

Seed germination and seedling emergence of three annuals growing on desert sand dunes in China.

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# Seed Germination and Seedling Emergence of Three Annuals Growing on Desert Sand Dunes in China FREE

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## Abstract

• *Background and Aims* Information on the initial growth characteristics of annuals found in Chinese deserts is very limited. The aim of this study was to investigate seed germination and interactive effects of irrigation and seed burial depth in sand on seedling emergence and seedling survival in three annuals (*Agriophyllum squarrosum*, *Bassia dasyphylla* and *Aristida adscensionis*) commonly growing on sand dunes in these regions.

• *Methods* Effects of temperature, light and polyethylene glycol-6000 on seed germination were examined by irrigating seeds sown on filter paper in Petri dishes. Seedling emergence was examined for seeds sown on the surface of, or at different depths (5, 10, 20, 30, 40 and 50 mm) in, sand-filled pots, which were irrigated under different regimes. For seeds buried at a depth of 50 mm, seed viability was examined after irrigation of the pots.

• *Key Results* Seeds of three species germinated at most temperatures recorded between spring and autumn in their native habitats. No seed dormancy was found in any species. For all three species, seedling emergence was most favoured when seeds were buried at a depth of 10 mm. When seeds sown on the sand surface were irrigated, seed germination was considerably suppressed due to water deficiency, but many seeds remained viable. For *A. squarrosum* and *B. dasyphylla*, many seeds that were deeply buried and irrigated remained ungerminated but viable, while for *A. adscensionis* deeply buried seeds germinated, but the seedlings did not emerge due to unfavourable seedling growth in deep sand.

• *Conclusions* Precipitation is the most crucial factor in determining the seasonal emergence of seedlings of the three tested species in the field. The vertical distribution of seeds in sand determines the proportion of seeds

that germinate after precipitation and acts to maintain seed banks over multiple years.

**Keywords:** [Agriophyllum squarrosum](#), [Aristida adscensionis](#), [Bassia dasyphylla](#), [irrigation regimes](#), [mechanical resistance of sand](#), [oxygen deficiency](#), [sand hardening](#), [seed burial depth](#), [seedling survival](#), [temperature effects](#)

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