A Method for Growing *Aldrovanda*

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Aldrovanda vesiculosa, the waterwheel plant, with its relationship to the Venus Flytrap and its gorgeous translucent leaves, is a highly desirable species of carnivorous plant to grow, and yet it has a reputation as being very difficult to maintain in cultivation. Lubomír Adamec, in his many fascinating articles published in Carnivorous Plant Newsletter and elsewhere, has deciphered the fine points of its mineral nutrition (*e.g.* Adamec, 1995, 1997).

However, growing *Aldrovanda* using carefully prepared mineral supplements as Adamec describes may be beyond the means of many amateur growers. This article describes a method of cultivating *Aldrovanda* which has worked very well, using untreated tap water and local soils from two different parts of the US (Figure 1). The soils used ranged from heavy black loam, to infertile red clay, to a version of the latter which was enriched with compost. This method has performed very well with Aldrovanda plants from Japan, Poland, Northern Territory (Australia) and New South Wales (Australia). Recently acquired plants from Romania and the southwestern corner of Western Australia also are responding very well to this method.

First, select a container, preferably a glass aquarium 20 liters (5 gallons) or more in volume. Growing containers with transparent sides are best because light passing into the container through its walls will encourage additional growth of *Aldrovanda*, and some of the most attractive views of the plants will be through the sides. However, the container may be a translucent (i.e. semi-transparent) or even opaque, as can be purchased in the USA for storing and organizing shirts or books.

Place 1-5 cm (0.5-2 inches) of soil (of any type, from fertile loam to heavy clay) in the bottom of the growing container. The heavier soils seem to work better, though this has not been tested systematically. Then fill the container with tap water to a depth of 15-20 cm (6-8 inches) above the soil. This method has not been tested systematically for helping plants cope with fluoridation or chlorination, and it has not been tested with very hard water. It has, however, been tested using moderately hard water in the Eastern US. If hardness might be a particular concern, the dilution of local tap water with distilled water might help, or allowing the companion plants mentioned below a few weeks to condition the water before adding the *Aldrovanda* might also be a useful aid.

Distilled water as the only source of water can be used if you prefer, though may not be necessary. You might want to temporarily cover the soil with something like a plastic sheet while adding water to avoid having too much soil material polluting the water. A thin topping of sand over the soil will work as well. In any event, it is not crucial as the particles will settle within a day or two.

Once you have added the water, drop in two water hyacinth plants (*Eichhornia crassipes*; Pontideriaceae) about 15 cm (6 inches) diameter each, or an equivalent amount of larger or smaller plants. While I think that water hyacinths are best, other floating plants may be used instead, or as supplements. They will not be bothered if the water is still murky. The cultures can be given full sun through partial shade—water hyacinths are adaptable, as are the *Aldrovanda*. Plants will grow in any temperatures above which they do not go dormant and form turions, as discussed more fully below, and even in very warm water on a day when the temperature in the greenhouse tops 40ºC (104ºF), plants will thrive. These cultures can take whatever natural photoperiod is available, but they will also grow well given constant temperature (20-25ºC, 68-77ºF) and 24 hr artificial light.

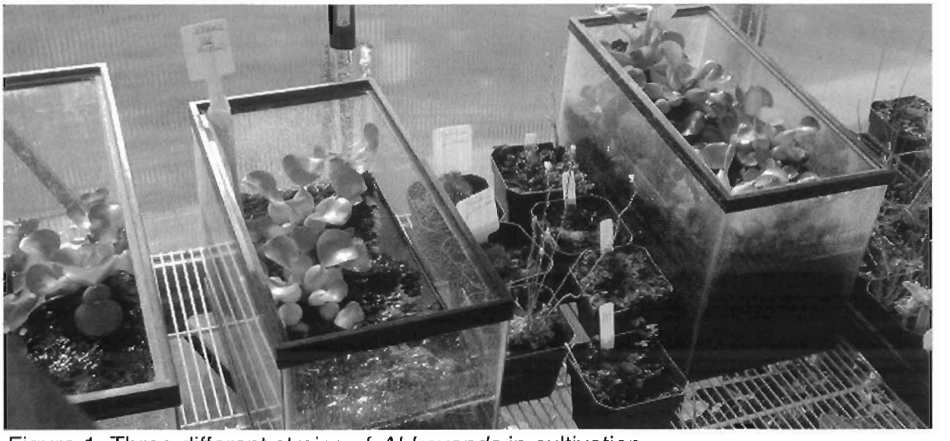

Figure 1: Three different strains of *Aldrovanda* in cultivation.

The water hyacinths can be allowed to grow to cover the surface of the aquarium. Enough light will filter between and through the plants to sustain the *Aldrovanda*. In fact, the *Aldrovanda* will thrive, and red forms produce excellent coloration (although not all plants will be red—I am trying to determine why this is the case).

Why does this simple method work for growing *Aldrovanda*? A good guess might be that the presence of the water hyacinths does two things. Water hyacinths are very good at conditioning water—they are even used in some stages at some sewage treatment plants. So, they may condition the water to the liking of the notoriously finicky *Aldrovanda*. Since the water hyacinths grow quickly, they may also help deplete extra nutrients from the water that would encourage algae to grow—algae can be a significant problem for some *Aldrovanda* growers.

In addition, water hyacinths have a large mass of roots with a large surface area. When this system is used, and a tank is illuminated from above, large numbers of small crustaceans and other aquatic creatures can be seen swimming into the roots, resting on them, and swimming out again. The root mass may provide a place for prey of *Aldrovanda* to breed, further benefiting the plants of interest. For this reason, it is a good idea to add some pond water or water from an established tank to a new tank of *Aldrovanda*. This addition acts as a starter culture. For the same reason, some pond snails or a similar type of snail should be added to the tank as *Aldrovanda* will capture and digest baby snails.

With this method, growing *Aldrovanda* should be significantly easier for those without access to the sort of chemical supplements described in Adamec's articles. Turions can be dropped into a tank as a new growing season begins. I have found that the red Northern Territory form will overwinter in a cool greenhouse using this method. Even though this strain is tropical in origin, it will make terminal buds which look like turions after some weeks of approximately 10ºC (50ºF) temperatures at night. These can be converted to true turions by placing the plants in 4ºC (39ºF) storage in the refrigerator. Plants which are left in culture without being stored may remain semi-active through the winter, resuming growth in the spring.

Dead whorls of leaves will be shed from behind the turion without damage to plants or spoiling the stored turions. Others might as well, but I have not tried them yet. Instead, I have collected the turions for these other varieties in October/November and stored them at 4ºC (39ºF) in pond water until April. Closed rigid containers are useful for this purpose. Do not include soil. When temperatures begin to warm, turions can be dumped into the same sort of culture from which they were taken, with growth resuming within days,

With this technique, increases of 10 fold in the number of plants (measured by counting growth tips) can be achieved in a month or so, given warm weather and adequate light. Adequate light can be anything from the level of light found in heavy shade on a

bright, sunny day to full sun. In the latter cases, companion plants provide some shade to the *Aldrovanda*, which will often remain partly shaded. Starting with just a few plants at the beginning of the growing season, you can expect to have fifty plants growing in a 20 liter (5 gallon) container for more active strains, such as the Australian varieties, and other types will increase vigorously as well.

Note that water hyacinth can be a significant invasive species in wildlands, where it can adversely affect native biodiversity, recreation, and agriculture. This species is even prohibited or regulated in Arizona, Florida, South Carolina, regions of Australia, and is probably prohibited or regulated in other areas, too. Plant growers are reminded not to introduce water hyacinths to the wild.—ed.

Adamec, L. 1995, Photosynthetic inorganic carbon use by aquatic carnivorous plants, Carniv. Pl. Newslett. 24: 50-53.
Adamec, L. 1997, How to grow *Aldrovanda vesiculosa* outdoors, Carniv. Pl. Newslett. 26: 85-88.

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