Influence of fire on the seed germination ecology of species of the jarrah forest

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Abstract

Plant species of the jarrah forest can be categorized by their life history syndromes related to the survival of fires and their mode of seed dispersal. Obligate seeding species require re-establishment following fire from seed because the parent plant is killed by the fire. Resprouting species differ in that the parent survives and reproductive output by seed is usually limited. Also, species may differ in the timing of seed dispersal; i.e. seed dispersed annually to the soil or retained in serotinous fruits for the plants for a period of years. Obligate seeding, soil seed store species, especially jarrah forest legume species, often have seed dormancy mechanisms which prevent them from germinating until after a fire. The heat shock provided by the fire can serve to break an impervious seed coat or possibly denature some seed coat inhibitor. To differentiate potential differences in these two influences of fire, differential germination results following scarification and boiling revealed that the jarrah forest could have both types of species. Examples of species which germinate following the mechanical breaking of the seed coat include *Acacia nervosa, Bossiaea eriocarpa, Daviesia physodes*, and *Gompholobium knightianum.* Species predicted, but not proven to have seed coat inhibitors are *Acacia drummondii, A. pulchella, Gastrolobium spinosum* and *Oxylobium cuneatum.* In addition to a requirement for a heat shock pre-treatment many jarrah forest species also must have the proper temperature and light cues to break dormancy. For example, *Acacia pulchella* var. *glaberrima* germinates in highest percentages corresponding to winter incubation temperatures in the dark, while *Banksia grandis* and *Hakea amplexicaulis* seeds germinated best at cool temperatures, but when light intensity is high. The implications for maintenance of the species under forest management are described.