

Germination and growth of *senecio madagascariensis* poir.(fireweed), a toxic plant of pastures in coastal New South Wales

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The South African plant, *S. madagascariensis*, previously considered in Australia to be part of the native *S. laetus* complex (1,2), has been shown to cause death and poor growth in cattle in the Hunter Valley, through the presence of pyrrolizidine alkaloids (2). Little information is available on this common weed, the only published accounts being a short general note (3), an incidental treatment of its occurrence in pasture experiments in the Far North Coast of New South Wales (4) and details of an autoecious rust, *Puccinia lagenophorae* (5), known to infest it in the field.

Methods

Herbarium material of fireweed was compared with other *S.spp.* so that accurate criteria could be found to characterize it. Its distribution in New South Wales was then established from herbarium records.

Germination studies of seed collected in early summer were conducted in the laboratory during the following winter. Dormancy studies were conducted on fresh seed collected in early spring. Plants were also grown under 5 different temperature regimes (day/night - 18/13, 21/16, 24/19, 27/22 and 30/25°C)

Results and Discussion

The most useful characters for identification are the number of phyllaries (20-21) and ray florets (13) and the cypselas (1.5 to 2.3mm long with short hairs in longitudinal lines). Distribution in New South Wales is essentially along the coastal river valleys from Wollongong to the Far North Coast, extending into the Northern Tablelands, the earliest specimen being collected at Raymond Terrace in 1918. Its occurrence in other States is not known.

Most rapid germination occurred between 20°C and 25°C. Optimum germination after 14 days occurred between 15°C and 27°C, with greatly reduced germination at lower and higher temperatures. There was no germination at 35°C, but seed exposed dry to 40°C was viable when germinated at 20°C. At 20°C, there was 50% germination of the old seed in light but only 8% in the dark. Three days after collection, seed gave 90% or more germination. Growth rate increased and time to flowering decreased with increasing temperatures. The shape of leaves showed much variation at different temperatures.

The optimum temperatures observed for germination and the ability of the seeds to withstand high summer temperatures are those expected of a winter-growing species in parts of coastal New South Wales. The absence of dormancy suggests that more than one generation may occur throughout the winter period. Field observations indicate that some plants persist throughout the summer. The response in germination to light indicates that some measure of control could be obtained by inverting the upper soil layers before sowing of improved pastures.

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