

B-47: Susceptibility of *Cynodon dactylon* populations to herbicides

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Cynodon dactylon (L) Pers is a troublesome weed of several major crops. It is ranked among the 3 most serious weeds in rice and vegetables in Sri Lanka. *C. dactylon* occurs in various habitats and a wide range of climatic zones suggesting evidence of ecotypic differentiation. Differential tolerance of *C. dactylon* to various herbicides has been reported either pre-adaptation or race formation through natural selection.

The objective of this study was to examine the susceptibility of various *C.dactylon* populations to the sethoxydim and glyphosate.

Populations of *C.dactylon* were collected from various habitats within each of the major climatic zones in Sri Lanka i.e. low country dry (Hambantota) intermediate (Kurunegala, Tangalle) wet (Galle) and up country wet (Nuwara Eliya). Within each zone populations were sampled from each of the 3 habitats (roadside, lawn and paddy-field) except the up country wet zone where the absence of rice prevented sampling of the paddy-field habitat. In this zone additional sampling of forest and grassland populations was made.

The experimental design was a factorial with 3 replicates in which the treatments were 32 populations, 3 initial ramet sizes (1, 2 and 3 node fragments), 2 herbicides (sethoxydim and glyphosate) and 4 application rates (x 1.0, x 0.75 x 0.5 of the recommended rate and no application). The recommended rate for sethoxydim is 0.69 kg ai/ha and that for glyphosate is 0.7 kg ai/ha. Ramets were planted and herbicides were applied 4 weeks after planting. Plants fresh weight was determined 14 days after treatment. Bud viability was assessed 2 weeks after treatment by cutting rhizomes into single node fragment and re-planting into trays (30 x 20 cm). Buds were examined for regrowth after a further 3 weeks.

Populations from low country dry zone had the greatest fresh weight ($p < 0.001$) averaged across all herbicide treatments, while those from low country wet zone had the least. This difference was also apparent when no herbicide was applied. Similarly populations from paddy-fields had the greatest fresh weight ($p < 0.001$) and those from the lawns had the least. Similar results were observed for bud viability as well.

Both herbicides significantly reduced shoot fresh weight of all populations, sethoxydim was of greater efficacy than glyphosate such that at the recommended rate, above ground biomass was reduced on average by 77 and 49% respectively. Sethoxydim reduced the number of viable buds by 76% and glyphosate by 52%. Ramets derived from single node fragments were more susceptible to both herbicides than those derived from 3 node fragments.

Populations from low country zone were resistant to both herbicides while those from the low country wet zone was least. Population from low country wet zone were predominantly diploids except from paddy-field populations, which were a mixture of tetraploid and diploid. The greater susceptibility of the wet zone populations may be due to their diploidy. Populations from paddy-fields were least susceptible. This may relate to differences in vegetative morphology and relative growth rate.

Sethoxydim has not been used previously in Sri Lanka suggesting that differences in herbicide susceptibility are not a consequence of selection pressure resulting from previous exposure.