

Introduction to **AQUARIUM PLANTS** and some remarks on ***Proserpinaca palustris***

by DR. H. C. D. deWit

Laboratorium voor
Plantensystematiek en -geografie
WAGENINGEN

There are aquarists who want fishes and plants in a well arranged aquarium as a part of their home decorations. They want colour, a graceful movement of living beings displayed in the subdued greenish light falling through water. They are well aware that the hue of thriving waterplants and the ever-changing spectacle of fishes gliding and turning through the limpid recesses of that radiant underwater world adds a touch to the colours and sphere of their house that no other hobby can give. And if there are children, their keen joy and interest in the life and well-being of the home aquarium is a pleasure to their parents and of far-reaching educational value at the same time. A child who has helped to clean or change the aquarium, has learned to deal most carefully with plants and fishes. It will easily assume the habit to treat other plants and ani-



Dr. deWit

mals also with kindness and foresight.

A certain number of aquarists, however, are different. They are usually quiet, but always fiery adherents of the hobby: the amateur breeders. They will not desist until they have discovered the way

A.G.A. NEWS

the shows in this area from Delaware, Washington, D. C. and Pennsylvania. If you are interested, kindly contact Mrs. Sweeney at 8402 Fifth Ave., North Bergen, N. J. The number of diners who can be accommodated is limited so get your reservation in early and avoid disappointment. If you cannot make dinner, a snack bar will be in operation.

In addition to the dinner and the meeting this year, there will be en-

tertainment.

At the Annual May Meeting a tropical fish exhibit is held in competition for the "Clyde Jasmin Trophy". The trophy is held for one year by the Society receiving the most points through the exhibits of their Society's members. However, only members of a Northeast Council club can exhibit. Everyone interested is invited to visit this show, so even if you cannot come for dinner. Plan to visit and enjoy this meeting.

certain fish of their favour spawn and rear their young. All possible little tricks and devices are, if necessary, tried and tried again; hours, days and nights are spent watching and victory is theirs when eggs hatch and the young reach maturity.

Aquarists of this type are naturalists, devoting their efforts to induce fish to follow their natural life-cycle. These patient observers and experimenters belong to the best among us. The pleasure they derive from their hobby is deep and fascinating.

In recent years another kind of aquarist is now feeling his way. It has been gradually realized that plants are not just green stuff needed for an oxygen supply, or only desirable to give the fishes a natural background. The movements and the gay or striking colours of the fishes are more apt to draw the attention than the immobile, modestly coloured plants. Aquarium plants are living organisms. That means that they are a source of inexhaustible study and of an always fresh and unexpected interest.

The majority of the plants in our aquaria are bog- or marsh plants. They withstand a submerged condition remarkably well but are only able to complete their life-cycle if a period of "breathing the air" is granted them. The plant lover's trained eye delights in a play of varying shades of green, a vigorous finely shaped leaf, a flower suddenly appearing and revealing new

shape and colour. At present the number of aquarists who take up as a special hobby the growing and "breeding" of aquarium plants is steadily increasing. I am one of them.

It is my purpose to tell in "The Aquarium", in the course of time, of what I found and saw when I gave aquarium plants an opportunity to live as they should live.

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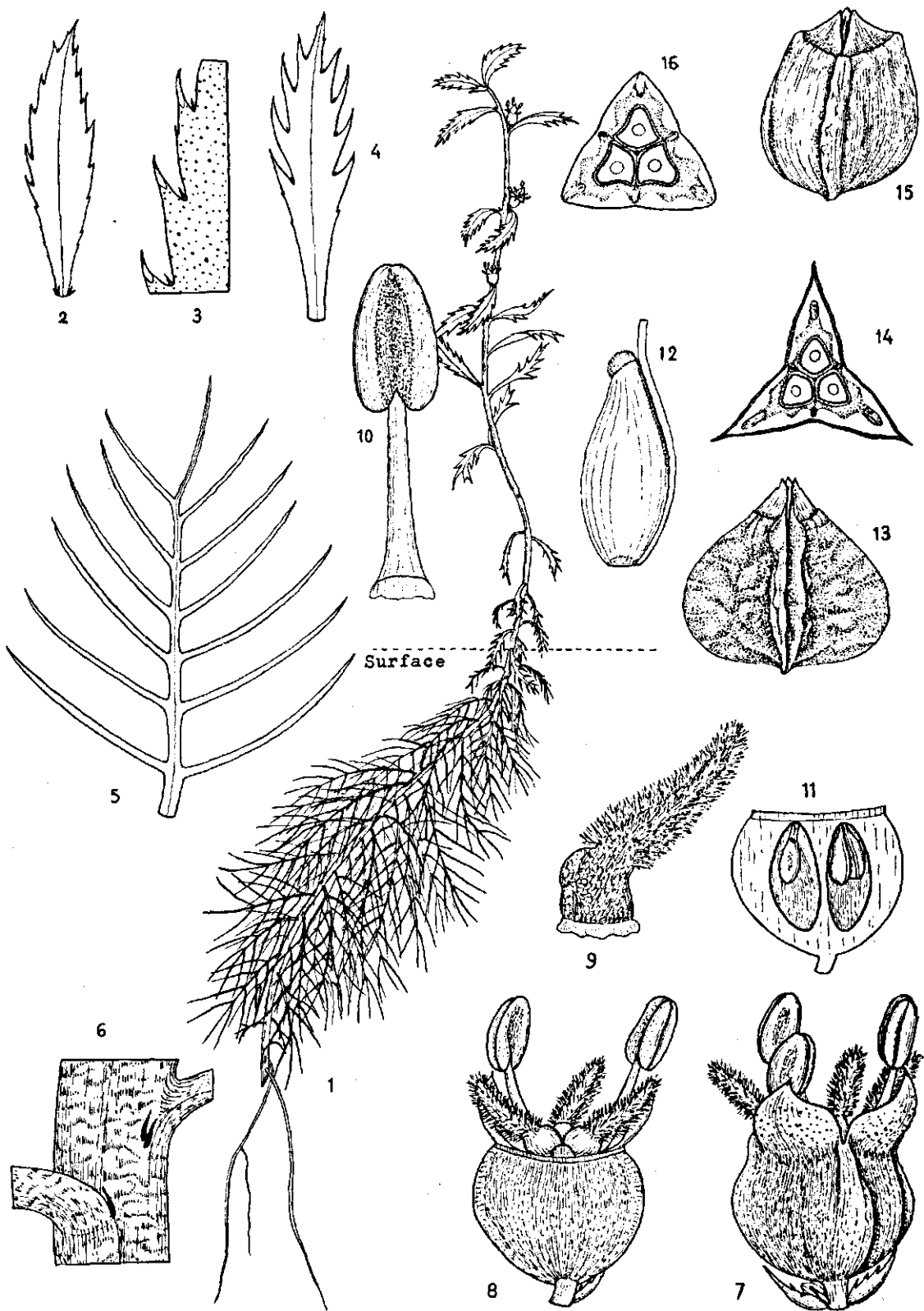
Whatever Pliny, that prolific writer on natural history, meant when he referred to *Proserpinaca*, for the first time in literature, now almost two thousand years ago, nobody knows. Most certainly he was not thinking of the Common Mermaid Weed, which bears as its official and correct name: *Proserpinaca palustris*, meaning a "marsh Proserpinaca". And so our present day *Proserpinaca* received the name of that ancient unidentifiable plant:

Kept submerged in an aquarium it increases slowly and forms, in sufficient light, small bushes of light green, feathery leaves. Mermaid Weed can be found in all the eastern United States, in Canada, and as far south as Florida, the West Indies (Cuba), the Bahamas, and Guatemala.

It favours shaded situations and is generally seen in fresh-water swamps, in shallow ponds or stagnant, perhaps slow-flowing water or in temporary (calcareous) pools. The stems, creeping at base, are often 10 - 25 cm long but may be

PROSERPINACA PALUSTRIS L.

1: emerging plant (x 4/5); 2: leaf (x 3); 3: leaf-edge (x 8); 4, 5: leaves (x 3); 6: part of stem (x 15); 7: flower (x 13); 8: flower, 1 stamen and calyx removed (x 13); 9: stigma (x 25); 10: stamen (x 25); 11: length section, ovary (x 13); 12: ovule, side-view (x 40); 13: fruit, var. *palustris* (x 6); 14: fruit, var. *palustris*, transverse section (x 6); 15: fruit, var. *amblyogona* (x 6); 16: fruit, var. *amblyogona* (x 6).



come 80 cm. The temp. of the water is preferably between 15° - 22°C.

Here is a first question to be answered. Plants occurring in so widely different climates will probably react differently to aquarium life according to the place of origin. One might try to get fresh cuttings from at least half a dozen different spots in a north-south (Canada-Cuba) distribution and start comparative growing trials, taking precautions to prevent the lots to mingle. A cutting stuck into the aquarium soil will root easily. After several months trial, select the best for further propagation.

A point to be considered is the tendency of letting the bright green feathers drop when the upper stem succeeds in reaching the surface. Some specimens are very liable to bare their stems under these conditions, losing all merit as an aquarium plant, others are rather trustworthy in keeping their waterfoliage.

On the other hand, if a plant is placed in very shallow water, the emersed stem shows interesting things. Leaves of different shape appear while tiny green flowers sit in their axils (fig. 1). The leaves have now a saw-tooth edge (fig. 2, 4) left over from the comb-like teeth of the underwater leaf (fig. 5), after a transitional surface zone (fig. 1).

A magnified flower appears to have (fig. 7, 8) three sepals, no petals (actually the petals are reduced to tiny bulges but one needs a microscope to see them!), 3 stamens and 3 stigmas. The style (fig. 9) of *Proserpinaca* is peculiar: it looks like a knob from which a finger-shaped densely hairy stigma rises. The stigma is meant to receive the pollen grains from the

stamens. And here is another point to be settled.

It has been said that pollination is effected by insects. This may be correct. Also that the stamens shed all pollengrains long before the stigmas of the same flower become receptive and able to promote a successful fertilization. This would mean that fruits and viable seeds will only be produced after cross-pollination, after pollen has been carried from one plant to another which happens to have at that moment receptive stigmas. The position of the stamens in the flower, however, suggests strongly (fig. 7, 8) that pollen may drop readily on the stigma's of the same flower. An aquarist, growing his *Proserpinaca* in a suitable tank, may be able to decide whether pollen may produce in the same flower (or at least on the same plant) viable seeds. He only needs to wrap up some flowering stems carefully so as to preclude foreign pollen to enter, and to wait. If fruits should appear they ought to be sown in order to verify whether they contain viable seeds.

The figures further show an enlarged stamen (fig. 10), a length section through the three-celled ovary (fig. 11), showing the pendent ovules, which turn the tip upwards (fig. 12). It appears, after slight magnification, that many dark coloured spinelets occur all over the plant, on the stem (fig. 6) or leaves (fig. 3).

Just for your information: only two species of Mermaids are known. One has comb-shaped emersed leaves (*P. pectinata*), and the other is *P. palustris*, pictured here. Sometimes plants of intermediate characters are found but I doubt whether they should be re-

garded as a species, though some authors do so and speak of *P. intermedia*. In the SE areas (Virginia, Florida, Cuba) a variety with large, broad-faced (4 - 6 mm) sharp-angled fruits occurs: *P. palustris* var. *palustris* (also known as *P. platycarpa*, and *P. palustris* var. *latifolia*). By far the most common is *P. palustris* var. *crebra*, with smaller, longer fruits (2.3 - 4 mm) and bluntish angles. A third variety is var. *amblyogona* (also named *P. amblyogona*) with smallish but broad plump fruits and rounded, indistinct angles. It is found in the Great Lake region (Ontario, Lake Huron, Georgian Bay; Indiana, Roby; Missouri, Butler County) and as far South as Guatemala. This latter variety is pictured here but there are many

intermediate forms and the only way to separate the varieties is by the characters of the three-angled fruits which are somewhat similar in appearance to buckwheat.

The fruit of var. *amblyogona* is pictured (fig. 15) and accompanied by a transverse section. The outer layer of the fruit is somewhat spongy and seems to be well adapted to drift. In each of the three bony-walled cells is a seed, shown as a small circle. This seed contains a high amount of fat. The fruit of var. *palustris* is seen in fig. 13; its transverse section (fig. 14) shows the sharp edged wings very well. The var. *crebra* is in between var. *amblyogona* and var. *palustris*.

While the aquarist finds a great assortment of waterplants for tropical tanks, the number of aquatic

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plants available for the coldwater fancier is very limited. So the coldwater aquarist is always looking for plants suited to his tank conditions.

Nearly every aquarist who has seen the beautiful foliage of our native pondweed, *Potamogeton*, has tried to cultivate this plant, but often without success, because pondweeds in indoor-tanks after a time will have only a poor growth, they will degenerate and finally begin to die down.

What is the cause for this failure? The pondkeeper will have noticed that pondweeds kept in outdoor-tanks grow very well, occasionally so densely that it needs a cutting. The same plants brought in an indoor-tank will grow only very poorly. We can suppose that the lack of daylight is the main cause for all failures with pondweeds. Further it has been presumed that pondweeds need the ultra-violet-rays of the natural daylight. After my observations I think, first of all, it is the total sum of light which must be available to secure development of strong plants. As a window-glass absorbs a great deal (up to 30%) of the natural daylight, we never will get full, strong forms of pondweeds as found in their natural places or outdoor tanks.

For years I have had a small tank with *Potamogeton perfoliatus* standing on the window sill in my studio. From the very high window the tank gets maximal light and a great deal of top-light. Under this condition the pondweed is always in good growth, though it is much smaller than outdoor plants. This rapidly growing form of *Potamogeton perfoliatus* is elegant in its appearance and so it is a

good coldwater-plant.

If the coldwater aquarist has tanks which get full daylight (sunlight is not always necessary), it is always interesting to make an attempt with pondweeds.

The following submerged species are suitable: curled pondweed (*Potamogeton crispus*), with wavy edged leaves; opposite pondweed, or Frog's Lettuce (*P. densus*), which somewhat resembles *Potamogeton perfoliatus*, with alternate leaves, and *Potamogeton gramineus*. It is advisable to set rhizom-cuttings in gravel which is mixed with sand and loam. Care should be taken that the reaction of the water is neutral or slightly alkaline, and that hardness is neither too high nor too low. On no account should temperature be higher than normal room temperature. Stalk-cuttings of pondweeds will reduce their growth after planting, while rhizom-cuttings will develop an aquarium-adapted form at once, provided the tank gets enough natural daylight. During winter months native pondweeds are more or less reduced, but in indoor-tanks the plants are in good appearance up to December and longer.

For outdoor tanks the pond owner can scarcely find better plants. All are good oxygenators and the pondwater is always clear. These are best conditions for breeding coldwater fishes.



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