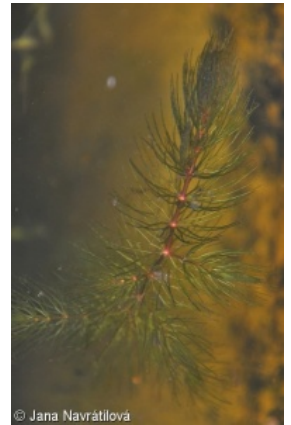
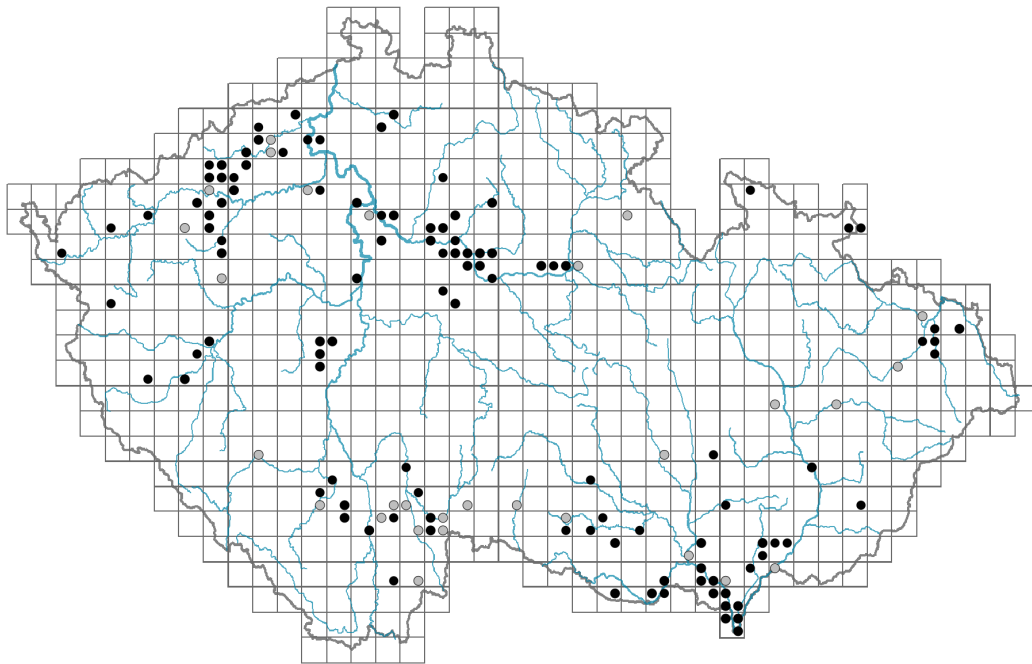


# *Ceratophyllum submersum*

## Distribution



### Map info

● revised records

● unrevised records

On the map are not visualized records without the coordinates and records marked as incorrect or doubtful.



## Habitus and growth type

Height [m]: **0.3-1.2**

Growth form: **clonal herb**

Life form: **hydrophyte**

## Leaf

Leaf presence and metamorphosis: **leaves present, not modified**

Leaf arrangement (phyllotaxis): **verticillate**

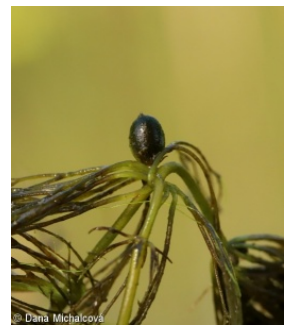
Leaf shape: **simple - forked**

Stipules: **absent**

Petiole: **absent**

Leaf life span: **evergreen**

Leaf anatomy: **hydromorphic**



## Flower

Flowering period [month]: **June-September**

Flowering phase: **8 Clematis vitalba-Galium sylvaticum (mid-summer)**

Flower colour: **green**

Flower symmetry: **actinomorphic**

Perianth type: **reduced**

Perianth fusion: **reduced**

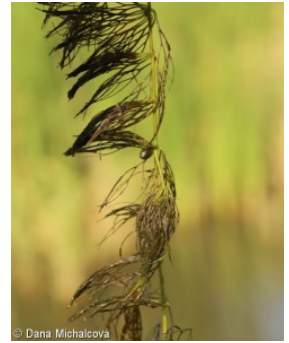


Inflorescence type: **flores solitarii**

Dicliny: **monoecious**

Generative reproduction type: **facultative autogamy**

Pollination syndrome: **water-pollination**



## **Fruit, seed and dispersal**

Fruit type: **dry fruit - nut**

Fruit colour: **brown**

Reproduction type: **mostly vegetatively, rarely by seed/spores**

Dispersal unit (diaspore): **fruit, infrutescence or its part, turion, shoot fragment**

Dispersal strategy: **Wolffia (mainly hydrochory)**

Myrmecochory: **non-myrmecochorous (b)**

## **Belowground organs and clonality**

Shoot metamorphosis: **turion**

Storage organ: **turion**

Type of clonal growth organ: **turion**

Freely dispersible organs of clonal growth: **present**

Primary root: **absent**

Persistence of the clonal growth organ [year]: **1**

Number of clonal offspring: **6**

Lateral spreading distance by clonal growth [m]: **0**

Clonal index: **7**

### **Bud bank**

Number of buds per shoot at the soil surface (root buds excluded): **5**

Number of buds per shoot at a depth of 0–10 cm (root buds excluded): **0**

Number of buds per shoot at a depth greater than 10 cm (root buds excluded): **0**

Size of the belowground bud bank (root buds excluded): **5**

Depth of the belowground bud bank (root buds excluded) [cm]: **1**

Number of buds per shoot at the soil surface (root buds included): **5**

Number of buds per shoot at a depth of 0–10 cm (root buds included): **0**

Number of buds per shoot at a depth greater than 10 cm (root buds included): **0**

Size of the belowground bud bank (root buds included): **5**

Depth of the belowground bud bank (root buds included) [cm]: **1**

## **Trophic mode**

Parasitism and mycoheterotrophy: **autotrophic**

Carnivory: **non-carnivorous**

Symbiotic nitrogen fixation: **no nitrogen-fixing symbionts**

## **Karyology**

Chromosome number (2n): **40 (72)**

Ploidy level (x): **2 (4)**

2C genome size [Mbp]: **1496.36**

1Cx monoploid genome size [Mbp]: **748.18**

Genomic GC content: **40.3 %**

## Taxon origin

Origin in the Czech Republic: **native**

## Ecological indicator values

Ellenberg-type indicator values

Light indicator value: **5 - semi-shade plant, only exceptionally occurring in full light, but usually at more than 10% of the diffuse radiation incident in an open area**

Temperature indicator value: **8 - transition between values 7 and 9**

Moisture indicator value: **12 - permanently or almost permanently submerged aquatic plant**

Reaction indicator value: **7 - indicator of slightly acidic to slightly basic conditions, never occurring in very acidic conditions**

Nutrient indicator value: **7 - occurring at nutrient-rich sites more often than at average sites and only exceptionally at poor sites**

Salinity indicator value: **2 - oligohaline, often on soils with very low salt content**

Indicator values for disturbance

Whole-community disturbance frequency indicator value: **-0.31**

Herb layer disturbance frequency indicator value: **-0.31**

Whole-community disturbance severity indicator value: **0.19**

Herb layer disturbance severity indicator value: **0.23**

Whole-community structure based disturbance indicator value: **0.52**

Herb layer structure-based disturbance indicator value: **0.55**

## Habitat and sociology

Occurrence in habitats

3 Aquatic vegetation

3A Macrophytic vegetation of eutrophic and mesotrophic still waters: **2 - optimum**

4 Wetland and riverine herbaceous vegetation

4A Reed-beds of eutrophic still waters: **1 - rare occurrence**

4B Halophilous reed and sedge beds: **1 - rare occurrence**

4C Eutrophic vegetation of muddy substrata: **2 - optimum**

Affinity to the forest environment

Affinity to the forest environment in Thermophyticum: **0 - taxon that does not spontaneously occur in Czech forests**

Affinity to the forest environment in Mesophyticum and Oreophyticum: **0 - taxon that does not spontaneously occur in Czech forests**

Diagnostic taxon

Diagnostic taxon of alliances: [\*\*VAC Hydrocharition morsus-ranae\*\*](#)

Diagnostic taxon of associations: [\*\*VAC04 Potamo-Ceratophylletum submersi\*\*](#)

Constant taxon

Constant taxon of associations: [\*\*VAC04 Potamo-Ceratophylletum submersi\*\*](#)

Dominant taxon

Dominant taxon of associations: [\*\*VAC04 Potamo-Ceratophylletum submersi\*\*](#)

Ecological specialization indices

Ecological specialization index for all vegetation types: **5.5**

Ecological specialization index for non-forest vegetation: **5.5**

Colonization ability

Index of colonization success (ICS): **1**

## Distribution and frequency

Floristic zone: **northern temperate, southern temperate, submeridional, meridional, subtropical, tropical**

Floristic region: **Europe, Asia**

Continentality degree: **6**

Distribution range extension along the continentality gradient: **5**

Elevational belt in the Czech Republic: **lowlands, colline belt**

Expansive taxon in the region: **Bohemian Thermophyticum, Bohemian Moravian Mesophyticum, Pannonian Thermophyticum**

Occurrence frequency in the basic grid mapping cells and quadrants of the basic grid mapping cells: **132**

taxon.data.freq\_in\_quad: **196**

Commonness in vegetation plots from the Czech Republic

Occurrence frequency in vegetation plots: **0.3 %**

Occurrence frequency in vegetation plots with a cover above 5%: **62.8 %**

Occurrence frequency in vegetation plots with a cover above 25%: **56.4 %**

Occurrence frequency in vegetation plots with a cover above 50%: **46.2 %**

Mean percentage cover in vegetation plots: **43.6 %**

Maximum percentage cover in vegetation plots: **88 %**

Number of habitats with taxon occurrence in the Czech Republic

Number of narrow habitats in which the taxon occurs: **4**

Number of narrow habitats in which the taxon has its optimum: **2**

Number of broad habitats in which the taxon occurs: **2**

Number of broad habitats in which the taxon has its optimum: **2**

## Threats and protection

Red List 2017 (national categories): **C3 - vulnerable taxon**

Red List 2017 (IUCN categories): **LC - least concern**

Legal protection: **endangered taxon**