

# Science for Environment Policy

## The value of seed harboured in Mediterranean temporary ponds

**Temporary ponds** and their varying water levels provide the conditions for valuable wildlife habitat. A study in Crete, conducted under the LIFE-Nature project<sup>1</sup> Actions for the Conservation of Mediterranean Temporary Ponds in Crete, has demonstrated these ponds contain varied collections of seeds and that these 'seed banks' could play an important role in vegetation recovery after droughts.

**In order for plants to survive** the alternation of flooding and drying out, they create a soil seed bank so seeds can germinate when conditions become favourable. Conservation of a healthy diversity of plants relies on this strategy and temporary ponds often shelter rare species. However, this role of temporary ponds can be neglected and bad management practices, such as soil extraction, land drainage or over-grazing, can damage these vulnerable habitats. These impacts can be made worse by climate change, particularly in the Mediterranean area.

This project, Actions for the Conservation of Mediterranean Temporary Ponds in Crete<sup>2</sup>, aimed to establish a deeper understanding of the potential for temporary ponds to maintain biodiversity. It studied several areas in Crete which included Omalos and Elafonisos, both which are within the boundaries of Natura 2000<sup>3</sup> sites. Soil cores were collected from a large pond in Omalos and four smaller ponds in Elafonisos at regular intervals. Soils were spread on seedling trays in a greenhouse and emerged seedlings were identified. The study also recorded the species of the standing vegetation in the ponds.

There was a high density of seeds in both sites: on average 75,662 seeds per m<sup>2</sup> were found in Omalos and 22,941 seeds per m<sup>2</sup> were found in Elafonisos. Both sites had a similar level of species richness, i.e. a large diversity of species, but there was a difference in the species composition. The seeds in the Omalos pond were dominated (73%) by species that grow in water or moist conditions (hydrophytes), whereas virtually all the seeds in the Elafonisos pond (99%) were from plants with seeds that have the ability to overwinter (therophytes). In general, there was a low number of perennials (plants that live for more than one year).

There was also a significant difference in the species found in the soil seed bank and the standing vegetation. A large percentage of seeds recorded in the seed bank were absent from the vegetation and vice versa. A total of 22% and 45% of species sheltered in the seed bank of the ponds in Omalos and Elafonisos respectively, were not present in standing vegetation. Half of these species were plants that survived for one year only or dwarf shrubs. In contrast, perennials tended to dominate the vegetation. This indicates that the ponds' soil seed banks harbour a different range of species that cannot be supported by the standing vegetation.

Approximately 60% of the species found in the temporary pond seed banks were classified as rare. For example, the Omalos seed bank hosted three species identified as priority species under the [Habitats Directive](#). The Elafonisos ponds provided habitat for the *Crepis pusilla* communities that have recently been included in the Habitats Directive.

The study demonstrated that both sites housed large seed banks that can serve as a reservoir of plant diversity. As such, activities that change the structure or water conditions of these temporary ponds should be avoided and measures taken to protect these valuable seed banks.



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1. [http://ec.europa.eu/environment/life/project/Projects/index.cfm?fuseaction=search.dspPage&nproj\\_id=2674](http://ec.europa.eu/environment/life/project/Projects/index.cfm?fuseaction=search.dspPage&nproj_id=2674)

2. See [http://www.life-medponds.gr/EN/index\\_en.htm](http://www.life-medponds.gr/EN/index_en.htm)

3. <http://www.natura.org>