

Research Note
OVIPOSITIONAL SITE PREFERENCE
OF NEOCHETINA EICHHORNIAE (TRUE WEEVIL)
ON WATER HYACINTH

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Neochetina eichhorniae (commonly called true weevil) feeds on the petioles and leaves of water hyacinth. Usually, the female chews a hole in the lamina or petiole into which an egg is oviposited. In addition to these specially created holes, *Neochetina eichhorniae* may place eggs around the edge of leaf abrasions created by the feeding of adults.

De Loach (1976) reported that in cage test *Neochetina eichhorniae* preferred the tender central leaves or the unsheathing stipules at the leaf bases. From field studies in Florida, Center and Balciunas (1982) found that eggs of *Neochetina eichhorniae* were rare in the youngest leaves but were usually found in those of intermediate age prevalently in the basal portions of the petioles where the adults congregated.

The eggs are whitish, ovoid, and about 3/4mm (1/30 inch) in length. Since they are embedded in the plant tissue, they can usually only be found by dissecting the plant under a microscope (Center and Balciunas, 1982). The eggs hatch into the first instars larvae, which begin to burrow under the epidermis and work their way towards the base of the water hyacinth. The larvae are more on the leaves, stem and rhizome of the water hyacinth. *Neochetina eichhorniae* has been introduced for the control of water hyacinth into several states of the United States of America with success. The weevils were first released in 1972. In Louisiana, they were released in 1974 and by 1977 more than 500 sites had received the weevils (Manning, 1979). Further introductions have been made in several other countries followed by field releases in some of them. *Neochetina eichhorniae* was released in Australia near Brisbane and Rockhampton in October 1975. Within two years, patches of the water hyacinth mats were completely killed (Wright 1979, 1982). Further releases were made at more than 40 sites in different parts of Australia with encouraging results (Haley et al, 1978). The Federal Government of Nigeria set up the Biological Task Force for the control of water hyacinth with its headquarters at the National Horticultural Research Institute, Ibadan to investigate the potentials of the weevils in the control of water hyacinth in Nigeria. Laboratory experiments have shown that *Neochetina eichhorniae* is an excellent candidate for the biological control of water hyacinth in Nigeria (Oke, 1999). The objective of this work is to confirm the suitability of *Neochetina eichhorniae* (true weevil) as a biological control agent of water hyacinth *Eichhornia crassipes* in Nigeria.



A creek at Itasin covered with Water Hyacinth

Materials and Methods

The ovipositional site preference for the different parts of the water hyacinth plants was determined by allowing five mated, caged female *Neochetina eichhorniae* to oviposit for five days on entire water hyacinth. The female weevils were kept in 0.5 L clear glass jar (with ventilation holes on the top) containing water hyacinth inside for feeding and oviposition. The glass jar was held at $27.5^{\circ}\text{C} \pm 2^{\circ}\text{C}$ in a cooled incubator (Griffin) with glass windows to allow for illumination. The ovipositional behaviour of the weevils was observed.

The total number of egg spots made after 5 days on the different segments of leaf (i.e. the pseudo-lamina, the distal petiole, the middle petiole and basal petiole) of each type of leaf (i.e. the bulbous old leaves, the bulbous young leaves, the slender leaves and the central leaves with growing buds) was recorded and compared. The numbers of eggs in each egg spot were also observed.

Results

The study on the ovipositional site preference of *Neochetina eichhorniae* on water hyacinth showed that females oviposited by making a hole with their mandibles in the petiole of the leaf and then inserted an egg into the hole De Loach (1976). Center and Balciunas (1982) and Stark and Goyer (1983) made similar observation on the oviposition of *Neochetina eichhorniae* on water hyacinth.

Table 1 shows the data of the preference for oviposition site by *Neochetina eichhorniae* when offered entire plants of water hyacinth. No egg was recorded on any part of the old leaves of the water hyacinth. 14 eggs were laid on the young leaves: 20 eggs were laid on the slender leaves: while 35 eggs were laid on the central leaves. The 14 eggs were laid on these different parts of the young leaves: pseudo-lamina had 3 eggs, distal petiole 0, middle petiole 1 egg and the basal petiole 10 eggs. The 20 eggs were variously laid on the slender leaves thus, pseudo-lamina, 8 eggs, distal petiole 3 eggs, middle petiole, 0 and the basal petiole, 9 eggs. Of the 35 eggs laid on the central leaves, the pseudo-lamina had 14 eggs, distal petiole 6 eggs, middle petiole, 2 eggs and basal petiole 13 eggs.

Discussion and Conclusion

More eggs were laid on the central leaves, which had 35 eggs, than any other leaf types of the water hyacinth. This is followed by the slender leaves, which had 20 eggs. Then, the young leaves. This result show that *Neochetina eichhorniae* will lay most of its eggs in the central leaves which are well concealed from ecological disasters such as being easily washed away by water currents and desiccation by the sunlight. These weevils will also lay their eggs on the young and slender leaves which are tender and readily chewed to make the oviposition sites in which to lay the eggs. These young and slender leaves also serve as nutrients for the weevils. However, the weevils will not lay any egg on the old bulbous

leaves, which are exposed and dried. This is an important ecological adaption, which makes *Neochetina eichhorniae* a good biological control agent of water hyacinth.

Table 1

Number of eggs laid by *Neochetina eichhorniae* on the different layers of the different leaves of water hyacinth

THE SAMPLED LEAF TYPES	DIFFERENT LAYERS OF EACH SAMPLE LEAF				Total Eggs Laid
	Pseudo-lamina	Distal Petiole	Middle Petiole	Basal Petiole	
Old Leaf	0	0	0	0	0
Young Leaf	3	0	1	10	14
Slender Leaf	8	3	0	9	20
Central Leaf	14	6	2	13	35

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