



Centre for
Ecology & Hydrology

NATURAL ENVIRONMENT RESEARCH COUNCIL

Centre for Aquatic Plant Management

Information Sheet 30: Mares-tail (*Hippuris vulgaris*):

Hippuris vulgaris (Mare's-tail) is an emergent, amphibious, heterophyllous, rhizomatous perennial aquatic macrophyte common throughout the UK. It is a native of the British Isles; that it can survive cold conditions is evidenced by the occurrence of the plant at 2000 m in the Swiss Alps today. It is a plant of the Northern Hemisphere only, being confined to temperate, boreal and sub-arctic regions. It is the only species in the genus *Hippuris*, which in turn is the only genus in the family Hippuridaceae. It is therefore not closely related to many other aquatic plants, although there may be a relationship with the family Haloragaceae, which contains many other aquatic nuisance species such as *Elodea* and *Myriophyllum*.

It can grow in water up to 3m deep. It exhibits heterophylly (two types of leaf form). When submerged the leaves are soft and the stems have close whorls of long, flaccid, leaves without stomata; 15 to

7 cm long and 0.75 to 3 mm wide, which can number between 2 and 16 per whorl. Above the surface they have relatively longer internodes and whorls of shorter rigid leaves, to 3.5 cm long by 1 to 3 mm wide, bearing functional stomata. The emergent type stems and leaves are much stiffer and, unusually for aquatic plants, the stems develop xylem thickenings for added strength. The trigger for development of emergent type leaves appears to be high light intensity at temperatures above 10°C. Although the transition normally takes place as shoots emerge from the water, aerial type shoots can be formed underwater in very clear water conditions in summer.

Growth when submerged is mainly by cell division, but as soon as the plant forms emergent type leaves, growth is maintained by cell elongation. Growth of the horizontal rhizome is maintained by cell elongation of the lowest internode of a lateral bud. Adventitious roots develop at all nodes where lateral buds appear. The plant shows sympodial growth, in that it grows actively in front and dies away behind. This mode of growth maintains a healthy invasive front while encouraging siltation at the rear of the stand. It thus increases the speed of succession to fen and carr vegetation in small lakes and ponds.

It reproduces sexually. The flowers are very small and appear in the axils of emergent leaves. The hermaphrodite flowers are pollinated by wind. It then forms small, drupe-like, nutlet seeds which are dense and sink rapidly close to the parent plant. In most cases, rapid expansion of stands is probably due to vegetative growth while maintenance of growth within the stand is probably due to seedling recruitment.

The plant grows as an aquatic in clear base-rich water and as a terrestrial plant at the edges of standing waters in often meso to eutrophic substrates. It can tolerate up to 5 parts per thousand of salinity.

Mechanical control

The plant can be cut mechanically using a weed cutting boat, or by hand in shallow water. The rate of regrowth is rapid before July (the period of maximum growth activity) and control will be short term. A recut will be necessary later in the season. If the plant is cut after July then control will usually last until the end of the season. Further cutting will be necessary in following seasons as the plant is perennial.

Chemical control

Hippuris is susceptible to herbicides containing dichlobenil and terbutryn. Successful control is only possible when the plant is fully submerged.

Dichlobenil must be applied in April and will only be successful if the plant has no emergent type leaves (which can be formed underwater) usually at the beginning of May. Dichlobenil acts on cell division processes within the plant which are only operative when the plant is forming submerged leaves. Emergent leaves are formed by elongation of cells already formed underwater. The length of control period will probably be for two seasons.

Terbutryn must be applied in early April or late March because the plant must remain submerged for at least three weeks for the herbicide to kill it. Clarosan causes severe deoxygenation of water and should only be used in the spring when biomass of plants is low. Again the period of control is likely to be for at least one season and maybe, under favourable conditions for up to two seasons

Environmental control

Shading is not an appropriate method of control for this species as it responds to low light by rapid elongation of internodes, which will usually reach the edge of any shading material. The stands may be less dense if grown in shade and emergent parts may form later in the year than usual but successful control will not be achieved.

Biological control

There are no known biological control agents for this species.

Best option

Apply dichlobenil in early April when the plant is submerged. Cut any regrowth after July in the same year and re-apply the herbicide again in the following year.

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Dr Jonathan Newman

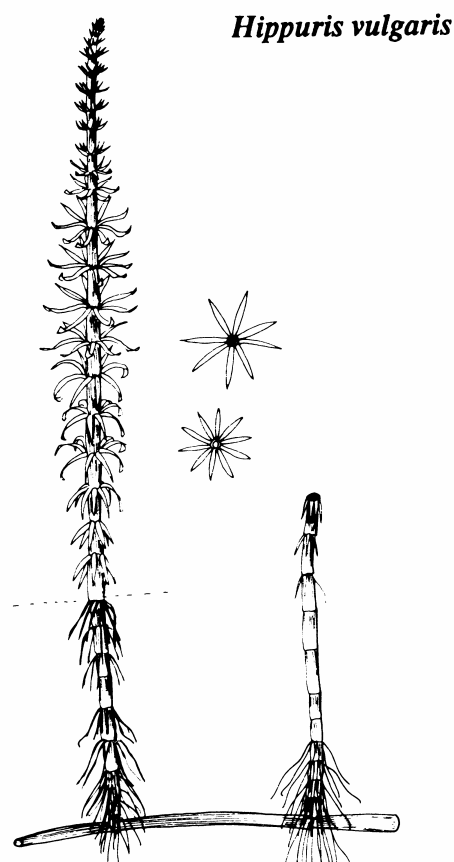


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