Biology and rearing of the chevroned water hyacinth weevil *neochetina bruchi* a new biological control agent of water hyacinth in Sri Lanka

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Water hyacinth (*Eichhornia crassipes*) well known as 'The world's worst aquatic weed' has been a major threat in a majority of Sri Lankan water bodies. The mechanical and chemical control methods have been proven to be inadequate and expensive. One of the sustainable solutions to manage the infestations seems to be biological control and the main biological control agents used in many countries including Sri Lanka are reported to be the weevils *Neochetina eichhorniae* (Warner) and *N. bruchi,* (Hustache) (Coleoptera; Curculionidae)]. *Neochetina eichhorniae* the water hyacinth weevil was introduced to Sri Lanka in 1988 and though the establishment is evident the control has been very low. *Neochetina bruchi* was imported to Sri Lanka as a second bio control agent and the preliminary biological studies were carried out on the weevil. This study was designed to find out the mass rearing techniques of the weevils, their life cycle and the alterations in different nutrition levels, and the competition between the two weevils. Mass rearing was done in fiberglass tanks, and the life cycle studies were done in plastic bottle containers. The study revealed that *N. bruchi* could successfully complete its life cycle under Sri Lankan environmental conditions, with six fold increase in the weevil population at the ½ fold (Total Nitrogen; 14 ppm) nutrition level of Sato's solution. Both 1 fold and 2 fold nutritional levels caused algal blooms and unhealthy conditions. Temperature and the amount of sunlight proved to be important factors for weevil cultures. The generation time of the weevil is 63± 2.43 days. (Temperature; 32.8 °C ± 0.621, Relative humidity 72%) Studies revealed that females are sensitive to the olfactory sense, substrate nature and tissue temperature of the host plant for the oviposition. Three larval stages were identified according to the length of the head capsule. Pupae occurring in the roots of the plant are sensitive to the physiological factors in the plant. The highest fecundity was in the nutrition condition of 1 fold. These revealed that a nutrition level between ½ and 1 fold is the recommended nitrogen level for the mass cultures of the weevils. Competitive studies between *N. bruchi* and *N. eichhorniae* revealed that they occupied two different niches in the water hyacinth plant without competition. There was no predation observed between two species. The weevil *N. bruchi* preferred a higher nutrition level (1 fold) compared to *N. eichhorniae* (1/2 fold). The two weevils could be used together in the control programme, after field-testing and host specificity studies. Combination of the two weevil species *N. bruchi* with *N. eichhorniae* under continuous monitoring programme may be the best way to control the water hyacinth infestations in Sri Lanka.

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