ASSESSING HABITATS VULNERABILITY - A MACROECOLOGICAL APPROACH WITHIN THE LIFEWATCH ITALY “ALIEN SPECIES SHOW CASE”

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LifeWatch Italy Annual Conference
Rome, 25-27 June 2018

in collaboration with the Secretariat General of the Presidency of the Republic
Earth and Environmental Sciences are rapidly entering the new paradigm of large scale, data-intensive analytics to understand our complex and ever changing planet.

AS are considered one of the major threat to biodiversity, even though their role is going to be reconsidered.

the case study of alien species LifeWatch has a core represented by a database of biotic resources (occurrence) and abiotic resources (linked to geo-referenced sites)
**Introduction**

Identify emergent patterns regarding the potential drivers of alien species occurrence in freshwater/marine/terrestrial sites within a PAB framework.

**Habitat vulnerability**

Are different systems/habitat more susceptible to invasion?

**Invasion drivers**

Which abiotic, biotic and pressure attributes of the recipient site affect invasion probabilities (presence/absence)?

**a macroecological approach to invasion biology!**
Abiotic factors serve as the first “filter” to invasions, limiting establishment of alien species to conditions approximating their native ranges.

Species cannot invade a community if propagules do not arrive at the site.

Biotic resistance refers to the ability of a community of resident species to repel invaders as a result of species interactions.


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Data survey to ensure a good spatial and ecological coverage in Italy

34,386 TOTAL OBSERVATIONS
12,406 SPECIES
878 ALIEN SPECIES OBSERVATIONS
563 SITES
42 TAXONOMIC (PHYLA) GROUPS
36 HABITATS (EUNIS LEVEL 2)
40 YEARS OF OBSERVATIONS

EUNIS covers all types of habitat types from natural to artificial, terrestrial, freshwater and marine.
DATA ARE NOTHING IF NOT ORGANIZED AND QUALIFIED

The available data are the real infrastructure

1) DATA UPLOAD (tool kit)
2) DATA STANDARDIZATION (mapping, Darwin Core)
3) QUALITY CHECK (LW data validation, Global Name Architecture)
4) DATA AVAILABILITY (harvesting, acces, my knowledge, remote desktop)

LifeWatch DATAPORTAL

Findable
Accessible
Interoperable
Reusable

The FAIR Guiding Principles for scientific data management and stewardship
Wilkinson et al., 2016
Original database
Many taxa, habitat, sites

Variable extraction from rasters (pressure, abiotic, biotic)

Subsetting, reshaping

Data matrix for modeling (Non-normal distributed data)

GLMM
General Linear Mixed Models

Presence/absence matrix

Ordination Techniques
PCA, MCA

Rarefaction curves

MY KNOWLEDGE
Scientific production in the framework of CT to test the functionality of the workflow
Invasive freshwater species: an Italian case study

Italian freshwaters: a macroecological assessment of invasion drivers

Positive correlation with accessibility, native Richness and temperature

sites with high native richness can host new non-native species
Ecosystem vulnerability to alien and invasive species: a case study on marine habitats along the Italian coast
Plant invasions in Italy: an integrative approach using the European LifeWatch infrastructure database

| IS NIS | Estimate | Std Error | z value | Pr(>|z|) |
|--------|----------|-----------|---------|----------|
|        | Intercept| 0.05052   | 1.28333 | 0.039    | 0.9686   |
|        | P (Accessibility) | -0.01931 | 0.00884 | -2.184   | 0.0289   |
|        | A (Environment)   | -0.38132 | 0.29641 | -1.286   | 0.1983   |
|        | B (Native richness)| -1.86734 | 0.80888 | -2.308   | 0.0210   |

Rome, 25-27 June 2018
Alien species in Italian freshwater ecosystems: a macroecological assessment of invasion drivers

Paolo Colangelo1, Diego Fontaneto2, Aldo Marchetto3, Alessandro Ludovisi4, Alberto Basset3,4, Luca Bartolozzi3,4, Isabella Bertani5, Alessandro Campanaro5, Antonella Cattaneo6, Fabio Cianferoni6,7, Giuseppe Corriero3,4, Gentile Francesco Ficetola1,8, Francesco Nonnis-Marzano9, Cataldo Pierri2, Giampaolo Rossetti6, Ilaria Rosati6,9 and Angela Boggero3,4

Ecosystem vulnerability to alien and invasive species: a case study on marine habitats along the Italian coast

GIUSEPPE CORRIERO, CATALDO PIERRI, STEFANO ACCORONI, GIORGIO ALABISI, GIORGIO BAVESTRELLO, ENRICO BARBONE, MAURO BASTIANINI, ANNA MARIA BAZZONI, FABRIZIO BERNARDI ALBURY, FERDINANDO BORRO, MARIA CRISTINA BIASI, MARINA CARRINI, ELISA CAMATTI, FRINE CARDONE, BRUNO CATALETTO, RICCARDO CATTANEO VETTI, ESTER CECERE, TAMARA CIVIC, PAOLO COLANGELO, ALESSANDRA DE OLAZABAL, GIANFRANCO DONGHI, STEFANIA FOGGIETTI, NICOLA FIORI, DANIELA FORNARO, SIMONETTA FRANCHETTI, MARIA CRISTINA GAMBI, ADRIANA GIANGRANDE, CINZIA GRAVILE, ROSANNA GUERRILO, CATERINA LONGO, MAUROZIO LORENTE, ANTONELLA LUIGI, PORZIA MADARANO, MARIA GRAZIA MAZZONI, MARIA MERCURO, FRANCESCO MASTROIOTARI, MICHELE MISTRE, MARINA MONTI, CRISTINA MUNARFA, LUIGI MUSCO, CARLOTTA NONNIS-MARZANO, BACHESO MARIO PAIDEZZA, FRANCESCO PAOLO PATXI, ANTONELLA PETRUCELLI, STEFANO PARANZI, GIUSEPPE PORTACCI, ALESSANDRA PUGNETTI, SILVIA PULINA, TIZIANA ROMAGNOLI, ILARIA ROSATI.

VALIDATION OF STATISTICAL MODELS USING PEER-REVIEWED PAPERS

DATAPAPER: A geographic distribution data set of biodiversity in Italian freshwaters

ANGELA BOGGERO, CATALDO PIERRI, RENATE ALBER, MARTINA AUSTONI, ENRICO BARBONE, LUCA BARTOLOZZI, ISABELLA BERTANI, ALESSANDRO CAMPANARO, ANTONELLA CATTANEO, FABIO CIANFERONI, PAOLO COLANGELO, GIUSEPPE CORRIERO, AMBROSIO MARTIN DORM, A. CONCETTA ELIA, G. FRANCESCO FICETOLA, LUDEMILA KAMBURSKA, GIANDREA LA PORTA, SARA LAURO, ALESSANDRO LUDOVISI, STEFANO ACCORONI, GIORGIO ALABISI, GIORGIO BAVESTRELLO, FRANCESCO NONNIS-MARZANO, GIUSEPPE BERNARDI ALBURY, FERDINANDO BORRO, MARIA CRISTINA BIASI, MAURO BASTIANINI, ANNA MARIA BAZZONI, FABRIZIO BERNARDI ALBURY, FERDINANDO BORRO, MARIA CRISTINA BIASI, MARINA CARRINI, ELISA CAMATTI, FRINE CARDONE, BRUNO CATALETTO, RICCARDO CATTANEO VETTI, ESTER CECERE, TAMARA CIVIC, PAOLO COLANGELO, ALESSANDRA DE OLAZABAL, GIANFRANCO DONGHI, STEFANIA FOGGIETTI, NICOLA FIORI, DANIELA FORNARO, SIMONETTA FRANCHETTI, MARIA CRISTINA GAMBI, ADRIANA GIANGRANDE, CINZIA GRAVILE, ROSANNA GUERRILO, CATERINA LONGO, MAUROZIO LORENTE, ANTONELLA LUIGI, PORZIA MADARANO, MARIA GRAZIA MAZZONI, MARIA MERCURO, FRANCESCO MASTROIOTARI, MICHELE MISTRE, MARINA MONTI, CRISTINA MUNARFA, LUIGI MUSCO, CARLOTTA NONNIS-MARZANO, BACHESO MARIO PAIDEZZA, FRANCESCO PAOLO PATXI, ANTONELLA PETRUCELLI, STEFANO PARANZI, GIUSEPPE PORTACCI, ALESSANDRA PUGNETTI, SILVIA PULINA, TIZIANA ROMAGNOLI, ILARIA ROSATI.

AQUATIC CONSERVATION: MARINE AND FRESHWATER ECOSYSTEMS


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Original Articles

Plant invasions in Italy: An integrative approach using the European LifeWatch infrastructure database

Marco Malavasi1,2, Alicia Teresa Rosario Acosta3, Maria Laura Carranza2, Luca Bartolozzi1,2, Alberto Basset3,4, Mauro Bassignani1, Alessandro Campanaro2, Roberto Canullo3, Francesca Carruggiu, Viviana Cavallaro, Fabio Cianferoni2, Claudia Cindolo, Cristiana Coccia, Giuseppe Corriero3, Francesco Saverio D’Amico3, Luigi Forte2, Michele Freppaz, Francesca Manti, Giorgio Matteucci1,2, Cataldo Pierri3,4, Angela Stanisci, Paolo Colangelo1,2

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GLMM and GAMM

- Abiotic:
  - Temperature
  - Chlorophyll
  - Dissolved Oxygen
  - Diffuse Attenuation
  - Photosynthetically available radiation
- Pressure
  - Maritime traffic
  - Mollusch farms?
- Random effect
  - geographic & taxonomic bias

Conclusions

- MORE DATA
- MORE ENVIRONMENTAL DRIVERS
- INVESTIGATE THE BIOLOGICAL FILTER
- PREDICT HIGH RISK AREAS FOR AS?

Difficult to measure!
THANKS FOR YOUR ATTENTION