EFFECT OF SOIL AND CLIMATIC FACTORS ON THE ACTIVITY OF PRE-EMERGENT HERBICIDES IN THE SOIL IN RELATION TO WEED CONTROL OF YOUNG TEA

By

HENNADIGE SARATH NIMALSIRI PEIRIS

Thesis

Submitted in partial fulfilment of the requirements

for the degree of

MASTER OF PHILOSOPHY

in the

POSTGRADUATE INSTITUTE OF AGRICULTURE

of the

UNIVERSITY OF PERADENIYA

SRI LANKA

August, 1999

ABSTRACT

In Sri Lanka, tea is grown under varying soil and climatic conditions and the persistency of soil applied pre-emergent herbicides greatly influenced by these factors. Therefore, the present study was conducted on the persistency and efficacy of pre-emergent herbicides under different soil and environmental factors. This will be very useful in designing a proper weed management programme in tea.

A field experiment was conducted at Noragalle Tea Estate (65 m amsl) in Ratnapura from January 1995 to January 1996 to study the effect of soil applied pre-emergent herbicides *viz.* Diuron and Oxyfluorfen on weed control and growth of young tea. In this experiment, these herbicides were compared with and without mulching of mana (*Cymbopogen confertiflorus*) grass loppings. Simultaneously, a separate glass house experiment was conducted at the Tea Research Institute, Low Country Station, Ratnapura (60 m amsl) to investigate the effect of environmental factors *ie.* ambient temperature and light and soil factors *ie.* organic carbon and moisture on persistency of the above two herbicides.

Prior to the field experiment, a weed survey was conducted in Ratnapura district to identify the common weeds in tea fields. Weed density was found to be low in mature tea fields when compared with young tea. *Borreria latifolia* is the most common weed in both mature and young tea in the district. Efficacy of Oxyfluorfen and Diuron was almost same at their recommended levels (288 g/ha and 1500 g/ha of active ingredients respectively). At their half the recommended level, Oxyfluorfen was significantly superior to Diuron within three months of their applications. However, spraying of 1/2 the recommended level was

not effective on weed control.

Mulching in young tea reduces the weed population by 65%. A similar level of weed control may be obtained by spraying these herbicides at recommended level. None of these herbicides showed any effect on feeder roots of tea upto their recommended levels.

Lower levels of soil moisture and ambient temperature lead to longer persistence of both herbicides. Meanwhile, higher levels of shade and soil organic matter enhance the persistency.

Therefore, when using pre-emergent herbicides such as Diuron and Oxyfluorfen, it is very important to consider the type of herbicide used and their dosage, environmental and soil factors in order to achieve a better level of weed control without any adverse effect on young tea.