Smoke and Germination of Arable and Rangeland Weeds

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Plant derived smoke has been shown to stimulate the germination of a number of native Australian species however, little is known of the effect of smoke on the germination of introduced weed species. A series of laboratory experiments were conducted to determine the effect of smoke on the germination of two arable grass weeds, wild oats (*Avena sterilis* ssp *ludoviciana*) and paradoxa grass (*Phalaris paradoxa* L) and a rangeland weed, parthenium (*Parthenium hysterophorus* L). Both arable weeds were stimulated by a 5% smoked water solution while the germination of the non dormant parthenium weed was reversibly depressed.

In a further experiment with soil seed bank samples collected from five arable sites and one rangeland site near Brisbane, the soil was treated with a smoke produced from burning native vegetation. Two introduced weed species molasses grass (*Melinis minutiflora* Beauv.) and crabgrass (*Digitaria ciliaris* (Retz.) Koeler) were smoke stimulated. No other weed or native species were stimulated by the smoke treatment. These observations are discussed in the light that smoke may play an important ecological role in the management and control of exotic weeds in native communities in Australia.

Lettuce endosperm weakening: an involvement for endo-β-mannanase in seed germination at high temperatures

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Under high temperatures, seed germination of most lettuce genotypes can be erratic or completely inhibited. Weakening of the endosperm layer is a pre-requisite to radicle protrusion at high temperatures. Enzyme-mediated degradation of endosperm cell walls may be a crucial factor for lettuce germination at high temperatures. The galactomannan polysaccharides in lettuce endosperm cell wall are mobilized by endo-β-mannanase. The involvement of endo-β-mannanase during germination of lettuce seeds at high temperature (35°C) was investigated by a gel-diffusion assay. Genotype, seed maturation temperature, and seed priming enhanced lettuce seed germination at high temperature. Less force to penetrate the endosperm was observed in seeds of thermotolerant genotypes or primed seeds, and structural alterations of endosperm in the micropylar area were also observed before radicle protrusion. Also under these conditions, a higher endo-β-mannanase activity was observed prior to radicle protrusion. Our results suggest that increased endo-β-mannanase activity might contribute to lettuce endosperm weakening, especially at high temperatures.