



## **Teratology in fossil spores and pollen - A result of chance, a genetic pattern or a result of ecological upheaval?**

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The end-Triassic biotic crisis is considered as one of the five most severe extinction events. However, it is often argued that flora, in contrast to fauna, depicts different patterns of change and lower degrees of disturbance in times of extinction. Indeed, given that plants cannot “runaway” (or escape) like animals do in an abruptly changing environment, their responses in times of intense stress might manifest in other ways than in mere taxonomical extinction.

Recently, teratological studies, i.e. studies investigating the occurrence of ‘abnormal’ structures, are increasing along mass extinctions, especially the presence of ‘aberrant’ spores and pollen grains along the P/T- and T/J-boundary. They are also getting more attention because they might provide new insights on the different response of the plant kingdom to ecological crisis.

Here we present unpublished data on teratological spores and pollen grains from the Bonenburg section in the Central European Basin from the Triassic-Jurassic transition, and using arguments from extant plant lineages, provide potential explanations for their occurrence. Specifically, we review intrinsic genetic processes naturally causing such variation, and which can be triggered by extrinsic ecological causes, such as a changing environment typical for times of biotic crisis. We thereby provide new interpretations on the potential significance of the occurrence of aberrant terrestrial palynomorphs and discuss the potential value of teratology as a signal of ecological disturbance, and its significance to re-evaluate the severity of mass extinctions in the plant kingdom.