THE ROLE OF *NEOCHETINA EICHHORNIAE* AND *NEOCHETINA BRUCHI* ON BIOLOGICAL CONTROL OF WATER HYACINTH IN SRI LANKA

By

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DECLARATION

I hereby declare that the work included in the thesis in part or whole has not been submitted in any form for any other academic qualification of any institution.

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ABSTRACT

One of the major scourges accompanying water resource development in Sri Lanka is the explosive proliferation of water hyacinths (*Eichhornia crassipes*). A better sustainable solution to manage the infestations seems to be biological control and the main biological control agent used in many parts of the world including Sri Lanka is reported to be the weevil [(*Neochetina eichhorniae* Warner) (Coleoptera; Curculionidae)]. Fernando and Room used the weevil *N. eichhorniae* for the first time in Sri Lanka in 1988. Although some 15 years have elapsed since the first release, infestation in the areas in which the weevil was released is as high as in the areas in which *N.eichhorniae* was not released. The present study therefore focuses on the evaluation of the role of *N. eichhorniae* and *N.bruchi* on controlling water hyacinth and is designed to evaluate the optimum weevil densities required to cause significant damage to the plants. Healthy plants of height 21 cm ±1 were cultured in 6 and 4 fiberglass tanks respectively for a period of 8 weeks to complete one life cycle of weevil. Different weevil densities were used, varied from 1, 3, 6,10 and 15 weevils per plant, and the control with no weevils. In case of *N.bruchi* the first 3 treatment levels were tested with the control. Field monitoring carried out in eight locations within the Western province and showed the average maximum weevil density in natural conditions as 2 per plant. The success of biological control using *N.eichhorniae* will ultimately rely on host plant quality and the habitat conditions to establish a healthy population of weevil densities. Results showed that the treatments with weevil numbers less than 3 of *N.eichhorniae* per plant did not significantly change ($p>0.01$) the water hyacinth stands, but 3 weevils per plant of *N.bruchi* was the best option in sustainable management. Densities of 10 of *N.eichhorniae* and 6 of *N.bruchi* were subjected to complete eradication of the plant.

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TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES