



Artemisia halodendron litters have strong negative allelopathic effects on earlier successional plants during vegetation restoration in a semi-arid sandy dune region in China

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Artemisia halodendron Turcz. ex Besser occurs following the appearance of a pioneer species, *Agriophyllum squarrosum* (L.) Moq., and the former "killed" and replaced the latter during the naturally vegetation succession in sandy dune regions in China. A previous study revealed that the foliage litter of *A. halodendron* had strong negative allelopathic effects on germination of the soil seed bank and on the seedling growth. It is unclear whether an allelopathic effect of *A. halodendron* litters positively or negatively affects the seed germination, leading to a progressively replacement of the plant species in sandy dune regions.

We, therefore, carried out a seed germination experiment to determine the allelopathic effects of three litter types of *A. halodendron* (roots, foliage, and stems) on seed germination of six plant species that progressively occur along a successional gradient in the semi-arid grasslands of northeastern China.

In line with our expectation, we found that the early-successional species rather than the late-successional species were negatively affected by the allelopathic effects of *A. halodendron*, and that the allelopathic effects on seed germination increase with increasing concentration of litter extracts, irrespective of litter types.

Our study evidenced the negative allelopathic effects of *A. halodendron* on the species replacement and on the community composition during dune stabilization. Further studies are needed to better understand the successional process and thus to promote the vegetation restoration, as *A. halodendron* itself disappeared also during the process.