Seed dormancy, a property that prevents germination, already existed 360 million years ago

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Seed dormancy is a phenomenon that has intrigued naturalists for decades, since it conditions the dynamics of natural vegetation and agricultural cycles. Credit: UGR

An international team of scientists, coordinated by a researcher from the U. of Granada, has found that seed dormancy (a property that prevents germination under non-favourable conditions) was a feature already

present in the first seeds, 360 million years ago.

Seed dormancy is a phenomenon that has intrigued naturalists for decades, since it [conditions](link) the dynamics of natural vegetation and agricultural cycles. There are several types of dormancy, and some of them are modulated by environmental conditions in more subtle ways than others.

In an article published in the *New Phytologist* journal, these scientists have studied the evolution of dormancy in [seeds](link) using a unique data group. This included the features of dormancy in more than 14.000 species. It is the result of Carol and Jerry Baskin's work, the co-authors of this publication, who have been studying latency since the 60s.

The analyses conducted by this team of researchers have established that dormancy is as old as seeds themselves. In other words, the oldest among all seeds already had dormancy. 'Of all possible types of dormancy, the oldest one already featured very sophisticated adjustments to [environmental conditions](link)", according to the coordinator of this project, Rafael Rubio de Casas, a researcher from the Environment Department at the University of Granada, and the only Spaniard involved in this research.

Producing new species

The results of this project indicate that plants without dormancy tend to be less capable of diversification, i.e. to produce [new species](link). "This can be due to the fact that dormancy facilitates that germination only takes place at the optimal moment, in spite of changes in the environment, due either to weather phenomena, or whether due to the fact that the seeds reach a new location after dispersal. This adjustment of the plant cycle to the new environment can reduce the probability of a particular species to become extinct", Rubio de Casas pointed out.

Dormancy does not simply involve that seeds do not germinate when it is too hot or too cold, since under those conditions it is the environment itself which precludes germination. "What dormancy does is make sure that the seeds do not germinate even when conditions are favourable, which precludes germination after a summer storm, or during a few warm days in winter", the U. of Granada researcher added.

However, not all plants have dormant seeds. Actually, many species of plants simply germinate at the moment when their seeds are exposed to favourable conditions. Besides, it appears that plants can acquire and lose the dormancy of their seeds in a relatively fast way as a result of natural selection.

"For instance, in the case of cultivated plants, dormancy is one of the first features that appear to have been lost over the domestication process, and for this reason the date for sowing is such an important parameter in farming", according to Rubio de Casas.

More information: Willis; C.G.; Baskin; C.C.; Baskin; J.; Auld; J. R.; Venable; D. L.; Cavender-Bares; J.; Donohue; K.; Rubio de Casas; R. & The NESCent Germination Working Group (2014) "Seed dormancy and diversification: Environmental cues, evolutionary hubs, and diversification of the seed plants". *New Phytologist*, 203 300-309.

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