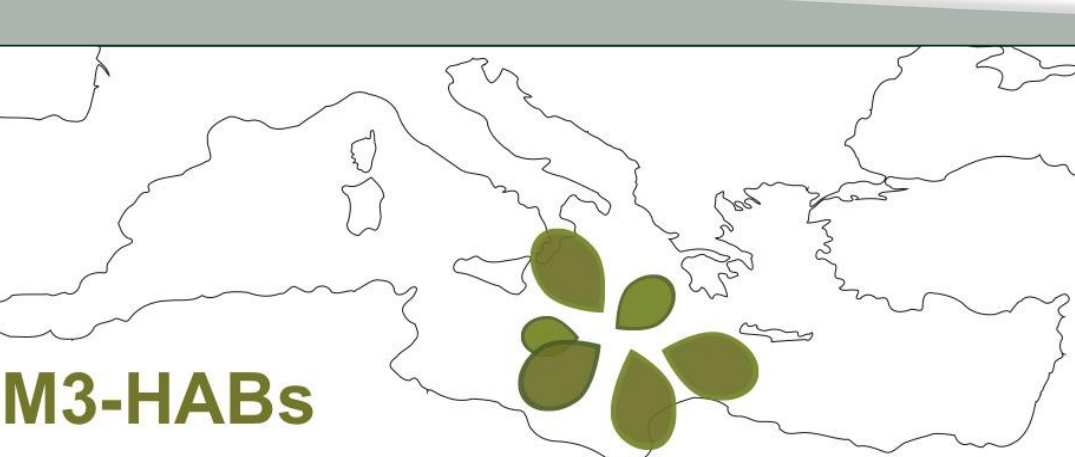
WP7: Common risk detection and management strategies

❖ Open Groups of relevant stakeholders
❖ Definition of strategies and sharing procedures
❖ Guidelines on risk management

Expected results larger awareness of the risks associated to the *Ostreopsis* blooms and improvement in management capacity of local authorities

Connecting *Ostreopsis* people

The project will improve the establishment of solid networks along Mediterranean coasts to cope with *Ostreopsis* emergencies, providing the target groups common and intercalibrated protocols, in order to have comparable samplings in space and time through the Mediterranean Sea.

M3-HABs

Project funded by the EUROPEAN UNION

ENPI CBCMED CROSS-BORDER COOPERATION IN THE MEDITERRANEAN