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# Biological Control with Insects: The Waterhyacinth Weevils [1]

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( *Neochetina eichhorniae* Warner *N. Bruchi* (Hustache)

Coleoptera: Curculionidae: Erirhinae: (Bagoini)

**Host** : *Eichhornia crassipes* (Mart.) Solms-Laubach (Pontederiaceae)

The genus *Neochetina* is comprised of six species whose native range is primarily South and Central America. All are semiaquatic, are covered with a layer of very dense, water-repellent scales, and feed only on species of plants in the family Pontederiaceae.

The adults of *N. bruchi* and *N. eichhorniae* can usually be distinguished by the color and pattern of the scales covering the elytra. *N. bruchi* ranges in color from uniform tan or brown with no distinct markings to brown with a broad, crescent-shaped or chevron-like tan band across the elytra. *N. eichhorniae* never has the tan band and is usually gray mottled with brown. The color pattern is associated with the scales and specimens may be difficult to identify if the scales are missing or the specimens are dirty or wet. Both species have two short, shiny, dark lines on the elytra on either side of the mid-line.

The eggs, larvae, and pupae of both species are very similar and virtually indistinguishable from one another. Identification of the immature stages is difficult. Eggs are whitish, ovoid, and about 0.75 mm in length. Because they are embedded in the plant tissue, they can usually only be found by carefully dissecting the plant. Pupae are white. The pupa is enclosed in a cocoon formed among the lateral rootlets and attached to the main root axis below the water surface. These appear as small balls or nodules about 5 mm in diameter on the roots usually near the stem.

Eggs of both species of *Neochetina* are deposited directly in the plant tissue. The female chews a hole into the lamina or petiole in which to lay eggs. *N. eichhorniae* deposits only one egg per hole whereas *N. bruchi* deposits several. Either species may also place eggs around the edge of the adult feeding pits.

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The eggs hatch within 7 to 10 days at 75°F. They pass through a total of three larval instars. Third instars are generally located at the petiole bases and may enter the stem (rhizome) and excavate small pockets near the point of insertion of the leaf. They occasionally burrow up the stem to enter the base of younger petioles and sometimes reach the stem apex and destroy the apical bud. The larval period probably requires 30 to 45 days with *N. bruchi* developing somewhat faster than *N. eichhorniae* .

The fully developed larvae burrow out of the stem and move to the upper root zone just under the surface of the water. They cut off the small lateral rootlets and form a spherical parchment-like cocoon around themselves. This cocoon is attached to one of the roots. Curiously, at the point of attachment, the larvae chews a notch into the root. This notch possibly functions in gas exchange between the hollow inside of the cocoon and vascular tissue of the plant. After the cocoon is formed the larva molts a third time and becomes a pupa. This is an inactive stage during which the transition from larva to adult occurs. It is not known with certainty how long this stage lasts, but best estimates indicate about 7 to 10 days.

As the adults emerge they split the cocoon, push the opening wider with their legs and pull themselves out through the split. Once they are out, they climb up onto the emergent leaves of the plant to feed and mate. The female weevils begin to lay eggs within a few days after emerging from the pupa and most are deposited within the first week. A single female *N. bruchi* will deposit up to 300 eggs and a female *N. eichhorniae* can deposit in excess of 400 eggs during her lifetime. About 90% of the eggs are deposited within a month after the female emerges although the adults may live over 9 months.