

(ABSTRACT¹)
PHOTOSYNTHETIC CHARACTERISTICS OF THE AQUATIC
CARNIVOROUS PLANT *ALDROVANDA VESICULOSA*

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Aldrovanda vesiculosa L. is a critically endangered aquatic carnivorous plant. It is considered to be strictly stenotopic. Chemical and physical factors were measured *in situ* in *Aldrovanda* stands at eight Polish sites. There, the oxygen concentration usually ranged between 0.25–0.28 mM. There was a very wide range of pH of 5.04–7.60, but with a median of 7.17. The total alkalinity ranged between 0.16–4.2 meq l⁻¹ but was mostly within 1.0–2.7 meq l⁻¹. A high CO₂ concentration was typical in all stands; it ranged between 0.14–3.5 mM and was usually within 0.2–0.5 mM. *Aldrovanda* grew in unshaded stands and in areas shaded by emergent vegetation, where only about 18–24% of incident irradiance penetrated to the water surface. *Aldrovanda* can therefore tolerate various levels of oxygen, pH, total alkalinity, and shading but requires a high CO₂ concentration (i.e. above about 0.14 mM). This is the most important condition for its very fast apical growth. Laboratory photosynthetic study revealed that *Aldrovanda* was a strict CO₂ user; its CO₂ compensation point of photosynthesis was 5.9–8.2 M. Its net photosynthesis depended on CO₂ according to the Michaelis-Menten kinetics. The K_m was 165±77 μM CO₂ and the maximum photosynthesis 99±10 mmol kg⁻¹ (FW) h⁻¹. Thus, it is a CO₂ user and high CO₂ concentration in the environment can ensure rapid growth. It was found to be markedly photophilous: its light compensation point was 6.0 W m⁻² of PAR. Photosynthetic rates rose from 15 to 34°C. The highest photosynthetic rate was found in young apical shoot segments and it declined toward the bases.

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Lake	n	[O ₂] (mM)	pH	TA (meq l ⁻¹)	[CO ₂] (mM)	PAR (%)
Miklaszówek	8	0.30 0.24-0.34	7.33 7.19-7.60	4.23	0.44 0.24-0.62	24(3)
Kruglak	4	0.28 0.18-0.39	7.25 7.14-7.46	2.67	0.35 0.22-0.48	36(3)
Orle	1	0.27	7.30	2.42	0.27	n.d.
Krzywe	1	0.26	7.59	2.50	0.14	n.d.
Ostrowo	5	0.29 0.26-0.34	7.10 7.00-7.28	1.60	0.28 0.18-0.36	33(1)
Długie	3	0.26 0.23-0.30	5.93 5.80-6.40	1.01	2.55 1.09-3.35	n.d.
Moszne	2	0.09 0.022-0.15	5.69 5.68-5.70	0.57	2.80 2.44-3.16	n.d.
Brzeziczno	1	0.08	5.04	0.16	3.50	n.d.
Mean		0.26	6.15	1.75(12)	0.94	31(7)
Median		0.27	7.17	1.60	0.39	28
Total Range		0.022-0.39	5.04-7.60	0.2-4.2	0.1-3.5	18-49

Mean values and ranges of values are shown and the number of measurements are shown in brackets. Total mean and range of values are also shown.

n, number of investigated stands.

TA, total alkalinity.

PAR, % of incident light penetrating to the water surface.

[CO₂], CO₂ concentration calculated from pH and total alkalinity.

n.d., not determined.

NEWS & VIEWS

Barry Meyers-Rice (P.O. Box 72741, Davis CA 95617, USA) This spring while exploring *Darlingtonia californica* habitats in California, I discovered an anthocyanin-free form of *Darlingtonia*. Discreet inquiries revealed that Christine Elder, a local naturalist, was familiar with these plants but thought they were merely a flower variant. A complete description of these plants will appear in the next issue of Carnivorous Plant Newsletter, and will include information on how to legally obtain specimens of this new and rare find through the ICPS!