

DIFFERENTIAL COMPETITIVE ABILITY OF WINTER CROPS TO ANNUAL RYEGRASS, *LOLIUM RIGIDUM*

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A field comparison was made of the competitive ability of a range of winter crops (wheat, barley, oat, lupin, field pea, triticale and canola) against annual ryegrass, *Lolium rigidum*. The crops were sown at standard densities. Annual ryegrass was sown immediately after the crops by broadcasting seed and raking it into the surface of the soil to achieve a density of 300 plants/m² in all crops. Two cultivars of each crop were included to estimate the range in competitive ability within each crop. Crop and ryegrass biomass were recorded at anthesis and maturity.

Oat, triticale and canola were the most competitive crops, while field pea and lupin were the weakest competitors. Wheat and barley were intermediate depending on cultivar. For example, the dry weight of ryegrass measured at anthesis was 53-74 g/m² with oat, 70-71 g/m² with triticale, 88-104 g/m² with canola, 60-170 g/m² with barley, 81-201 g/m² with wheat, 237-284 g/m² with field pea and 304-377 g/m² with lupin, in each case depending on cultivar.

Large differences in competitive ability of crops and cultivars of wheat and barley show potential for greater suppression of weeds with more competitive crops. Further experiments are examining the reasons for the superior competitive ability of certain crops and cultivars.

PORPHYRIN INTERMEDIATES INVOLVED IN HERBICIDAL ACTION OF δ -AMINOLEVULINIC ACID IN *LEMNA PAUCICOSTATA* HEGELM

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Although δ -aminolevulinic acid (ALA) is a common precursor for the synthesis of chlorophylls and hemes, exogenously applied ALA causes photobleaching on the susceptible plants. It is generally accepted that the accumulated porphyrin intermediates act as photosensitizer for the production of singlet oxygen to destroy plant pigments and membrane lipids. However, the porphyrin species responsible for the action is still unclear. In this study, the relationship between porphyrins accumulation and appearance of phytotoxic symptom in an aquatic higher plant *Lemna paucicostata*, which is quite sensitive to ALA, is investigated.

When the plant was treated with ALA in darkness for 12 h and then exposed to light, electrolyte leakage occurred immediately. A chlorophyll content reduction of approximately 40% was caused by 1 mM ALA. Profiles of four porphyrin intermediates were determined during dark incubation and following light exposure.