

DYNAMICS OF WEED SEEDLINGS AND SEED
POPULATIONS IN WHEAT GROWING SOILS

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Results from the first three years of experiments in progress were presented on the poster.

The aim of the experiments is to measure the effect of field factors on weed seedling emergence and the decline of soil seed populations with time, in situations with no fresh seed added. This is being done using 240 mm diameter plastic pots set in the ground with plastic mesh across the top, and mesh in the soil in the pots to mark seed location. The mesh on top holds stubble in place and prevents soil disturbance (e.g. by birds). Field trials are in progress with zero, tyne and sweep cultivation treatments.

The effect of soil disturbance, seed depth (1 to 2 cm vs. 7 to 8 cm) and stubble (3 t ha⁻¹) on paradoxa grass (*Phalaris paradoxa*) and wireweed (*Polygonum aviculare*) is being measured by in-ground pot experiments. Emergence of wireweed from the 7 to 8 cm depth was much less than from 1 to 2 cm, whereas for paradoxa grass depth of the seeds in the soil had little effect on emergence. The effects of soil disturbance and stubble were not consistent and will require interpretation after the experiments are completed. Duplicate experiments were commenced in 1979 and in 1980. Emergence in the first year was higher in the experiment started in 1980 indicating a year effect.

The emergence of ten weed species, black bindweed (or climbing buckwheat) (*Polygonum convolvulus*), wireweed, turnip weed (*Rapistrum rugosum*), Indian hedge mustard (*Sisymbrium orientale*), London rocket (*S. irio*), New Zealand spinach (*Tetragonia tetragonoides*), paradoxa grass, wild oats (*Avena fatua*), mintweed (*Salvia reflexa*) and urochloa grass (*Urochloa panicoides*), is being measured by in-ground pot experiments. Seed of all species was distributed in the 0 to 8 cm layer and is disturbed 4 times per year. Emergence in the first year (1979) ranged from 5 to 40% and in the first year of the duplicate experiment (1980) ranged from 8 to 70%. Emergence declined in the second and third years except for that of London rocket and New Zealand spinach, where emergence was highest in the second year. The rate of decline of emergence varied between species.

The periodicity of emergence in these experiments also varied between species. For example, the emergence of paradoxa grass occurred mainly in April and May, whereas turnip weed emerged almost throughout the year. Urochloa grass emerged mainly in October and November.

Seed of three biotypes of *Avena fatua* and five biotypes of *A. sterilis* were sown in an in-ground pot experiment. The first flush of emergence occurred in February for one biotype and varied from late April to late June for the other biotypes. At the end of the first year, total emergence varied from about 25 to 85%.

On a site at Mt. Emlyn on the Darling Downs weeds were allowed to produce seed for one year before a field experiment was established in 1980. The most common weed present was black bindweed; emergence declined from 2114 seedlings m^{-2} in the first year to 698 m^{-2} in the second year. Prairie grass (*Bromus unioloides*) declined from 996 seedlings m^{-2} in the first year to 85 m^{-2} in the second year. Viable seed populations in the soil are being measured annually. A second field experiment has been established in 1981.