STUDIES ON BIOLOGY AND MANAGEMENT OF *Crassocephalum crepidioides* (Benth.) AND *Erigeron sumatrensis* (Retz.) IN HIGH GROWN TEA

By

MERAGALGE SWARNA DAMAYANTHI LUXMEI MENIKE

Thesis

Submitted in partial fulfilment of the requirments

for the Degree

MASTER OF PHILOSOPHY

in the

POSTGRADUATE INSTITUTE OF AGRICULTURE

of the

UNIVERSITY OF PERADENIYA

SRI LANKA

October, 1993

ABSTRACT

Crassocephalum crepidioides and *Erigeron sumatrensis* were problem weeds in tea plantations especially in high elevations due to their tolerance to commonly used herbicides in tea. A study was, therefore, conducted on the biology and to identify an effective herbicide combination to control these two weeds. This study was conducted at the St. Coombs Estate, Talawakelle in 1990 and repeated in 1991. In the biological study, morphological, phenological, and anatomical studies were conducted while in the control study, the effect of four post emergence herbicides and three pre emergence herbicides and their combinations were tested.

Both weed species have a prolific seed production. These seeds are disseminated mainly by the wind, leading to widespread infestation in tea lands. Pappus arrangement of flowers and parachute achenes assist the seed dispersal. These characteristics lead to a rapid and widespread increase in populations of these weeds. The leaf angle of *C. crepidioides* and *E. sumatrensis* was more than 45° to the horizontal plane. Pubescence appeared on both leaf and stem. The tap root system grows as deep as 25-30 cm in *C. crepidioides* and 40-50 cm in *E. sumatrensis*.

The fast growing period of both species was in the range of 75-130 days after emergence, which includes the stage of flower bud appearance to initial stage of maturity.

C. crepidioides and *E. sumatrensis* showed a varying degree of tolerance to common herbicides, which also varied with the stage of growth and herbicide. *C. crepidioides* was more tolerant to Glyphosate at the 2-4 leaf stage than other growth stages. The tolerance decreased at subsequent

stages. It displayed the susceptibility to Paraquat only at 2-4 leaf stage, but was tolerant at subsequent stages. Glufosinate ammonium and 2,4-D were very effective at all stages, except 2-4 leaf stage.

E. sumatrensis was slightly tolerant to Glyphosate at the 2-4 leaf stage, but was susceptible at other stages. Glufosinate ammonium and 2,4-D were effective at any stage of growth. Paraquat caused early damage at 2-4 leaf stage, but tolerance occurred at subsequent stages.

Oxyfluorfen was very effective for both C. crepidioides and E. sumatrensis and reduced plant growth more than Linuron and Diuron. Linuron also gave a satisfactory control of E. sumatrensis, but Diuron was less effective. The dry weights of total weeds were greatly reduced by Glyphosate when combined with Oxyfluorfen more than with Linuron or Diuron.

The tipping weight and black tea yield increased with weeding when compared to unweeded plots, but did not differ among post-emergence herbicides. Significantly greater tipping weight and black tea yield resulted from the application of Oxyfluorfen than Linuron or Diuron. All post- emergence herbicides tested performed well when combined with Oxyfluorfen than Linuron or Diuron.

The net income was significantly greater with weeding than unweeded. There was no significant difference in the net income among post emergence herbicides in both years. The pre-emergence herbicide, Oxyfluorfen, gave the significantly highest net income only in 1990.