

## 1st GYPNET meeting – Summary

GYPNET, a network of scientists working on gypsum ecosystems, was officially launched during its first meeting, held last 16<sup>th</sup>-18<sup>th</sup> March 2016 in Aranjuez, Spain. The meeting was co-organized by the King Juan Carlos University and the Instituto Pirenaico de Ecología (IPE-CSIC) and founded by the King Juan Carlos University and the Community of Madrid. It gathered scientists from all over the world to discuss recent advances and develop future projects on the ecology of gypsum ecosystems. During the field trip held on the 18<sup>th</sup> March, attendees also had the opportunity to discover the beauties of gypsum outcrops from Central Spain. What follows is a summary of the main conclusions reached in each of the sessions held.

### 16<sup>th</sup> March 2016

#### Afternoon

**15:00-18:00:** Presentation of the GYPNET network. Members of each attending research group briefly explained their main research lines and interests.

**15:00- 15:15:** **Current knowledge about Gypsum ecosystem and gypsophilous plants of Iran.** Abedi M & Akhani H

**15:15-15:30:** **Gypsicole Vegetation of Turkey.** Kurt L, Bolukbasi A, Özbey BG, Ozdeniz E & Bolukbasi E

**15:30-15:45:** **A molecular phylogenetics perspective on speciation, gene flow, and community stability in a gypsum archipelago.** Moore, M

**15:45-16:00:** **Plant-soil relations of the gypsophilic flora of the Chihuahuan Desert.** Muller C, Moore MJ, Feder Z & Drenovsky RE

**16:00-16:15:** **Understanding plant life on gypsum.** Palacio S, Montserrat G, Azorín J & Maestro M

**16:15-16:30:** **Structure and dynamics of gypsum plant communities under different environmental conditions and human use in the Middle Ebro Valley (NE Spain): implications for conservation and restoration.** Pueyo Y, Foronda A & Alados CL

**16:30-16:45:** **Biodiversity of arbuscular mycorrhizal fungi associated to gypsum plants.** Torres P, Díaz, G, Alguacil, MM, Montesinos-Navarro, A & Roldán, A

**16:45-17:00:** **Research lines on gypsum flora and vegetation. Research team RNM 344, UAL.** Mendoza-Fernández, AJ, Martínez-Hernández F, Pérez-García FJ, Salmerón-Sánchez E, Garrido-Becerra JA, Salinas-Navarro M, Gil de Carrasco C, Martínez-Nieto MI, Merlo-Calvente ME & Mota-Poveda, JF

**17:00-17:15: Population level processes and community assembly in annual and perennial plant communities on gypsum soils in Central Spain.** *Sánchez AM, Luzuriaga AL, Escudero A, Peralta AML, Pescador D*

**17:15-17:30: Evolutionary ecology of gypsum specialists.** *Matesanz S & Valladares F*

**17:30-17:45: Spatial patterns of biodiversity in a species-rich Mediterranean shrubland.** *Chacón J, de la Cruz M & Escudero A*

## 17<sup>th</sup> March 2016

### Morning

**9:30 – 11:30:** Presentation of tentative working groups. Three main initiatives to study different aspects of gypsum ecosystems at a global scale were explained:

**1) Diversity of gypsum communities.** *Led by Adrián Escudero ([adrian.escudero@urjc.es](mailto:adrian.escudero@urjc.es))*

Gypsum soils host an outstanding diversity of plants. Understanding the structure of these diverse communities, their composition and their relation to environmental factors is a key step towards their conservation and management. Initially envisaged to monitor plant and possibly also biological soil crust diversity, this initiative aims at establishing monitoring plots in different gypsum areas. The goal is to evaluate, in an inexpensive way, the composition and structure of gypsum plant communities from different regions of the world, and their variation through time. A protocol will be made available to all those interested in taking part. For further information please contact Adrián Escudero.

**2) Chemical composition of plants growing on gypsum.** *Led by Sara Palacio ([s.palacio@ipe.csic.es](mailto:s.palacio@ipe.csic.es))*

Plants growing on gypsum, both exclusively and non-exclusively, show physiological mechanisms to cope with the atypical composition of gypsum soils. This study aims to identify the main nutritional strategies of gypsum plants from different regions of the world and to explore their relationship to the origin and evolution of gypsum plants. The initiative initially includes the gypsum flora of the Chihuahuan Desert (USA/Mexico), Spain, Turkey and Iran only, but is open to the consideration of other regions of the world, provided the flora is documented well enough to clearly identify plant species that are exclusive and non-exclusive to gypsum soils. The project currently has funds to cover analytical costs of samples from this initial stage; 30% of the species from Spain and USA have already been sampled. Researchers interested in taking part may contact Sara Palacio [and/or download the protocol from the GYPNET website: <http://gypnet.weebly.com/resources.html>]

**3) Phylogenetics of gypsum plants.** *Led by Mike Moore ([michael.moore@oberlin.edu](mailto:michael.moore@oberlin.edu))*

Previous results suggest that certain lineages may be preadapted to growing on gypsum, and that replicated ecophysiological comparisons of congeneric or otherwise closely related gypsophiles and gypsovags may help to elucidate whether common adaptations to gypsophily exist. This initiative aims to unravel the phylogenetic relationships of plants growing on gypsum soils. We expect to gain information about the origin and evolution of gypsophily in different floras of the world, and to identify groups of plants pre-adapted to survive on gypsum. The initiative is fully open to anyone willing to contribute with sample collection

and/or molecular analyses. A detailed protocol and a species list will be made available at the GYPNET website. For further information please contact Mike Moore.

**11:30 – 12:00:** Coffee break

**12:00 – 14:00:** Exploration of common research interests from all participants and new collaboration proposals.

Summary of the main new collaborative initiatives suggested:

- Compilation of species lists of gypsum plants from different regions of the world. So far, the network has compiled species lists from Spain, the Chihuahuan Desert and Turkey. Plant lists from Somalia and Iran may be also available in the near future. This initiative will be led by Mike Moore ([michael.moore@oberlin.edu](mailto:michael.moore@oberlin.edu)) and Juan Mota ([jmota@ual.es](mailto:jmota@ual.es)).
- Preparation of a forum paper highlighting the relevance of gypsum ecosystems globally, their value as model systems and the need to improve our knowledge about them. This initiative will be led by Adrián Escudero ([adrian.escudero@urjc.es](mailto:adrian.escudero@urjc.es))
- Attendees also agreed on the need to find ways of combining different approaches into studies on gypsum ecosystems. Hopefully GYPNET will serve as a forum to foster discussion and implementation of different methodologies and to encourage collaboration among researchers from different disciplines.

#### Afternoon

**15:00-18:00:** Discussion of prospective funding opportunities to support GYPNET and to develop future collaborative projects.

The following potential funding opportunities were identified:

- COST (EU countries only): potential for creating a COST action on special substrates including also serpentines and dolomites.
- Dimensions of Biodiversity (US NSF): call will open in March 2017, could fund international collaborative projects that combine molecular phylogenetic and phylogeographic analyses with ecological and/or functional approaches. Funds available for work undertaken within the US or by US researchers in non-US laboratories of collaborators.
- INTERREG (EU): Explore the possibility of including other Mediterranean non-EU countries
- Bilateral programs between different countries, i.e. Turkey-US, Turkey-Spain
- For Spanish researchers going abroad (CSIC members only): i-LINK (for collaboration with US or Turkey), i-COOP (collaboration with Iran).
- National Geographic Trust: for fieldwork related to “exploration” (this term is very broadly defined) anywhere in the world; could be useful for exploring gypsum floras in poorly known areas
- USDA: for collaboration between US and other countries
- Fulbright program: for collaboration between US and other countries

- The American Philosophical Society. For short projects (also available to post-docs)
- UNDP: Small grant program
- MAVA Foundation conservation grants

The session was closed with a summary of the next steps for the network:

- Create a website and an e-mail list for all members
- Speak to the organizers of the Plant-soil interactions symposium within the forthcoming MEDECOS conference to have a sub-session on special substrates.
- Explore COST options with other EU researchers working on special substrates (MEDECOS Conference)
- Try to secure funding
- The next GYPNET meeting will be held in 2018 in Turkey (coordinator: Latif Kurt, [Latif.Kurt@ankara.edu.tr](mailto:Latif.Kurt@ankara.edu.tr)) – we are all looking forward to it!

### **18th March 2016:**

Field trip to Tajo valley gypsum outcrops. Sites visited: experimental station on gypsum soils in Aranjuez, mixed gypsum-marl soils next to Titulcia and the picturesque village of Chinchón.

**A huge THANKS to all the people who made this meeting possible!!**