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PROGRAMME

Monday 27 October 2014

- 8:00-9:00** Participants welcome and registration
- 9:00-10:00** **Opening of the Symposium**
- 10:00-10:30** *Coffee break*
- 10:30-11:30** Keynote conference: **Terrestrial versus marine diversity of ecosystems. And the winner is: the marine realm** by **Pr. Charles F. BOUDOURESQUE**, RUITTON S., BIANCHI C.N., CHEVALDONNÉ P., FERNANDEZ C., HARMELIN-VIVIEN M., OURGAUD M., PASQUALINI V., PEREZ T., PERGENT G., THIBAUT T., VERLAQUE M.
- Session 1: Mediterranean Marine Vegetation: population, biology, ecology and dynamics – Marine "macroalgae"**
- 11:30-11:45** "Marine forests at risk: solutions to halt the loss and promote the recovery of Mediterranean canopy-forming seaweeds" by **Laura AIROLDI**, BALLESTEROS E., BUONUOMO R., VAN BELZEN J., BOUMA T.J., CEBRIAN E., DE CLERK O., ENGELEN A.H., FERRARIO F., FRASCHETTI S., GIANNI F., GUIDETTI P., IVESA L., MANCUSO F.P., MICHELI F., PERKOL-FINKEL S., SERRAO E.A., STRAIN E.M., MANGIALAJO L.
- 11:45-12:00** "*Cystoseira Sedoides* (desfontaines) C. Agardh des côtes tunisiennes : état actuel des connaissances" by **Cyrine BOUAFIF**, OUERGHI A., LANGAR H.
- 12:00-12:15** "Ecology and perturbations of Mediterranean deep-water algal communities: linking population biology and community ecology for conservation" by **Bernat HEREU**, CAPDEVILA P., CEBRIAN E., DÍAZ D., GARRABOU J., KERTING D., LINARES C., NAVARRO L., PAUNER O., TEIXIDO N.
- 12:15-12:30** "Distribution and composition of *Cystoseira* stands along the west Istrian coast (northern Adriatic, Croatia) and comparison with historical data" by **Ljiljana IVEŠA**, DEVESCOVI M.
- 12:30-12:45** "Distribution and genetic variation of two bioconstructor coralline algae (*Lithophyllum byssoides* (Lamarck) Foslie and *L. stictaeforme* (Areschoug) Hauck) along the Italian coasts" by **Fabio RINDI**, PEZZOLESI L., HERNANDEZ-KANTUN J.J., FALACE A., KALEB S., PONTI M., CERRANO C.
- 12:45-13:00** Discussion
- 13:00-14:00** *Lunch*

Session 2: Mediterranean Marine Vegetation: population, biology, ecology and dynamics – Marine Magnoliophytes

- 14:00-14:15** "Insight into the typology of reef formations of the Mediterranean seagrass *Posidonia oceanica*" by Charles F. BOUDOURESQUE, BONHOMME D., ASTRUCH P., BONHOMME P., GOUJARD A., THIBAUT T.
- 14:15-14:30** "*Posidonia oceanica* meadows in greek seas: lower depth limits and meadow densities" by Vasileios GERAKARIS, PANAYOTIDIS P., TSIAMIS K., NIKOLAIDOU A., ECONOMOU-AMILLI A.
- 14:30-14:45** "The importance of genetic make-up for restoration success - a case study of the seagrass *Zostera noltii* hornem in a mediterranean lagoon" by Marlene JAHNKE, SERRA I.A., BERNARD G., PROCACCINI G.
- 14:45-15:00** "Modelling the reference conditions of the upper limit of *Posidonia oceanica* meadow" by Gloria MISSON, VACCHI M., MONTEFALCONE M., ARCHETTI R., BIANCHI C.N., FERRARI M.
- 15:00-15:15** "Preliminary study on the distribution of *Posidonia oceanica* along the Dardanelle Strait" by Melike İdil ÖZ, YAĞLI H., AK İ.
- 15:15-15:30** "Effects of the invasive seagrass *Halophila stipulacea* on the native seagrass *Cymodocea nodosa*" by Yassine Ramzi SGHAIER, ZAKHAMA-SRAIEB R., CHARFI-CHEIKHROUHA F.
- 15:30-15:45** "Distribution and habitat requirements of *Zostera noltei* along the northern coast of Jerba Island (Southern Tunisia, Mediterranean sea)" by Abdessalem SHILI, BEN HMIDA A., BEN MAÏZ N., BOUDOURESQUE C.F.
- 15:45-16:00** "Dynamics of benthic macrophytes in the Southern Tunis Lagoon (Tunisia, Mediterranean Sea)" by Abdessalem SHILI, BACCAR L., BEN MAÏZ N., BOUDOURESQUE C.F.
- 16:00-16:15** Discussion
- 16:15-16:45** *Coffee break*
- 16:45-18:00** Poster Session (1 to 13)
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- 18:00-19:00** *Side event*
- One day in Albania coastline by Violeta ZUNA, Eno DODBIBA
-

Tuesday 28 October 2014

Session 3: Mapping, monitoring and management of Mediterranean marine vegetation

8:30-8:45 "Assessment of the conservation status of *Posidonia oceanica* meadows in the Samaria National Park, an MPA in Crete, Greece" by Dimitris POURSANIDIS, Antonios BARNIAS, LYMBERAKIS P.

8:45-9:00 "Application de la sismique UHR pour le suivi de l'état de conservation des herbiers a *Posidonia Oceanica*" by Sylvain BLOUET, DUPUY DE LA GRANDRIVE R., CHERE E., NOEL C., VIALA C., MARCHETTI S., BAUER E., TEMMOS J.M., BOISSERY P.

9:00-9:15 "First continuous seabed map in France used for the creation of a management tool protecting *Posidonia oceanica*" by Florian HOLON, DELARUELLE G., GUILBERT A., Julie DETER, BOISSERY P., DESCAMP P.

9:15-9:30 "Development of the national monitoring protocol for *Posidonia Oceanica* meadows in Croatia: a pilot project" by Ivan GUALA, NIKOLIĆ V., IVEŠA L., JAKL Z., ŠIJAN M., PRVAN M., KRSTINIĆ P., BRUNDU G., DI CARLO G., RAJKOVIĆ Z.

9:30-9:45 Discussion

9:45-10:00 "Combining modelling and historical data to define the status of *Posidonia oceanica* meadows" by Alice OPRANDI, MONTEFALCONE M., VACCHI M., COPPO S., DIVIACCO G., MORRI C., FERRARI M., BIANCHI C.N.

10:00-10:15 "Monitoring and expansion of *Posidonia* monitoring networks along Corsican coastline" by Gérard PERGENT, BEIN A., BLANFUNE A., DEDEKEN M., OBERTI P., ORSINI A., PERGENT-MARTINI C., RUITTON S., SHORT F.

10:15-10:30 "Monitoring of *Posidonia* meadows under the EC habitats directive: vehicular videography can estimate trends in coverage at low cost and high precision" by Stewart T. SCHULTZ, BAKRAN-PETRICIOLI T., KRUSCHEL C., PETRICIOLI D.

10:30-10:45 Discussion

10:45-11:15 *Coffee break*

11:15-11:30 "A rapid and non-destructive assessment of your *Posidonia* meadow" by Gérard PERGENT

11:30-12:15 Poster Session (15 to 22)

Session 3: Mapping, monitoring and management of Mediterranean marine vegetation (continued)

12:15-12:30 "Analyse critique de l'évaluation de l'état de conservation de l'herbier de posidonie dans le cadre du programme de Cartographie des Habitats Marins – CARTHAM" by Boris DANIEL, LAMOUREUX A.

- 12:30-12:45 "Are Mediterranean MPAs protecting marine forests?" by Fabrizio GIANNI, MANGIALAJO L.
- 12:45-13:00 Discussion
- 13:00-14:00 *Lunch*
- Session 4: Mediterranean vegetal assemblages: Impact and disturbance**
- 14:00-14:15 "Impact de la pêche par mini-chalut benthique sur les herbiers à *Posidonia oceanica* dans le secteur nord-est des îles Kerkennah (Tunisie) " by Ahmed BEN HMIDA, SHILI A., SGHAIER Y.R., RAIS C.
- 14:15-14:30 "Assessment and quantification of the anthropic impact on the *Posidonia Oceanica* seagrass meadow" by Samy ALAMI, BONACORSI M., CLABAUT P., JOUET G., PERGENT-MARTINI C., PERGENT G., STERCKEMAN A.
- 14:30-14:45 "Assessing *Posidonia oceanica* beds regressions using anthropogenic pressures maps along a French coastal region" by Florian HOLON, BOCKEL T., BOISSERY P., DETER J.
- 14:45-15:00 "Arsenic concentrations in seagrass around the Mediterranean coast and seasonal variations" by Christine PERGENT-MARTINI, SALIVAS-DECAUX M., LANGAR H., PERGENT G., AKÇALI B., ALVAREZ-PÉREZ E., APOSTOLAKI E., BAKRAN-PETRICIOLI T., BELBACHA S., BORG J., BUIA C., CASALTA B., CELEBI B., FERNANDEZ-TORQUEMADE Y., HADJICHRISTOFOROU M., LLAGOSTERA I., LIPEJ L., LOPEZ Y ROYO C., MARCOU M., MAVRIC B., PANZALIS P., ROMERO J., SEMROUD R., SKOUFAS G., TURK R., WEITZMANN B., ZAPATA-SALGADO F.J.
- 15:00-15:15 "The conceptualization of trace element flows within *Posidonia oceanica* meadows: a collaborative proposal to fill knowledge gaps" by Jonathan RICHIR, GOBERT S.
- 15:15-15:30 "Mercury contamination in *Posidonia oceanica* in a harbour area of the eastern coast of Tunisia" by Rym ZAKHAMA-SRAIEB, SGHAIER Y.R., BEN HMIDA A., CHARFI-CHEIKHROUHA F.
- 15:30-15:45 Discussion
- 15:45-16:15 *Coffee break*
- 16:15-17:00 Poster Session (23 to 31)
- 17:00-17:30 Awards for best poster
- 17:30-19:00 Closure of the Symposium

PROGRAMME

Lundi 27 octobre 2014

- 8:00-9:00** Accueil et inscription des participants
- 9:00-10:00** **Ouverture du symposium**
- 10:00-10:30** *Pause café*
- 10:30-11:30** Conférence introductive : **Terrestrial versus marine diversity of ecosystems. And the winner is: the marine realm** par **Pr. Charles F. BOUDOURESQUE**, RUITTON S., BIANCHI C.N., CHEVALDONNÉ P., FERNANDEZ C., HARMELIN-VIVIEN M., OURGAUD M., PASQUALINI V., PEREZ T., PERGENT G., THIBAUT T., VERLAQUE M.
- Session 1 :** **Végétation marine de Méditerranée: population, biologie, écologie et dynamique – "Macroalgues" marines**
- 11:30-11:45** "Marine forests at risk: solutions to halt the loss and promote the recovery of Mediterranean canopy-forming seaweeds" par **Laura AIROLDI**, BALLESTEROS E., BUONUOMO R., VAN BELZEN J., BOUMA T.J., CEBRIAN E., DE CLERK O., ENGELEN A.H., FERRARIO F., FRASCHETTI S., GIANNI F., GUIDETTI P., IVESA L., MANCUSO F.P., MICHELI F., PERKOL-FINKEL S., SERRAO E.A., STRAIN E.M., MANGIALAJO L.
- 11:45-12:00** "*Cystoseira Sedoides* (desfontaines) C. Agardh des côtes tunisiennes : état actuel des connaissances" par **Cyrine BOUAFIF**, OUERGHI A., LANGAR H.
- 12:00-12:15** "Ecology and perturbations of Mediterranean deep-water algal communities: linking population biology and community ecology for conservation" par **Bernat HEREU**, CAPDEVILA P., CEBRIAN E., DÍAZ D., GARRABOU J., KERTING D., LINARES C., NAVARRO L., PAUNER O., TEIXIDO N.
- 12:15-12:30** "Distribution and composition of *Cystoseira* stands along the west Istrian coast (northern Adriatic, Croatia) and comparison with historical data" par **Ljiljana IVEŠA**, DEVESCOVI M.
- 12:30-12:45** "Distribution and genetic variation of two bioconstructor coralline algae (*Lithophyllum byssoides* (Lamarck) Foslie and *L. stictaeforme* (Areschoug) Hauck) along the Italian coasts" par **Fabio RINDI**, PEZZOLESI L., HERNANDEZ-KANTUN J.J., FALACE A., KALEB S., PONTI M., CERRANO C.
- 12:45-13:00** Discussion
- 13:00-14:00** *Déjeuner*

Session 2 : Végétation marine de Méditerranée : population, biologie, écologie et dynamique – Magnoliophytes marines

- 14:00-14:15** "Insight into the typology of reef formations of the Mediterranean seagrass *Posidonia oceanica*" par Charles F. BOUDOURESQUE, BONHOMME D., ASTRUCH P., BONHOMME P., GOUJARD A., THIBAUT T.
- 14:15-14:30** "*Posidonia oceanica* meadows in greek seas: lower depth limits and meadow densities" par Vasileios GERAKARIS, PANAYOTIDIS P., TSIAMIS K., NIKOLAIDOU A., ECONOMOU-AMILLI A.
- 14:30-14:45** "The importance of genetic make-up for restoration success - a case study of the seagrass *Zostera noltii* hornem in a mediterranean lagoon" par Marlene JAHNKE, SERRA I.A., BERNARD G., PROCACCINI G.
- 14:45-15:00** "Modelling the reference conditions of the upper limit of *Posidonia oceanica* meadow" par Gloria MISSON, VACCHI M., MONTEFALCONE M., ARCHETTI R., BIANCHI C.N., FERRARI M.
- 15:00-15:15** "Preliminary study on the distribution of *Posidonia oceanica* along the Dardanelle Strait" par Melike İdil ÖZ, YAĞLI H., AK İ.
- 15:15-15:30** "Effects of the invasive seagrass *Halophila stipulacea* on the native seagrass *Cymodocea nodosa*" par Yassine Ramzi SGHAIER, ZAKHAMA-SRAIEB R., CHARFI-CHEIKHROUHA F.
- 15:30-15:45** "Distribution and habitat requirements of *Zostera noltei* along the northern coast of Jerba Island (Southern Tunisia, Mediterranean sea)" par Abdessalem SHILI, BEN HMIDA A., BEN MAÏZ N., BOUDOURESQUE C.F.
- 15:45-16:00** "Dynamics of benthic macrophytes in the Southern Tunis Lagoon (Tunisia, Mediterranean Sea)" par Abdessalem SHILI, BACCAR L., BEN MAÏZ N., BOUDOURESQUE C.F.
- 16:00-16:15** Discussion
- 16:15-16:45** *Pause café*
- 16:45-18:00** Session Posters (1 à 13)
-
- 18:00-19:00** *Evènement parallèle*
- One day in Albania coastline par Violeta ZUNA, Eno DODBIBA
-

Mardi 28 octobre 2014

Session 3 : Cartographie, surveillance et gestion de la végétation marine de Méditerranée

8:30-8:45 "Assessment of the conservation status of *Posidonia oceanica* meadows in the Samaria National Park, an MPA in Crete, Greece" par Dimitris POURSANIDIS, Antonios BARNIAS, LYMBERAKIS P.

8:45-9:00 "Application de la sismique UHR pour le suivi de l'état de conservation des herbiers a *Posidonia Oceanica*" par Sylvain BLOUET, DUPUY DE LA GRANDRIVE R., CHERE E., NOEL C., VIALA C., MARCHETTI S., BAUER E., TEMMOS J.M., BOISSERY P.

9:00-9:15 "First continuous seabed map in France used for the creation of a management tool protecting *Posidonia oceanica*" par Florian HOLON, DELARUELLE G., GUILBERT A., Julie DETER, BOISSERY P., DESCAMP P.

9:15-9:30 "Development of the national monitoring protocol for *Posidonia Oceanica* meadows in Croatia: a pilot project" par Ivan GUALA, NIKOLIĆ V., IVEŠA L., JAKL Z., ŠIJAN M., PRVAN M., KRSTINIĆ P., BRUNDU G., DI CARLO G., RAJKOVIĆ Z.

9:30-9:45 Discussion

9:45-10:00 "Combining modelling and historical data to define the status of *Posidonia oceanica* meadows" par Alice OPRANDI, MONTEFALCONE M., VACCHI M., COPPO S., DIVIACCO G., MORRI C., FERRARI M., BIANCHI C.N.

10:00-10:15 "Monitoring and expansion of *Posidonia* monitoring networks along Corsican coastline" par Gérard PERGENT, BEIN A., BLANFUNE A., DEDEKEN M., OBERTI P., ORSINI A., PERGENT-MARTINI C., RUITTON S., SHORT F.

10:15-10:30 "Monitoring of *Posidonia* meadows under the EC habitats directive: vehicular videography can estimate trends in coverage at low cost and high precision" par Stewart T. SCHULTZ, BAKRAN-PETRICIOLI T., KRUSCHEL C., PETRICIOLI D.

10:30-10:45 Discussion

10:45-11:15 *Pause café*

11:15-11:30 "Une évaluation rapide et non destructive de votre herbier de Posidonie" par Gérard PERGENT

11:30-12:15 Session Posters (15 à 22)

Session 3: Cartographie, surveillance et gestion de la végétation marine de Méditerranée (suite)

12:15-12:30 "Analyse critique de l'évaluation de l'état de conservation de l'herbier de posidonie dans le cadre du programme de Cartographie des Habitats Marins – CARTHAM" par Boris DANIEL, LAMOUREUX A.

- 12:30-12:45** "Are Mediterranean MPAs protecting marine forests?" par Fabrizio GIANNI, MANGIALAJO L.
- 12:45-13:00** Discussion
- 13:00-14:00** *Déjeuner*
- Session 4 :** **Impact et nuisances menaçant les formations végétales de Méditerranée**
- 14:00-14:15** "Impact de la pêche par mini-chalut benthique sur les herbiers à *Posidonia oceanica* dans le secteur nord-est des îles Kerkennah (Tunisie) " par Ahmed BEN HMIDA, SHILI A., SGHAIER Y.R., RAIS C.
- 14:15-14:30** "Assessment and quantification of the anthropic impact on the *Posidonia Oceanica* seagrass meadow" par Samy ALAMI, BONACORSI M., CLABAUT P., JOUET G., PERGENT-MARTINI C., PERGENT G., STERCKEMAN A.
- 14:30-14:45** "Assessing *Posidonia oceanica* beds regressions using anthropogenic pressures maps along a French coastal region" par Florian HOLON, BOCKEL T., BOISSERY P., DETER J.
- 14:45-15:00** "Arsenic concentrations in seagrass around the Mediterranean coast and seasonal variations" par Christine PERGENT-MARTINI, SALIVAS-DECAUX M., LANGAR H., PERGENT G., AKÇALI B., ALVAREZ-PÉREZ E., APOSTOLAKI E., BAKRAN-PETRICIOLI T., BELBACHA S., BORG J., BUIA C., CASALTA B., CELEBI B., FERNANDEZ-TORQUEMADE Y., HADJICHRISTOFOROU M., LLAGOSTERA I., LIPEJ L., LOPEZ Y ROYO C., MARCOU M., MAVRIC B., PANZALIS P., ROMERO J., SEMROUD R., SKOUFAS G., TURK R., WEITZMANN B., ZAPATA-SALGADO F.J.
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- 15:15-15:30** "Mercury contamination in *Posidonia oceanica* in a harbour area of the eastern coast of Tunisia" par Rym ZAKHAMA-SRAIEB, SGHAIER Y.R., BEN HMIDA A., CHARFI-CHEIKHROUHA F.
- 15:30-15:45** Discussion
- 15:45-16:15** *Pause café*
- 16:15-17:00** Session Poster (23 à 31)
- 17:00-17:30** Remise de prix pour le meilleur poster
- 17:30-19:00** Clôture du Symposium

KEYNOTE CONFERENCE

CONFERENCE INTRODUCTIVE

Charles F. BOUDOURESQUE, RUITTON S., BIANCHI C.N., CHEVALDONNÉ P., FERNANDEZ C., HARMELIN-VIVIEN M., OURGAUD M., PASQUALINI V., PEREZ T., PERGENT G., THIBAUT T., VERLAQUE M.

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TERRESTRIAL VERSUS MARINE DIVERSITY OF ECOSYSTEMS. AND THE WINNER IS: THE MARINE REALM

The concept of biodiversity encompasses a wide range of scales and metrics, from genetic and species diversity to functional and ecosystem diversity. Ecosystems can be characterized by a number of descriptors, such as species richness, type of primary production (where present), e.g. photosynthesis and chemosynthesis, production and biomass of primary producers (where present), the balance between nutrients and primary production (HNLC, HNHC, LNLC and LNHC systems), fate of primary production (e.g. herbivores vs detritivores), type of the primary production recycling (slow vs. rapid), production and biomass of secondary producers structure and length of food webs, dominant control (bottom-up, wasp-waist or top-down), import of organic matter from adjacent ecosystems, export of organic matter to other ecosystems and the carbonate cycle. Comparison of a number of marine ecosystems (Posidonia oceanica meadows, Cystoseira forests, Macrocyctis forests, coralligenous constructions, coral reefs, underwater sea caves and hydrothermal vents), with some terrestrial ecosystems (temperate and tropical forests, matorral and grasslands), evidences an obviously higher functional ecosystem diversity in the marine realm. Similarly, marine phyletic diversity is far higher than the terrestrial, whose higher species diversity is virtually due to a few phyla. This is consistent with the fact that Life originated in the oceans, ~3.8 Ga ago, while the conquest of land by Life occurred comparatively in recent times, ~0.5 Ga ago.

ORAL COMMUNICATIONS

COMMUNICATIONS ORALES

Laura AIROLDI, BALLESTEROS E., BUONUOMO R., VAN BELZEN J., BOUMA T.J., CEBRIAN E., DE CLERK O., ENGELEN A.H., FERRARIO F., FRASCHETTI S., GIANNI F., GUIDETTI P., IVESA L., MANCUSO F.P., MICHELI F., PERKOL-FINKEL S., SERRAO E.A., STRAIN E.M., MANGIALAJO L.

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MARINE FORESTS AT RISK: SOLUTIONS TO HALT THE LOSS AND PROMOTE THE RECOVERY OF MEDITERRANEAN CANOPY-FORMING SEAWEEDS

Along Mediterranean coasts, canopy-forming seaweeds used to form diverse, productive and valuable “forest” habitats, but in the past decades conspicuous declines, sometimes to local extinction, have been reported in many regions. Canopies are retracting particularly close to urban areas, and are replaced by turf-forming and ephemeral algae or barrens. The persisting forests are under continued threat, and current protection measures are insufficient. We provide evidence that declines of canopy algae are dramatically extensive, and are driven by multiple local (nutrient enrichment and high sediment loads, fishing, heavy metal pollution) and global stressors (increasing temperature, high wave exposure). We also show that the combined management of local stressors (such as nutrients and sediments) would increase significantly the resilience of canopy algae to future climatic stressors, preventing their further deterioration. Finally, we discuss restoration prospects in areas where these systems have been lost. We conclude identifying the main needs to understand, guide and motivate effective conservation actions in these valuable ecosystems.

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ASSESSMENT AND QUANTIFICATION OF THE ANTHROPIC IMPACT ON THE *POSIDONIA OCEANICA* SEAGRASS MEADOW

The regression of seagrass meadows has been extensively studied over the past few years. Although the causes of this regression may be locally natural, it is more generally related to human impact.

In the framework of the HalGolo (2010) and CoralCorse (2013) oceanographic campaigns, acoustic data (mosaic of sonograms and bathymetry), validated by field data (Scuba diving, ROV), were acquired at depths of -10 m and -50 m at the NATURA 2000 site “Grand Herbier de la Plaine Orientale” (Western Mediterranean, Corsica). Processing of this data provided evidence of the scale of this mechanical degradation (trawling scars, mooring, etc.), and enabled its quantification with regard to surface area and scar density. The main degradation was observed between -20 and -40 m depth (98%); the surface area of seagrass meadow destroyed is estimated at 280 ha with more than 40 scars per hectare recorded in the northern part of the site. Given the slow growth rate of the meadow, assuming the hypothesis of the ending of these practices, it would require almost 150 years to recover these scars.

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IMPACT DE LA PÊCHE PAR MINI-CHALUT BENTHIQUE SUR LES HERBIERS À *POSIDONIA OCEANICA* DANS LE SECTEUR NORD-EST DES ÎLES KERKENNAH (TUNISIE)

*Le présent travail est une contribution à l'évaluation de l'impact d'une pratique de pêche illicite, la pêche au « Kiss », sur les herbiers à *Posidonia oceanica* dans le secteur Nord-Est des îles Kerkennah. Dans cette zone l'herbier constitué par la Magnoliophyte marine *P. oceanica* est très bien développé et présente différentes structures assez particulières notamment l'herbier tigré, une formation typique de la région. Ces herbiers, très importants pour l'équilibre écologique de la zone côtière sont menacés par le chalutage benthique. Dans ce travail les caractéristiques de l'herbier (recouvrement, densité des faisceaux, biométrie et biomasse foliaire) sont décrites dans un secteur impacté par le chalutage et dans un site de référence afin d'évaluer l'incidence de cette pratique de pêche. Cette première étude montre que c'est surtout le recouvrement de l'herbier qui est affecté par le chalutage benthique.*

Sylvain BLOUET, DUPUY DE LA GRANDRIVE R., CHERE E., NOEL C., VIALA C., MARCHETTI S., BAUER E., TEMMOS J.M., BOISSERY P.

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APPLICATION DE LA SISMIQUE UHR POUR LE SUIVI DE L'ETAT DE CONSERVATION DES HERBIERS A *POSIDONIA OCEANICA*

*La sismique réflexion Ultra Haute Résolution (UHR) est une technique récente particulièrement adaptée à la cartographie et la caractérisation des fonds marins. Elle a été utilisée avec succès par Claudio Lo Iacono et al., 2008 dans la baie de Port-lligat (Espagne) pour cartographier la matte morte et l'herbier de *Posidonia oceanica* (posidonies). Cette même technique a été appliquée pour cartographier et caractériser l'herbier de posidonies et la matte morte dans l'Aire Marine Protégée (AMP) de la côte agathoise (France) en Méditerranée Nord occidentale.*

La sismique UHR a permis d'imager la structure et le substrat sur lequel l'herbier de posidonies se développe. L'épaisseur de la matte sous herbier, la présence et l'épaisseur de mattes mortes et le type de substrat sur lequel repose l'herbier ont été estimés à partir des profils sismiques.

A l'échelle de l'AMP la couche de matte morte est homogène et relativement fine, soit comprise entre 20 et 50 cm. La faible épaisseur de mattes mortes sur le site confirmerait les processus dynamiques rapides de développement et de disparition des herbiers. Ainsi, le rapport matte morte sur herbier vivant bien qu'élevé sur le site ne constituerait pas un phénomène alarmant de disparition de l'herbier, mais un développement naturel pour ce type d'herbier confronté à de forts phénomènes d'hydrodynamisme.

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CYSTOSEIRA SEDOIDES (DESFONTAINES) C. AGARDH DES COTES TUNISIENNES : ETAT ACTUEL DES CONNAISSANCES

Cystoseira sedoides (Desfontaines) C. Agardh (Ochrophyta, fucales), est connue pour être endémique à la Méditerranée, cantonnée à la partie nord-africaine de la Méditerranée occidentale et à deux localités de Pantelleria (Sicile-Italie). La synthèse des données historiques disponibles sur la biogéographie de *C. sedoides* en Tunisie, confrontée aux résultats d'une prospection de l'infralittoral supérieur (0 - 4 m de profondeur) du littoral tunisien effectuée entre 2012 et 2014, a montré que l'espèce a connu une régression de sa distribution. La présence des peuplements de *C. sedoides* est limitée au littoral Nord de la Tunisie, entre Melloula (frontière Nord Est Tuniso-algérienne) et Raf Raf, limite Ouest du Golfe de Tunis, avec des densités moyennes variables entre 15 et 41 individus/m². La variation des densités des peuplements semblerait être en relation avec l'importance des aménagements côtiers. La disparition de certaines stations anciennes, sur la côte Est de Tunisie, correspond en revanche, probablement ou certainement, à des erreurs de détermination.

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INSIGHT INTO THE TYPOLOGY OF REEF FORMATIONS OF THE MEDITERRANEAN SEAGRASS *POSIDONIA OCEANICA*

Reef formations of the Mediterranean seagrass *Posidonia oceanica* result from the rise of the mat towards the sea surface, when the meadow reaches the sea surface, and the tips of the leaves emerge. The process of reef formation was first described in the Bay of Port-Cros (Provence, France). Since then, the Port-Cros barrier reef has been considered as the model of *P. oceanica* reefs. In fact, there is a wide variety of *P. oceanica* reefs. Here, we outline a typology of these reef formations: fringing reefs (FR), barrier reefs with mat lagoon (BRML), barrier reefs with eroded mat lagoon (BREML), barrier reefs with a geomorphological lagoon (BRGL), fossil barrier reefs (FOBR), false barrier reefs (FABR), plateau reefs (PR), perpendicular reefs (PER) and atolls (micro- and macro-atoll, MA). It is of paramount importance to take into account this typology, which encompasses reefs that differ from the paradigmatic Port-Cros barrier reef, for the management of the coastal zone, as these reef formations have a high heritage value. In addition, these reef formations contribute greatly to ecosystem services, such as beach protection from erosion and fish nursery. The reef building process lasts centuries, or even millennia, so that their destruction is irreversible at human scale.

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ANALYSE CRITIQUE DE L'ÉVALUATION DE L'ÉTAT DE CONSERVATION DE L'HERBIER DE POSIDONIE DANS LE CADRE DU PROGRAMME DE CARTOGRAPHIE DES HABITATS MARINS – CARTHAM

Le programme de cartographie des habitats marins (CARTHAM) mis en place par l'Agence des aires marines protégées, a permis d'évaluer l'état de conservation des herbiers de Posidonie et sa surface au sein de plusieurs aires marines protégées (AMP) dont les sites Natura 2000. CARTHAM a permis une cartographie quasi continue des biocénoses marines côtières.

L'analyse critique porte sur la méthode d'évaluation de l'Etat de Conservation (EC) de l'herbier de Posidonie proposée dans le cadre du programme CARTHAM.

La méthode d'évaluation s'appuie sur plusieurs paramètres comme la surface de l'habitat, « structure et fonctionnalité » ou encore « menace et pression ». Pour encadrer ces travaux, conduits sur 26 AMP et par 8 opérateurs, le Muséum National d'Histoire Naturelle (MNHN) a identifié un ensemble de descripteurs servant de base commune pour apprécier l'EC.

L'évaluation de l'EC de l'herbier de Posidonie, malgré cette recherche d'harmonisation reste délicate. L'avis d'expert est renforcé par les données CARTHAM, mais est indispensable à l'analyse. Le niveau d'investissement et l'effort d'échantillonnage ont été proposés par les opérateurs et n'ont pas été être encadré par des documents techniques. L'analyse de l'EC n'est pas aujourd'hui structurée pour répondre à une évaluation multi-échelle.

Vasileios GERAKARIS, PANAYOTIDIS P., TSAMIS K., NIKOLAIDOU A., ECONOMOU-AMILLI A.

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POSIDONIA OCEANICA MEADOWS IN GREEK SEAS: LOWER DEPTH LIMITS AND MEADOW DENSITIES

The current study aims to present the main characteristics (depth of lower limit and shoot density at a fixed depth of 15m) of Posidonia oceanica meadows in Greek coasts. All sampling sites were chosen at pristine (undisturbed) areas and are equally distributed geographically (10) in each one of the three main divisions of the Greek seas: North Aegean Sea, South Aegean Sea and Ionian Sea. In total, P. oceanica meadows were studied in 30 sampling sites. Based on our results, the mean value of the lower depth limit of P. oceanica meadow in the North Aegean Sea was 26.3 ± 6.44 meters, while the mean value of the shoot density was 343.1 ± 104.58 shoots/m². In the South Aegean Sea, the mean values of the lower depth limit and shoot density of P. oceanica meadow were slightly higher, 30.0 ± 5.75 meters depth and 430.2 ± 87.97 shoots/m² respectively. In the Ionian Sea, the mean values of lower depth limit of P. oceanica meadow (35.4 ± 4.95 meters depth) and shoot density (470.19 ± 69.33 shoots/m²) were higher than the corresponding values of the Aegean Sea. Since all of our sampling sites correspond to undisturbed conditions the above mentioned values of lower depth limit and shoot density of each division of the Greek seas (North Aegean Sea, South Aegean Sea, and Ionian Sea) could be used for the calculation of reference conditions values for the estimation of the ecological status of all Greek seas' meadows.

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ARE MEDITERRANEAN MPAs PROTECTING MARINE FORESTS?

*In the Mediterranean Sea, Marine Protected Areas (MPAs) are nearly 700, covering approximately 5% of the sea surface, but merely 0.1% of the Mediterranean's total surface is included in no-take zones. Mediterranean MPAs are often established according to political or socio-economic criteria more than nature conservation aspects, and only less than half of them have a management plan or have evaluated the status and the distribution of marine habitats. Results from our literature-based research highlight that scientific studies are abundant only in few Mediterranean MPAs, generally the biggest and the long-established ones. Usually, it is often the case that on land the vegetation has a primary role in establishing protected areas. By contrast, in marine systems, the vegetation has a secondary role or in some cases is absent in the establishment of protected areas. Furthermore, in the most studied Mediterranean MPAs, there have been limited scientific research on the status of large brown algae (i.e. *Cystoseira* and *Sargassum*) forests. As a result of this lack of information, marine forests are generally not included in Mediterranean MPA management plans, making it difficult to assess their evolution and understand the potential role of MPAs in the conservation of marine forests. With this contribution, we would like to remark the importance of conducting research on marine forests of *Fucales* in MPAs that may represent priority sites for the conservation of healthy forests and for the recovery of degraded ones.*

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DEVELOPMENT OF THE NATIONAL MONITORING PROTOCOL FOR POSIDONIA OCEANICA MEADOWS IN CROATIA: A PILOT PROJECT

*In the framework of the MedMPAnet Project, we aimed at developing a monitoring protocol for the habitat type 1120 *Posidonia* beds to assist Croatia in fulfilling the requirements of the Habitats Directive. Field activities for assessing the status of *Posidonia oceanica* meadows were carried out in five sites within the Primorje-Gorski Kotar County (Northern Adriatic Sea). At each site, the survey was performed at nine stations and three different depths. Non-destructive sampling was done using traditional descriptors widely applied in nearly all Mediterranean *P. oceanica* monitoring programmes. Shoot density and the surface of different substrate types were assessed in the field; percentage covers of live *P. oceanica* and dead mat were then used to calculate the Conservation Index (CI). Values of density and CI were averaged for each station and each bathymetric range, then plotted to obtain an overview of the status of the investigated meadows. Meadows were then classified according to the values of density and the descriptors of lower limit (depth, type and coverage) following standard thresholds used in the Mediterranean to get information on conservation status of the meadows.*

**Posidonia oceanica* meadows showed clear signs of deterioration in three sites, two of them being close to direct sources of anthropogenic pressures. The collected data are preliminary and could serve as a baseline for future 6-year surveillance cycles within the framework of national monitoring programme to report status of this priority habitat according to the provisions of the EU Habitats Directive.*

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ECOLOGY AND PERTURBATIONS OF MEDITERRANEAN DEEP-WATER ALGAL COMMUNITIES: LINKING POPULATION BIOLOGY AND COMMUNITY ECOLOGY FOR CONSERVATION

Mediterranean deep-water algal communities of the genus Cystoseira are highly endangered, and in some places have become totally extinct. Furthermore, their distribution is largely unknown, even in the most studied sites, such as MPAs, where their presence has been described only recently. These populations of Cystoseira create a complex spatial structure that allows the coexistence of many associated species, thereby resulting in highly diverse communities. Deep-water algal communities show low dynamics and can therefore easily be affected by disturbances even inside MPAs. Consequently, the status of these communities can be an excellent indicator of anthropogenic disturbances such as trampling (by fishing nets, anchoring or diving), or competition by introduced invasive species. Moreover, measuring the impact of disturbances on the population structure and dynamics of these habitat-forming species allows impact assessments in the whole community. Here we present the results of several years of research on the distribution, composition and dynamics of deep-water algal communities along latitudinal gradients and under different perturbation regimes. Their response to different anthropogenic impacts and the conservation strategies to diminish the effect of these disturbances is discussed.

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ASSESSING POSIDONIA OCEANICA BEDS REGRESSIONS USING ANTHROPOGENIC PRESSURES MAPS ALONG A FRENCH COASTAL REGION

During the last half century, the development of coastal anthropogenic activities is at the origin of increasing pressures on marine coastal ecosystems. The management of those multiple and simultaneous threats moreover requires reliable and precise data on the distribution of the pressures and of the most sensitive ecosystems.

Posidonia oceanica beds (Tracheophyta) are encountered between the sea surface and a depth of 30-40 meters. Despite their important ecological and economical roles, they are threatened by many human activities. Regressions can be mapped on the basis of the visible areas of dead mattes and historical data. We used Random Forest algorithm to make predictions of P. oceanica beds regression data according to anthropogenic pressures along a Mediterranean French region (Provence-Alpes-Côte-d'Azur). Pressures tested appealed to reclamations from the sea, coastal population, aquaculture, wastewater effluents, anchoring areas, coastal land cover, and stream effluents data as a function of bathymetry and currents. Model performances were particularly good for extreme ecological states (classification error rates of 5% and 27% respectively for regression rate < 10 % and > 90 %). Stream effluents (approximated by siltation) was the major parameter forcing the distribution of P. oceanica dead mattes, while sketches of ecological thresholds regarding aquaculture, anchoring and coastal infrastructures are proposed.

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FIRST CONTINUOUS SEABED MAP IN FRANCE USED FOR THE CREATION OF A MANAGEMENT TOOL PROTECTING *POSIDONIA OCEANICA*

The Mediterranean Sea is a biodiversity hotspot facing numerous threats: high population density, high urbanization rate, coastal erosion, overexploitation of marine resources and spread of invasive species. Maps of marine habitats are an essential tool in order to appreciate the ecological and spatio-temporal heterogeneity of the environment, potential and real distribution of species, identify corridors but also propose relevant management measures and evaluate their effects. Different studies allowed the realization of high scale marine habitat maps. It resulted in a patchwork of more or less connected maps. Through the DONIA program we reviewed and completed 30 years of work in order to obtain a continuous map of the French coastline: 1 700 km and 47 water bodies.

We obtained a 1:5 000 continuous map of the seabed habitats using ten classes. The results are freely available (with login) on www.medtrix.fr in DONIA®expert. Besides the complete French Mediterranean coast, several Mediterranean islands are concerned: the Galite Archipelago in Tunisia, Zembra Island in Tunisia and Tavolara - Punta Coda Cavallo in Sardinia (Italy). A simplified database called DONIA® intended for the general public is also freely available on Medtrix without any login. The same regions are concerned but habitats were simplified into four classes (seagrass, dead matte, sand, rock) instead of ten. This simple dynamic map is freely accessible to all through the DONIA® application (App Store and Google play); it helps boats to safely anchor outside of sensitive habitats. The application opens new perspectives in terms of management of marine protected areas by facilitating the communication between site managers and visitors and providing an active management of mooring.

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DISTRIBUTION AND COMPOSITION OF *CYSTOSEIRA* STANDS ALONG THE WEST ISTRIAN COAST (NORTHERN ADRIATIC, CROATIA) AND COMPARISON WITH HISTORICAL DATA

*The northern Adriatic represents the northernmost biogeographic sector of the Mediterranean. Additionally, due to north Italian rivers runoff, it represents one of the most eutrophicated regions of the Mediterranean. Differently to other north Adriatic areas, the sea bottom along the west Istrian coast is mainly rocky, i.e. particularly adapted to harbor *Cystoseira* (Phaeophyceae, Fucales)-dominated assemblages. The west Istrian coast spans approximately 100 km straight from north to south. This particular orientation produces large scale gradients of oceanographic variables and wave action intensities. A series of *Cystoseira* demography surveys were conducted during the last 10 years at different depths. From 0 to 1 m depth *Cystoseira* stands were mainly composed of *Cystoseira amentacea*, which attained maximum abundances along southern sectors of the coast. Around 1 m depth stands were dominated by *C. crinita* or *C. barbata*. The composition of these stands likely depends on local gradients of wave action and anthropogenic pressure. From 4 m depth to the rocky bottom edge (usually between 10 and 20 m) mixed stands were dominated by *C. foeniculacea* or *C. corniculata*. In some sites *C. spinosa* was a major component of these mixed stands. *C. compressa* and *C. humilis* were found along the whole coast at all depths as components of mixed stands. Monospecific stands of *C. compressa* were noticed only in moderately polluted sites. Comparison with historical data revealed long term changes of *Cystoseira* spp. abundance. A phase of regression, occurring during the last decades of the past century, was followed by a phase of recovery. At present, the composition of stands in sites not directly subjected to urban pollution might be considered similar to that assessed during the 1950s.*

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THE IMPORTANCE OF GENETIC MAKE-UP FOR RESTORATION SUCCESS – A CASE STUDY OF THE SEAGRASS *ZOSTERA NOLTII* HORNEM IN A MEDITERRANEAN LAGOON

*Seagrass meadows are one of the most threatened ecosystems on earth. In order to restore seagrasses and maintain the ecosystem services they provide, transplantation and restoration of meadows is performed for several seagrass species and on different continents. Several studies have highlighted the importance of genetic diversity and make-up for transplantation success in seagrasses, but genetic diversity is still rarely taken into account in transplantation trials. To restore ecosystem functioning in the Mediterranean saline Berre lagoon (France), transplantation of *Zostera noltii* (Hornem) meadows was carried out after a genetic assessment of relict meadows and a marine donor site. The transplantation was followed over four years. The success was extremely low, while relict meadows made a slight recovery. We assessed genetic diversity of newly occurred patches and existing meadows and of the transplanted sites four years after the transplantation. Relict meadows have high genotypic richness values indicating high levels of sexual reproduction, while the assessed transplant site is extremely clonal. The transplant site is moreover genetically distinct from indigenous meadows. The lack of success of transplanted shoots could be due to an adaptation mismatch of the marine donor material to lagoon conditions.*

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MODELLING THE REFERENCE CONDITIONS OF THE UPPER LIMIT OF *POSIDONIA OCEANICA* MEADOW

*The European directive 2008/60/EC (MSFD: Marine Strategy Framework Directive) requires Member States to define the ecological quality of marine environment. The purpose of the MSFD is to attain, or maintain, a good environmental condition of the marine environment by 2020. In order to achieve this goal, reference conditions of a given environment can be defined also by modelling. In this paper, a modelling approach based on 2D mapping with predictive equations formerly developed at regional scale (Liguria region) is applied at the Mediterranean basin-wide spatial scale. This predictive model identifies a portion of the seabed (the buffer zone) where the upper limit of meadows of *Posidonia oceanica* (L.) Delile, the dominant seagrass in Mediterranean coastal waters, is expected to be located under natural conditions, thus representing its reference conditions. This approach has been applied to four Mediterranean coastal areas with different coastal morphologies and hydrodynamic characteristics. For the theoretical determination of the buffer zone, in which the meadow upper limit is expected to lay, two predictive equations were applied to each area and data were processed by GIS to represent the actual position of the upper limit. Results show good applicability of the predictive 2D model also at the Mediterranean scale, but its applicability is restricted to those meadows settled on sandy or matte substrate. Application of this model at the Mediterranean scale allows to define the reference conditions of a priority coastal habitat and thereby to quantify the regression of *P. oceanica* meadows caused by human activities and natural impacts (e.g. alterations generated by rivers).*

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COMBINING MODELLING AND HISTORICAL DATA TO DEFINE THE STATUS OF *POSIDONIA OCEANICA* MEADOWS

*Coastal marine ecosystems are particularly sensitive to global change due to natural and anthropogenic causes. Meadows of *Posidonia oceanica* (L.) Delile (Angiospermae, Posidoniaceae) are key Mediterranean coastal ecosystems that have been experiencing an alarming decline over the last decades. Regressed meadows have been shown to be prone to colonization by substitutes, either the seagrass *Cymodocea nodosa* or algae of the genus *Caulerpa*. All these substitutes exhibit a lower engineering capacity than *P. oceanica*, and thus lead to profound structural and functional changes in the ecosystem. As requested by the EU Marine Strategy Framework Directive, status of marine ecosystems has to be assessed through comparison with reference conditions, which can be defined by means of i) historical data, ii) pristine areas, and iii) modelling. In this study we combined a predictive model with historical data to define the reference conditions of the *P. oceanica* meadow of Bergeggi (Ligurian Sea, NW Mediterranean) and to evaluate changes in the meadow during the last 25 years. Starting from 1987, information collected through the years along a permanent underwater transect was available. The meadow experienced a dramatic decline through time and an ecosystem phase-shift due to the appearance of dead matte and the establishment of two substitutes, *Cymodocea nodosa* and the alien green alga *Caulerpa cylindracea*. In recent years the position of the upper limit of the meadow has been showing signs of recovery and has been slowly going back to the reference condition defined by the predictive model; from a compositional point of view, however, the arrival of the fast alien invader *C. cylindracea* has driven the ecosystem into an alternative state that seems hardly reversible.*

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PRELIMINARY STUDY ON THE DISTRIBUTION OF *POSIDONIA OCEANICA* ALONG THE DARDANELLE STRAIT

*Posidonia meadows, being one of the most reliable bioindicators of a disturbed environment, were investigated in Dardanos Bay (Dardanelles Strait). This site deserves attention due to both excessive anthropogenic impacts and natural hydrodynamics of the strait. Providing information that can be extrapolated to the northern extension of *Posidonia oceanica* towards the Marmara Sea was also aimed. Lower limit was marked in order to be used for long-term monitoring. Several parameters such as meadow cover, meadow density, and type of limit were noted according to the standardized in situ measurements. The lower limit is situated at 17 m depth, meadow cover average value is 47.47 % and the percentage of plagiotropic rhizome is 51.82%. The phenological and lepidochronological property were also analyzed. Finally the Ecological Quality Ratio was calculated and the values between 0.42-0.52 correspond to a "poor" vitality for Dardanos meadow, according to the BiPo index.*

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MONITORING AND EXPANSION OF POSIDONIA MONITORING NETWORKS ALONG CORSICAN COASTLINE

*The distribution and the vitality of the *Posidonia oceanica* meadow were monitored in the western Mediterranean at 15 sites along the coasts of Corsica (1 000 km of coastline) using two monitoring systems, the *Posidonia* Monitoring Network and *SeagrassNet*, between 2004 and 2013. While the vitality of the meadow is satisfactory overall, due to the low impact of human pressure along these coasts, patterns of change over time show a slight degradation of the main descriptors of the meadow. The meadow's vitality index has declined on average by 8.1%, the *BiPo* index by 9.8% and the position of the lower limit has regressed at 6 sites and only progressed at one site; however, the majority remains stable (8 sites). While this pattern of change may be the reflection of local alterations in the environment (increase or decline in human pressure), the regressive dynamic of the meadow observed at the lower limit at several reference sites (e.g. marine protected areas, sites distant from sources of human impact) is more worrying; both monitoring systems showed a significant decline for the common site of Stareso.*

Two hypotheses might explain the regression observed: (i) the rise in mean sea level during the study period (more than 2 cm), which may result in a significant regression in sectors where the slope is relatively slight, and (ii) the North Atlantic Oscillation (NAO), which declined from 2002 to reach very low values in 2010, resulting in an increase in precipitation (inflow from coastal rivers) and a decline in the amount of light available (increase in cloud cover and inputs of particulate matter).

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ARSENIC CONCENTRATIONS IN SEAGRASS AROUND THE MEDITERRANEAN COAST AND SEASONAL VARIATIONS

*Arsenic's occurrence in the environment could be due to human activities as well as to natural sources. In this study, *Posidonia oceanica* and *Cymodocea nodosa* are collected in 84 sites around the Mediterranean basin. In addition, both seagrass are collected monthly, in two sites (Calvi in Corsica and Salammbô in Tunisia). Arsenic concentrations in *C. nodosa* present seasonal variations in relation with spring phytoplankton blooms. For both species arsenic concentration is higher in the vicinity of geological sources (mining), lagoon outlets and industrial activities. Moreover, Mediterranean islands (Balearic, Sardinia, Corsica, Malta, Crete and Cyprus) and the Southern basin coastline exhibit lower concentrations in Arsenic than the rest of the Mediterranean basin. The wide spread distribution of these two species would encourage their use in a global monitoring network devoted to Arsenic contamination.*

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ASSESSMENT OF THE CONSERVATION STATUS OF *POSIDONIA OCEANICA* MEADOWS IN THE SAMARIA NATIONAL PARK, AN MPA IN CRETE, GREECE

Posidonia oceanica is seagrass endemic to the Mediterranean, and a key species in the coastal zone. It is widely employed as the ideal biological indicator for assessing the quality of water under the Water Framework Directive (WFD) as well as for assessing the health status of coastal ecosystems. To achieve both, it is crucial to develop a network of monitoring stations and cartographic work within the area of interest, in our case Samaria National Park. This is one of the biggest National Parks in Greece, including the well known gorge of Samaria, part of the NATURA 2000 network (SCI: GR4340008) and has an extended coastline of 32 km. The information about the spatial extent of the seagrass meadows from the area is poor, whereas there is no available information about their health status based on specific descriptors. Within a 3-years project, a cost-effective monitoring system has been established aiming to assess the conservation status, identify pressures and threats, and to draw and propose appropriate management measures. Taking into account the limited resources (personnel and funds) we established a network of monitoring stations at two depths (10 and 20 m). There, we monitor a series of descriptors (min - max depth, shoot density, CI index) that can be easily accessed by the staff of the Samaria National Park Managing Authority after minimal training. Moreover, we use low cost acoustic instruments (Lowrance echosounder + Structure Scan) for a complete habitat mapping of the meadows in the previously mapped areas as well as in new ones, after information from local fishermen.

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**THE CONCEPTUALIZATION OF TRACE ELEMENT FLOWS WITHIN
POSIDONIA OCEANICA MEADOWS:
A COLLABORATIVE PROPOSAL TO FILL KNOWLEDGE GAPS**

The Mediterranean seagrass *Posidonia oceanica* (L.) Delile is regarded as a relevant indicator of bioavailable trace elements (TEs) since it efficiently and proportionally bioaccumulates these chemicals from its surrounding environment. Recent studies have further brought supplementary insights in our understanding of the processes driving TE kinetics within that species. But at a higher degree of organization, the distribution and flows of TEs between *P. oceanica* meadow components, i.e. seagrass shoots, epiphytes, associated algae and animals and detritus, have not been investigated yet. The present study therefore aims to propose a conceptualization model of *P. oceanica* meadows, regarded as the juxtaposition of the 5 separate components listed above exchanging flows of TEs between themselves and with their environment, i.e. water and sediment. This model can be drawn in energy circuit language. By writing such a model, one in essence is writing equations describing a system. To be relevant, its elaboration requires the compilation of a large amount of quantitative data. This conceptualization can thus be regarded as a collaborative innovation requiring scientists to fill the model through the continuous supplement of new data. In fine, this model will lead to the exact quantification of the role played by *P. oceanica* meadows in the coastal biogeochemistry of TEs in the Mediterranean.

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**DISTRIBUTION AND GENETIC VARIATION OF TWO BIOCONSTRUCTOR
CORALLINE ALGAE (*LITHOPHYLLUM BYSSOIDES* (LAMARCK) FOSLIE
AND *L. STICTAEFORME* (ARESCHOUG) HAUCK) ALONG THE ITALIAN COASTS**

*Coralline red algae represent a worldwide component of hard-bottom coastal communities, where they play a key role in many ecological processes. Some species are ecosystem engineers that produce biogenic platforms, reefs and other calcified structures providing a wealth of habitats for many other species, especially in temperate seas. In the Mediterranean Sea these bioconstructions are widespread and occur both in the littoral zone (trottoirs of *Lithophyllum byssoides*) and in the sublittoral zone (coralligenous bottoms, where coralline algae are one of the main constituents). A detailed knowledge of their distribution and composition is essential for their conservation, but molecular data assessing taxonomic identity and population structure in corallines are extremely limited. The distribution and genetic variation in two important bioconstructor corallines, *Lithophyllum byssoides* and *L. stictaeforme* (Corallinales, Corallinaceae) are investigated using sequences of the plastid *psbA* gene and mitochondrial *cox2,3* spacer. Populations of *L. byssoides* occur on all parts of the Italian coastline where rocky shores exist and the molecular data show that Mediterranean populations of this species represent a sister lineage to Atlantic populations. *L. stictaeforme* is widespread along the Italian shores, particularly along the Ligurian and Tyrrhenian sides. In molecular phylogenies Mediterranean populations of *L. stictaeforme* form a well-supported clade, to which North Atlantic *Lithophyllum* spp. are the closest relatives. Overall the results indicate a high genetic variability in these species, with the possible existence of cryptic species.*

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**MONITORING OF *POSIDONIA* MEADOWS UNDER THE EC HABITATS
DIRECTIVE: VEHICULAR VIDEOGRAPHY CAN ESTIMATE TRENDS IN
COVERAGE AT LOW COST AND HIGH PRECISION**

*Regular monitoring of *Posidonia oceanica* (L.) (Posidoniaceae) is required under EC directives, and its purpose is to inform management agencies when and where actions are necessary to protect and restore ecological health and water quality. The Habitats Directive requires each EU member nation to report specifically on temporal trend in areal extent of *Posidonia* habitat. The success of the HD hinges on the power of the monitoring protocol to reveal a significant negative trend, wherever that trend occurs in nature. Statistical power is determined by the size of the sampling error of the protocol, which includes measurement uncertainty and natural spatial variation in the descriptor. We review several descriptors of *Posidonia* status, and consider published estimates of their typical sampling errors, to compare their ability to demonstrate a 10% temporal trend. We find that the protocols with potentially high statistical power are fixed-plot methods such as SeagrassNet and balisage, high resolution aerial photography, and remote underwater videography. The lowest statistical power is found for random plot protocols using descriptors from the interior meadow such as shoot density measured by SCUBA in 40 x 40 cm quadrats. The main advantage of videography over direct SCUBA methods is the ability to sample 20-30 times the area sampled by the equivalent SCUBA labour, but with none of the fatigue or discomfort. The main advantage of videography over aerial photography or acoustic imaging is its high resolution and near-perfect habitat classification accuracy for live seagrass, dead matte, and non-seagrass benthic habitats. We recommend remote underwater videography as a low-cost method of uncovering trends in *Posidonia* cover with high statistical power.*

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EFFECTS OF THE INVASIVE SEAGRASS *HALOPHILA STIPULACEA* ON THE NATIVE SEAGRASS *CYMODOCEA NODOSA*

Halophila stipulacea is a dioecious seagrass that colonized the Mediterranean basin following the opening of the Suez Canal (1869). It was one of the first lessepsian migrants reported from at least 11 Mediterranean countries. Since it first recorded in 2003 in the Gabes gulf, *H. stipulacea* showed a rapid expansion along the Tunisian coasts. We investigated the ecological survey of *H. stipulacea* in Marina Cap Monastir during the period May 2011 and May 2014. A total of four transect lines along 100 m and 50 m intervals at depths ranging from 0.5 to 4 m were performed. The mean percentage cover of all benthic plants was estimated showing a quick colonization inside the Marina by *H. stipulacea*. In the first field campaign (May 2011) furthermore, this plant covered a surface area of 2 000 m². It increased rapidly reaching a value of 22 000 m² in May 2014. Besides *Cymodocea nodosa* which was abundant in early 2010 on the outside of the Marina harbor is currently observed in only very restricted areas.

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DYNAMICS OF BENTHIC MACROPHYTES IN THE SOUTHERN TUNIS LAGOON (TUNISIA, MEDITERRANEAN SEA)

The Southern Tunis Lagoon (north-eastern Tunisia) has long been severely impacted by man-induced eutrophication. Like the Northern Tunis Lagoon, the Southern Tunis Lagoon has been the subject of an ambitious plan of restoration, implemented between 1998 and 2001. The program consisted mainly in deepening the lagoon, reducing its surface area and establishing one-way water circulation, ensuring a continuous and relatively rapid water renewal. Since then, the water quality has conspicuously improved and the macrophyte community dramatically changed. The authors show the decline of pollution-tolerant species and of free-living macrophytes. In contrast, the Ulvophyceae *Caulerpa prolifera* and the seagrass *Cymodocea nodosa* have become the dominant species, while species diversity has conspicuously increased. Although the restoration program is undoubtedly a success story, it is worth emphasizing that a return to a hypothetical natural condition is less clear, as 'natural' conditions continuously changed over the Holocene, then human, history of the lagoon.

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**DISTRIBUTION AND HABITAT REQUIREMENTS OF *ZOSTERA NOLTEI*
ALONG THE NORTHERN COAST OF JERBA ISLAND (SOUTHERN
TUNISIA, MEDITERRANEAN SEA)**

*The marine and brackish Magnoliophyta (seagrass) *Zostera noltei* is widely distributed in Tunisia. It thrives in sheltered bays and in brackish lagoons, in shallow waters where terrigenous inputs are relatively important. Here, we studied the distribution (mapping, biomass) and habitat requirements of *Z. noltei* in an embayment and a lagoon of the northern coast of Jerba Island (southern part of the Gulf of Gabès), one of the only two Mediterranean regions (with the northern Adriatic) where tide amplitude is conspicuous. *Z. noltei* meadows are either monospecific (from the seagrass point of view) or mixed, with *Cymodocea nodosa*. In comparison with northern Tunisia meadows (e.g. the Gulf of Tunis), in Jerba they are confined to shallower habitats, and exhibit a wider range of tolerance to a number of environmental parameters, e.g. tide, evaporation and salinity. In the absence of a baseline of the past distribution of the two seagrass species, possible changes in the balance between them, in relation with e.g. climate warming and resort development, cannot be evidenced.*

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**MERCURY CONTAMINATION IN *POSIDONIA OCEANICA* IN A HARBOUR
AREA OF THE EASTERN COAST OF TUNISIA**

*The seagrass *Posidonia oceanica* is considered to be an accurate bioindicator of past and present mercury contamination. Through the lepidochronology method, it is possible to have information on its life history traits, particularly its metal contamination. In the framework of MAPMED Project, we assess the temporal trend contamination by mercury investigations on dead sheaths of 45 samples of *P. oceanica* collected in the El Kantaoui area (Eastern Tunisian coast). Our results, first reported in this species inhabiting the Tunisian coasts, allowed comparing the mercury contamination in seagrass of El Kantaoui area with other Mediterranean ones. This study confirms the relevance of the use of *P. oceanica* as a biological indicator of metal contamination in coastal ecosystems. Thus the usefulness of *P. oceanica* as a tracer of temporal and spatial metal contamination and as a good tool for water quality health is highlighted.*

POSTERS

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COMPOSITION OF THE FUNCTIONAL MACROALGAL GROUPS ON *POSIDONIA OCEANICA* (L.) DELILE LEAVES

This paper is designed to display the functional macroalgal groups classified according to their morphologies and the morpho-functional group numbers expressed as percentage on Posidonia oceanica leaf surface area (cm²) around Gökçeada Island (North Aegean Sea, Turkey) and finally interpret their relations with environmental factors.

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BIOACCUMULATION DU MERCURE, DU ZINC ET DU CUIVRE CHEZ *POSIDONIA OCEANICA* : COMPARAISON AVEC UN SITE DE RÉFÉRENCE

Les concentrations de Hg, Zn et Cu sont mesurées chez Posidonia oceanica provenant de deux sites situés dans la baie de Bou Ismaïl (Algérie, Sud de la Méditerranée). Les mesures effectuées dans différentes parties de la plante ont mis en évidence des teneurs importantes de ces trois métaux traces au niveau des rhizomes. Les limbes des feuilles adultes présentent des teneurs importantes de Hg et de Zn et les feuilles intermédiaires des teneurs importantes de Cu. La concentration en Hg est plus importante dans les échantillons issus du site anthropisé comparativement au site de référence, contrairement à celles du Zn et du Cu pour lesquelles l'écart est moins important.

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NEW DATA ABOUT THE PHENOLOGY AND THE DISTRIBUTION OF *DICTYOTA CYANOLOMA* TRONHOLM ET AL. IN THE MEDITERRANEAN IBERIAN COASTS

Dictyota cyanoloma (Dictyotales, Phaeophyceae) was described by Tronholm et al. (2010). But little is known about the phenology and distribution of this species. Therefore, a detailed phenologic study was carried out in Palamós (Girona, Spain), where the type is from, and also a distribution study along the entire Mediterranean Iberian coast. In Palamós D. cyanoloma is present all the year with a maximum development in winter and a minimum in summer. Fertile specimens are found all the months except in summer (July and August). Sporophytes are dominant from January to June and gametophytes only occur in February, March and June. Information about the antheridia, which has never been described before, is provided. At present D. cyanoloma occurs along all the Mediterranean Iberian coasts, in 19 of 32 localities sampled. It is found mostly in harbours and the increase of its distribution suggests that D. cyanoloma could be an introduced species in the Mediterranean Sea.

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RESEARCH OF CIRCULAR PATTERN DAMAGE TO *POSIDONIA* MEADOWS ALONG THE EASTERN ADRIATIC SEA

Abstract

Remote aerial or satellite images of the Croatian Adriatic have revealed several locations of circular damage to Posidonia meadows extending back in time over a decade. In some locations these circles exist as a regular linear series on remote island shores, and at other locations they appear haphazardly positioned and sometimes overlapping. Our aims are to determine possible causes of this damage, obtain estimates of the time of damage, and to monitor the rate of Posidonia recovery. The damage circles are likely caused by submarine explosions, for example from blast fishing or military shelling. We expect that more than one type of human activity will be required to explain all the Posidonia damage circles in Croatia.

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APPLICABILITY OF MEDITERRANEAN BASELINES OF *POSIDONIA* *OCEANICA* DESCRIPTORS FOR THE ASSESSMENT OF ITS CONSERVATION STATUS ALONG THE EASTERN PART OF THE ADRIATIC SEA

Ecological differences along the Adriatic Sea (climatic differences along the NW-SE axis, higher eutrophication in the North Adriatic, and higher natural eutrophication in the area between the islands or inside deep indented bays) influence Posidonia oceanica distribution and the appearance of its meadows. As the baselines of descriptors for Posidonia meadows for a particular area in the Croatian Adriatic have not yet been established we argue that non-critical and untested use of baselines of descriptors and classification methods that exist for Posidonia meadows in the NW Mediterranean could lead to erroneous conclusions and an incorrect assessment of meadow conservation status.

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**VERS UNE NOUVELLE AIRE MARINE PROTEGEE MAROCAINE EN
MEDITERRANEE :
LE CAP DES TROIS FOURCHES**

Dans le cadre du Projet MedMPAnet, une priorisation des Sites d'Intérêt Biologique et Ecologique (SIBE), préalablement identifiés sur la façade méditerranéenne du Maroc, a révélé que le site « Cap des Trois Fourches », est le mieux approprié pour être érigé en Aire Marine Protégée (AMP). Ceci a été confirmé par les prospections sous-marines, réalisées en 2012 et 2013. En effet, le site présente un excellent état environnemental et une grande valeur écologique liée à la présence de communautés bien structurées et de nombreuses espèces d'intérêt pour la conservation en Méditerranée. Il se caractérise également par une grande diversité d'habitats remarquables (coralligène, herbiers de phanérogames marines, maërl, grottes, etc.). La mise en place d'une AMP dans cette zone servira certainement à améliorer la connectivité entre les diverses AMPs en mer d'Alboran et à promouvoir l'économie locale dans une perspective de durabilité des ressources.

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**THE COMMON PROCESS OF IDENTIFICATION OF ECOLOGICALLY OR
BIOLOGICALLY SIGNIFICANT MARINE AREAS IN THE RAMOGE AREA –
A PILOT INITIATIVE OF TRANSBOUNDARY COOPERATION**

Integrated coastal zone management requires adequate information on the values characterizing a specific coastal area, starting from the identification of the possible presence of areas of high conservation value. In the framework of the RAMOGE Agreement it was decided to create an inventory of sites of particular ecological or biological interest. The objective of this paper is to present this pilot initiative describing the applied approach and criteria, and the results of the analysis. The sites identified and evaluated are 67: 35 for the Ligurian/Italian waters, 6 for Monaco and 25 for the French PACA region. A specific GIS layer was created and the application of the “kml” format allowed to visualize all the surfaces as well as the score assigned to the identified areas on Google Earth®.

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MONITORING *POSIDONIA OCEANICA* IN THE GULF OF IZMIR BETWEEN 2000 AND 2003: THE KARABURUN PENINSULA AS A REFERENCE AREA

The Gulf of İzmir is one of the best places on the coasts of the Aegean Sea to observe Posidonia beds, which are under pressure from many sources. The area shows a gradient of harmful factors from the outer to the inner gulf. The lower limit for beds rises from 33 m to 11 m in the mid-gulf, and finally to 8 m at the edge of the inner gulf. Density values also decline towards the inner gulf. A principal factor is domestic and industrial pollution: the inner gulf is in the centre of the city, and Posidonia beds have entirely disappeared from there. Fish farming has further increased the nutrient load, and together with mechanical damage caused by fishing activities has had a negative effect on plant health. The area, where plants are progressively healthier from the inner to the outer gulf, and particularly the Karaburun peninsula, which is least affected, is suitable as an area of protection and reference. The Karaburun peninsula can be a pioneering reference point for others to be chosen later, enabling comparison of Posidonia meadows in areas in the inner parts of the gulf and the whole Aegean coast.

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CONTRIBUTION A L'ETUDE DES CRUSTACES PERACARIDES ASSOCIES A L'ALGUE *CORALLINA ELONGATA* ET AUX HERBIERS DE *CYMODOCEA NODOSA* AU CAP DES TROIS FOURCHES (MAROC, MEDITERRANEE)

L'hétérogénéité spatiale des habitats de l'algue Corallina elongata et des herbiers de Cymodocea nodosa au niveau du Cap des Trois Fourches a été approchée par une analyse des assemblages des crustacés pécarides. Les habitats de C. elongata du secteur Nord du Cap se sont révélés plus riches et mieux structurés que ceux du secteur Ouest ; probablement en raison de l'hydrodynamisme différentiel entre ces deux secteurs. Les deux herbiers de C. nodosa prospectés dans le secteur Ouest du Cap montrent une forte hétérogénéité, qui se traduit plutôt par un assemblage différentiel des espèces que par leur nombre et abondance. Les patrons de distribution des pécarides dans les deux habitats végétalisés considérés ici révèlent une hétérogénéité spatiale remarquable qui doit être prise en considération dans toute perspective de conservation du site.

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**DESIGNING AND ESTABLISHING OF MPA IN SALLUM AREA
(SOCIOECONOMIC PERSPECTIVE)**

The conservation of the western Mediterranean coast of Egypt with its natural resources has been recognized as a top priority on the biodiversity conservation agenda of Egypt. The utilization of a site based conservation approach, such as protected areas, is the most appropriate means to conserve the natural heritage of the Egyptian western Mediterranean coast. UNEP RAC/SPA has identified 26 priority sites for protection on the North African coast, of which the Gulf of Sallum, Egypt (31°31'N, 25°10'E) is one. The Gulf of Sallum supports a wide range of ecosystems, from the rich sea grass meadows and rocky reefs of the coastal zone, to little seamounts. It is very essential in designating a Marine Protected Area (MPA) to understand the socioeconomic conditions of the site and disseminate the basic information and knowledge of marine conservation among the local population in order to ensure the participation of all stakeholders in the process and to enhance the future support of the local population at the new marine area management. An Egyptian NGO, in collaboration with IUCN-Med had undertaken an awareness campaign in the Gulf of Sallum. They initiated a public awareness and information dissemination campaign in order to sensitize local people and relevant authorities of Sallum to the potential importance of marine protected areas. The target audiences in these events were not only fishermen, but government representatives who may not have a full appreciation of impacts of damaging practices on the area. To achieve the goals of this awareness campaign, meetings with the local populations and governmental officials were arranged, in addition to delivering presentations and ecologically friendly materials to school students, fishermen and officials.

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DOES ZOSTERA MARINA EXIST IN GREECE?

*The occurrence of the seagrass *Zostera marina* Linnaeus (Alismatales, Angiospermae) in Greece is obscure. Based on a detailed review on Greek marine vegetation literature, we detected 14 *Z. marina* records from the Greek coasts. 10 of them are dating from the 19th century until the 1950s, but all lacking a detailed description of the species. Since the mid 20th century, records of *Z. marina* found in Greece decline (4 records in total but none of them confirmed), despite the higher scientific effort. In conclusion, we state that two scenarios are possible: a) either *Z. marina* records from Greece are actually misidentifications of another seagrass species or b) the species existed until the 1950s and its population drastically decline since then, possibly due to a epidemic disease effect, similar with that reported in Northern Europe populations during that time. Since no herbarium specimens of *Z. marina* from Greece exist it will remain unknown if the species ever occurred in the Greek seas. However, we cannot exclude the possibility that *Z. marina* might occur locally through very small populations even today in unexplored areas of the Greek coasts.*

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TRACE ELEMENT BIOACCUMULATION AND COMPARTMENTALIZATION IN THE INVASIVE ALGAE CAULERPA RACEMOSA VAR. CYLINDRACEA FROM THE CALVI BAY, CORSICA

Very little is known regarding Caulerpa racemosa biochemistry and its natural ability to bioaccumulate trace elements (TEs). To fill this lack of knowledge, Caulerpa racemosa var. cylindracea (Sonder) were sampled in August 2011 along two depth gradients in the Calvi Bay (northwestern Corsica). 19 TEs were measured in the main compartments of the algae, i.e. fronds, stolons and rhizoids. TE bioaccumulation in C. racemosa ranged from 10^{-3} to 10^2 $\mu\text{g g}_{\text{DW}}^{-1}$, depending on the element. In accordance with the algae physiology (coenocytic algae), similar TE levels were measured in fronds and stolons. However, all TEs except Cd and As displayed higher concentrations in buried rhizoids. Some anthropogenic disturbances along one of the investigated depth gradient, i.e. the discharge of Calvi city Fe-treated wastewater and the presence of a the wreckage of a B17 aircraft, could explain the Fe and Bi level increases in the algae compartments with increasing depth. Thus, this study showed that poorly studied TE bioaccumulation and compartmentalization processes in C. racemosa var. cylindracea are under the influence of natural and anthropogenic factors that require further investigations.

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ON TWO PADINA SPECIES UNNOTICED IN THE BENTHIC MARINE FLORA OF THE IBERIAN PENINSULA

Padina distristromatica Ni-Ni-Win & H. Kawai and Padina pavonicoides Ni-Ni-Win & H. Kawai, two species of Dictyotales (Phaeophyceae) recently described from the Mediterranean Sea by Ni-Ni-Win et al. (2011) have been found in the coasts of the Iberian Peninsula and the former also in the Balearic Islands. In this paper new morpho-anatomic details of both vegetative and reproductive structures of these species are provided. Among them it can be noticed the longitudinal aperture of the indusium in the sporangial sori of P. distristromatica, as well as the lack of stoloniferous proliferations at the base of the specimens of this species. Both features are useful for distinguish P. ditristromatica from P. pavonica, the widest distributed Padina species in the Mediterranean Sea, and they are proposed as new taxonomical characters for P. distristromatica.

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INFRASPECIFIC GEOGRAPHICAL VARIABILITY IN THE FLAVONOID CONTENT OF *ZOSTERA NOLTEI*

The geographical variability in the flavonoid content of Z. noltei from different Atlantic and Mediterranean Sea regions was evaluated. Zostera noltei leaves were collected at thirteen localities and extracts were prepared by maceration in water. The flavonoid content was fully characterized using NMR, UV and LC-MS spectroscopy. Analysis of the results showed that the 3 populations from the French Atlantic coast and the 7 populations from the Mediterranean Sea share the same flavonoid pattern, largely dominated by diosmetin-7-sulphate. In contrast, the three populations grown in the sub-basin of the North Atlantic nearest to the Strait of Gibraltar are chemically distinct, with apigenin-7-sulphate being the dominant. This is the first large-scale study of the Zostera noltei flavonoid fingerprint.

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PHENOLIC CHEMISTRY OF THE NATIVE MEDITERRANEAN SEAGRASSES

The phenolic fingerprints of the four native Mediterranean seagrasses Posidonia oceanica, Cymodocea nodosa, Zostera marina, Zostera noltei, were unambiguously established using a panel of reliable techniques of analysis (NMR, analytical and quantitative HPLC with DAD-detection, LC/MS). Z. noltei and Z. marina are characterized by the same phenolic acid pattern, namely zosteric-, caffeic- and rosmarinic acid. In contrast, they differ in their flavonoid content, which is dominated by sulphates of luteolin- and chrysoeriol in the case of Z. marina and diosmetin-7-sulphate in the case of Z. noltei. In contrast, P. oceanica and C. nodosa were found to share the same phenolic signature, dominated by caffeic tartrates, along with low amounts of coumaric- and ferulic tartrates. The virtual lack of significant concentration of flavonoid in P. oceanica and C. nodosa contrasts with Z. marina and Z. noltei.

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CHEMICAL WARFARE IN COASTAL ECOSYSTEMS: ZOSTERA VERSUS ALEXANDRIUM

Allelopathic effects of Zostera marina and Z. noltei on the growth of the toxic red tide dinoflagellate Alexandrium catenella were studied in laboratory co-cultures. For the first time, exudates from Zostera leaves were successfully extracted from seawater, purified, and their effect on the biology of A. catenella investigated. Results showed a strong inhibition of photosynthetic activity and a significant reduction of vegetative cells growth. Both, exudates and pure phenolics isolated from Zostera induced severe structural anomalies in Alexandrium cells. The photosynthetic and growth inhibitions as well as cellular degradations were dose and time-dependent. The present study shows that Zostera species exhibit negative allelopathic effects on harmful bloom-forming microalgae.

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ETUDE DU MILIEU MARIN EN PALMES MASQUE TUBA GUIDE METHODOLOGIQUE

Le suivi des petits fonds côtiers peut être réalisé à l'aide d'un matériel simple et peu encombrant : les Palmes, le Masque et le Tuba (PMT). Afin de réaliser un guide méthodologique à destination des gestionnaires d'Aires Marines Protégées (AMP) sur l'étude du milieu marin en PMT, six protocoles ont été sélectionnés en concertation avec scientifiques et gestionnaires. En premier lieu, le guide rappelle le rôle du suivi naturaliste dans le cadre de la gestion d'une AMP puis les spécificités de la plongée libre concernant le matériel, les mécanismes de l'apnée et les principes de sécurité. Dans un second temps, les protocoles sélectionnés font l'objet d'une fiche méthodologique illustrant le suivi d'espèces et d'habitats marins du médiolittoral et de l'infralittoral supérieur méditerranéen notamment sur Diplodus spp., Pinna nobilis et Lithophyllum byssoides. Chaque fiche détaille le protocole de terrain ; des pistes pour l'exploitation des données sont également proposées.

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MAPPING OF MARINE HABITATS IN PORTO PALERMO BAY TO SUPPORT ESTABLISHMENT AND ZONING OF FUTURE MPA

*Porto Palermo is a protected bay and had a very limited access in the former time (until 1991), as it was a military area. Due to this, marine biodiversity is presumed to have been rich in that period, although the surveys were very limited. Several studies, including the 2013 Marine and Coastal Protected Areas Strategic Action Plan, have proposed the area to be established as a MCPA. The study has covered the area inside the Porto Palermo and the intermediate surroundings towards north and south of the bay. Particular attention has been paid to the vulnerable/sensitive Mediterranean habitats and species of conservation interest. Among the most sensitive habitats of the Mediterranean should be mentioned *Lithophylum byssoides* for the mediolittoral zone, the *Cystoseira* communities as an index of hydrodynamism at the upper littoral zone, and the *Posidonia oceanica* meadows in the infralittoral zone. A total of twelve species of green algae, fourteen species of brown algae and twenty five species of red algae were recorded during the survey. The study also has listed some of the main threats to biodiversity values in the Porto Palermo area. The final result of this study is a preliminary map of boundaries and zoning of the Porto Palermo MPA.*

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MAPPING *POSIDONIA OCEANICA* LOWER LIMIT COMBINING HIGH RESOLUTION INSTRUMENTS (SSS AND MBS)

*High resolution Side Scan Sonar (SSS) combined with MultiBeam echo Sounder (MBS) was used for mapping *Posidonia oceanica* lower limit. For this purpose an acoustic survey was performed in Mondello Bay (Palermo, Italy) where a progressive lower limit of the seagrass occurred. To improve the positioning precision of the SSS sonograms, data were joined by GIS platform and a repositioning process was performed. In particular, each sonogram was joined with the Digital Terrain Model (DTM) obtained by MBS, in which recognizable shapes of the sea-bottom were used as control points. After the repositioning process of the SSS data, the limit investigated during different periods showed a negligible error in absolute position, with an high level of spatial concordance compatible with the intrinsic error of the system.*

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POSIDONIA OCEANICA AND CAULERPA RACEMOSA VAR. CYLINDRACEA CO-EFFECTS ON PHENOLOGICAL PARAMETERS

Researches on interaction between invasive Caulerpa racemosa var. cylindracea and the seagrass Posidonia oceanica were carried out along the northern Tunisian coasts at two different sites (Cape Zebib & Sidi Raïs) from April 2009 to April 2010. The study showed that phenological parameters of P. oceanica seem to be not affected by the presence of C. racemosa excepting the leaves width.

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NEW BIONOMIC MAP OF PROTECTED MARINE AREA "TAVOLARA - PUNTA CODA CAVALLO", SARDINIA, ITALY, WEST MEDITERRANEAN

Bionomic mapping is one of the main tool for the analysis, knowledge and management of marine ecosystems. Between 2011 and 2012 the sea bottom of the Italian Marine Protected Area "Tavolara - Punta Coda Cavallo" (hereafter MPA) has been surveyed with multi-beam echo sounder, side scan sonar and scientific scuba divers: high-quality geodatasets has been produced in raster and feature formats describing marine habitats and biocenoses according to the typology of benthic biological communities of Mediterranean National Museum of Natural History. In 2013 MPA has reordered these feature datasets according to Natura 2000 and in early 2014 published a new bionomic map. In this poster we illustrate results, technologies and procedures that led to the publishing of this new bionomic map. The poster also integrates a diachronic comparison of the P. oceanica meadows in MPA between 1992 and 2012.

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WHICH CONTAMINATION OF THE SEAGRASS POSIDONIA OCEANICA ALONG THE PROVENCE COAST (FRANCE, NW MEDITERRANEAN SEA)?

Posidonia oceanica seagrass meadows are exposed to natural and anthropogenic pressures. Sewage effluents are a major recurrent problem due to the ever-increasing population along the coasts, inducing nutrient, particulate organic matter and contaminant enrichment of marine coastal waters. We studied contamination by organic (PCBs) and inorganic (As, Ba, Cd, Cr, Cu, Hg, Ni, Pb and Zn) contaminants in P. oceanica adult leaves and rhizomes collected at 4 sites exhibiting different levels of human pressure along the coasts of Provence (France, Mediterranean Sea) near the city of Marseilles (3 sites), and Hyères (the reference site). Higher values were recorded at Marseilles, due to the vicinity of major urban, harbour and industrial centres, but only for trace elements. In addition, more contaminants were accumulated in adult leaves than in rhizomes. Thus, P. oceanica leaves could be used as a tracer of spatial contamination and as a tool for water quality evaluation to assess the contamination level in food webs.

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DEVELOPMENT OF A MEDITERRANEAN MPAS NETWORK THROUGH THE BOOSTING OF MPAS CREATION AND MANAGEMENT (MedMPAnet) - PILOT PROJECT CROATIA

The MedMPAnet Project has been developed with the objective of 'enhancing the effective conservation of regionally important coastal and marine biodiversity features, through the creation of an ecologically coherent MPA network in the Mediterranean region', as required by the Barcelona Convention's Protocol concerning Specially Protected Areas and Biological Diversity in the Mediterranean (SPA/BD Protocol).

The main objectives of the Pilot Project Croatia are to improve MPA management at local level through filling gaps in ecological and fisheries knowledge and better enforcement and monitoring and to assist the Croatian Government in implementing SPA/BD Protocol and developing marine part of Natura 2000 network.

The project has brought Mediterranean best practice to the Adriatic through the development of national monitoring protocols for Posidonia oceanica meadows and coralligenous to meet monitoring and reporting requirements of the Habitats Directive, building on UNEP/MAP-RAC/SPA guidelines and standard methods. Habitat map and marine species inventory of one MPA and three Natura 2000 sites were prepared. Assessment of coastal fisheries resources was conducted in the same study areas as the mapping and socio-economic study of local fisheries was conducted through interviews with fishermen. Capacity of regional MPA authority with regard to inventory, mapping and monitoring of marine biodiversity has been built.

Direct beneficiaries and partners of the project are the Public Institution Priroda, the Ministry of Environmental and Nature Protection (MENP) and the State Institute for Nature Protection (SINP). Regional Project is coordinated by the Regional Activity Center for Specially Protected Areas (RAC/SPA) and Pilot Project Croatia by the MENP. The project is financed by the European Commission (EC), the Spanish Agency for International Cooperation to Development (AECID) and the French Global Environment Facility (FFEM) and its implementation period in Croatia is 2013-2014.

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BIODEGRADABLE ANCHOR MODULAR SYSTEM FOR TRANSPLANTING POSIDONIA OCEANICA CUTTINGS

Seagrass vegetative transplanting methods involve fixing to the seabed by anchoring the vegetative shoots. Several seagrass restoration projects have been attempted using this method, and most of transplants mortality, particularly in high water motion environments, is precisely attributable to dislodgement. For this purpose, a new and innovative Posidonia oceanica (Alismatales, Tracheophyta) transplant system, composed of an artificial underwater support constructed of starch-based biodegradable materials (Mater-Bi), was developed. To evaluate the efficacy of this system, in May 2012 a P. oceanica transplant was implemented in an area of high environmental quality (Mondello Bay, Palermo - Italy). In particular, after twenty months from transplanting cuttings survival was 94% and shoot density per unit showed a slight increment than the starting one. These results can be particularly important when large scale transplanting projects are carried out because this anchor system increases success probability and reduces costs.

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**LES MACROALGUES COMME INDICE DE QUALITE POUR
L'EVALUATION DE L'ETAT ECOLOGIQUE DE LA COTE ALGERIENNE**

L'étude qualitative et quantitative des communautés phytobenthiques de la côte algérienne est réalisée dans le but de mettre en évidence l'état écologique de la côte. Ainsi, la qualité de l'eau a été estimée par les espèces présentes (indicatrices de pollution et milieu perturbé) et par les indices écologiques (indice de Shannon : $H'=2,5$ bits ; Equitabilité : $E=0,4$; Indice de Sorensen : $Is=0,4$). Une analyse multivariée distingue les différents groupements d'espèces déterminant une qualité de l'eau en relation avec les activités anthropiques et les conditions environnementales. La zone littorale côtière semble être une zone de haute sensibilité aux agressions anthropiques. Ce constat repose sur la faible richesse floristique, ($Q=25$ espèce en moyenne), qui révèle un état environnemental de qualité médiocre, liée à l'impact des activités anthropiques.

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**CYMODOCEA NODOSA DISTRIBUTION ALONG
THE LEBANASE COAST**

Two marine surveys of Magnoliophyta along the Lebanese coast (about 160 km long) as a component of the biological monitoring in Enfeh Peninsula, Ras Chekaa cliffs, Raoucheh cliffs, Sidon, Tyre and Naqoura were conducted in 2012 and 2013. They were undertaken within the framework of the Regional Project for the Development of a Mediterranean Marine and Coastal Protected Areas (MPAs) Network through the boosting of MPA Creation and Management (MedMPAnet Project), led by RAC/SPA. During these surveys along the six sites of the Lebanese coast, Cymodocea nodosa was encountered in 33.7% (16/48) of the stations and was recorded only in three localities: Enfeh Peninsula and Ras Chekaa cliffs in the northern coast and Tyre in the northern coast. C. nodosa was common around Enfeh area but less common in Ras Chekaa. On the contrary, it has been rare in the southern sector of Lebanon, where it has been observed only in front of the south beach of Tyre. C. nodosa colonises the sandy and muddy sand bottoms and their meadows are developed in shallow waters (1-4m depth). It is noteworthy the abundance of germinated seeds in June of 2012, that colonised deeper sediments (as far as 31m depth).

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**UNDERSTANDING RESIDENTS' PERCEPTION OF MARINE
BIODIVERSITY AND THEIR ATTITUDES TOWARDS BIODIVERSITY
CONSERVATION INSTRUMENTS: THE CASE OF THE VENETIAN TEGNÙE**

Understanding the importance of marine biodiversity and its value are fundamental for designing appropriate conservation and protection policies. Also, the success of these policies is closely related to how people perceive marine biodiversity. This study aims to understand what local residents know and think of a particular marine ecosystem in the North Adriatic Sea, locally named Tegnùe.

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**ON SOME PECULIAR MACROALGAL
COMMUNITIES FROM GREECE**

*In pristine areas of the Mediterranean Sea typical macroalgal populations form dense communities in the shallow infralittoral zone, mainly dominated by the canopy-forming *Cystoseira* species. During an extensive macroalgal survey along the Greek coasts 3 rare macroalgal communities were detected. 1) *Sargassum acinarium* forest: a population of extremely large individuals of this brown alga, up to 2 m in height, formed a dense and luxuriant "forest" in 3-6 m depth, hosting abundant and diverse epiphyte flora and fauna. 2) *Tenarea tortuosa* "trottoire": this red calcified alga formed extensive, broad and continuous formations, similar with that of the genus *Lithophyllum*, up to 30 m long, along an exposed rocky upper infralittoral zone (0-1 m depth). 3) *Penicillus capitatus* beds: massive abundances of this green alga were found to monopolize the sea bottom of a protected bay, growing on dead and mostly buried *Posidonia oceanica* meadow between 5-30 m depth.*

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**ECOLOGICAL QUALITY CLASSIFICATION of AEGEAN AND
MEDITERRANEAN SEAS IN TERMS OF INVASIVE FISH SPECIES**

The aim of this study was to investigate ecological quality classification and demersal fish fauna of the Aegean and Mediterranean coastal waters of Turkey. Fish samples were collected by bottom trawl. Among 106 fish species which was sampled, 81 fish species were recorded in the Aegean Sea, 68 in the Mediterranean Sea and 43 species were shared in these two. 19 of 68 fish species in the Mediterranean Sea was Indo-Pacific migrant species. It can be evaluated that the effects of Red Sea seems to dominate when it is compared with the anthropogenic factors in Mediterranean Sea. In conclusion, ecological status of Mediterranean and Aegean Seas based on fish parameters are evaluated according to Shannon Weiner index, population parameters and expert decision. Evaluation is based on Water Framework Directive criteria.

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**COMARATIF STUDY OF TRACE METAL DISTRIBUTION IN *POSIDONIA*
OCEANICA, *CYMODOCEA NODOSA* AND SEDIMENTS
FROM EL KANTAOUI (EAST OF TUNISIA)**

Accumulation of trace metals (Pb, Cu, Cd, Ni and Zn) was measured in sediments, leaves of Cymodocea nodosa and Posidonia oceanica collected from El Kantaoui (Eastern coast of Tunisia). Our results show that metal concentrations in sediments are very low compared with seagrass. However, Posidonia oceanica leaves accumulate more trace metals than leaves of Cymodocea nodosa. Levels of metals in the studied seagrass were similar to those reported by other authors in uncontaminated areas of the Mediterranean Sea. This study reinforces the usefulness and the relevance of Posidonia oceanica as an indicator of spatial metal contamination and an interesting tool for environmental quality evaluation.