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A Core Sampler for Collecting Hydrilla Propagules

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INTRODUCTION

Hydrilla (*Hydrilla verticillata* Royle), since its introduction to Florida in the late 1950's (1), has become a major aquatic weed problem in North America. The manner in which it has spread from one area to another is not completely understood, but it is generally agreed that much of its spread is due to man's activity.

Only pistillate plants are present in North America; therefore, the spread of hydrilla is the result of the transport of vegetative propagules such as plant fragments, crowns, rhizomes, and specialized reproductive structures called turions and tubers.

Hydrilla easily forms axillary buds from the nodes of sub-apical fragments which grow rapidly (6). Fragments of hydrilla may be transported from one body of water to another when caught on boat trailers. The explosive growth of hydrilla is evident by recent studies which showed that one fragment (shoot tip 24 cm in length and without lateral side branches) increased in dry weight by 1,561 times its original amount during a 16-week period (8).

The importance of turions and tubers in the natural spread hydrilla is unknown, but recent evidence suggests that these propagules may be dispersed by waterfowl (5). Also, these may be especially important for regrowth of

hydrilla once the mature plants are removed by herbicides or other means.

More research has been directed toward the production of hydrilla propagules than to their distribution. Tuber production is seasonal with the greatest number being produced during the winter months (4, 7, 8, 9) although a small number are produced under longday conditions during the summer.

The lack of suitable sampling equipment has deterred studies on the abundance and distribution of hydrilla propagules. I describe here a method whereby hydrosoil samples can be easily collected to provide information on hydrilla propagules. This information is useful for understanding the life history of hydrilla and for the formulation of management strategies.

DESCRIPTION OF CORE SAMPLER

A core sampler was used by Haller and Sutton (3) and Bowes, *et al.* (2) to survey for hydrilla abundance but it was not described. In brief, the sampler used in their studies was constructed of standard irrigation polyvinylchloride (PVC) pipe with an inside diameter (ID) of 10.2 cm. The pipe was approximately 1 m in length with a fitting at the top which permitted the insertion of two smaller capped pieces of 5.2 cm ID diameter PVC pipe to serve as handles for pushing the sampler into the hydrosoil. After the sampler was pushed into the hydrosoil, a rubber stopper was placed in the open top to create a vacuum and the sampler was lifted out with a core of hydrosoil.

This sampler worked well in very shallow water or in areas which had been drained and many cores could be collected in this manner. In deep water however, divers equipped with self-contained underwater breathing apparatus (SCUBA) were required to use the sampler underwater to collect the cores.

The above sampler was modified (Figure 1) by attaching a galvanized pipe (2.54 cm ID) to the PVC pipe of approximately 30 cm in length in order to eliminate the need for diving equipment when we collected core samples in deep water. The length of the galvanized pipe could be varied depending on water depth and a valve at the top and bottom provided for release of the vacuum after the sample had been collected. Four metal strips were attached to the outside of the PVC pipe.

RESULTS AND DISCUSSION

This sampler can be easily operated from most boats, including airboats. Cores can be collected from most hydrosoil types but soil high in clay content is the most difficult to collect. The metal strips help cut through roots and other debris, and reduce wear to the teeth made in the PVC pipe.

One disadvantage of this sampler is that it must be pushed into the hydrosoil in a clockwise direction to avoid unscrewing the galvanized pipe from the sampler head. Another potential disadvantage is that it must be manually operated.

The sampler collects a core with a surface area of 86.59 cm^2 and to about 20 cm in length. The number of

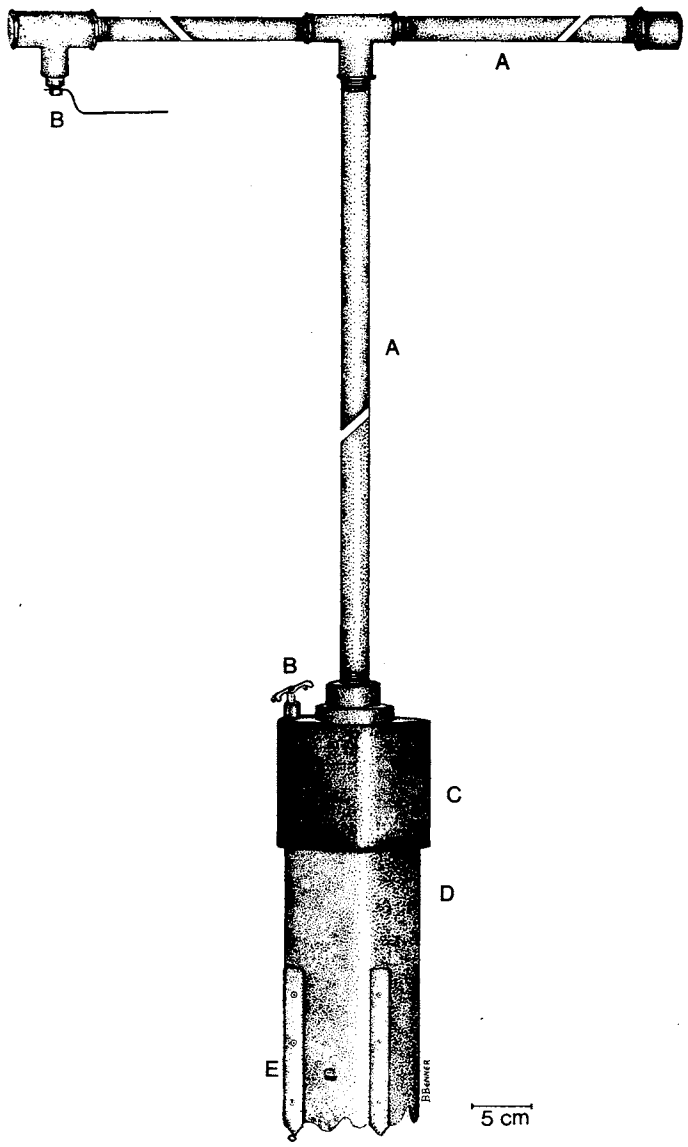

Figure 1. A core sampler for collecting hydrilla vegetative propagules: (A) galvanized pipe 2.54 cm ID, (B) air release valve, (C) PVC support collar, (D) PVC pipe 10.2 cm ID, and (E) metal cutting strips.

vegetative propagules found in the core can be expressed on a per ha basis since one core represents an area of 8.659×10^{-7} ha. Therefore, one hydrilla tuber in a core is equivalent to 1.15×10^6 tubers per ha. Of the several thousand core samples collected in south Florida, we counted 70 turions in one core and 30 tubers in another.[1] These are the extreme values and considerably less are normally obtained.

We normally collect 25 core samples to estimate the number of tubers for a particular location. This number of cores was chosen because of the time required to collect them and the small area sampled.

This core sampler can be easily modified to suit the needs of any study. The hydrosoil type and water depth

[1]Sutton, D. L. and V. V. Vandiver, Jr. 1980. Annual and final Comprehensive Report to the Florida Department of Natural Resources on the Research Project: Use of the White Amur for Aquatic Weed Problems in Enclosed Bodies of Water. 65 typed pages.

in south Florida is such that it can be used efficiently to survey for or to determine distribution and abundance of hydrilla propagules. Information of this type helps to gain a better understanding of the response of hydrilla growth to the various management strategies being used to alleviate problems caused by this troublesome exotic plant.

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