

(ABSTRACT<sup>1</sup>)  
PHOTOSYNTHETIC CHARACTERISTICS OF THE AQUATIC  
CARNIVOROUS PLANT *ALDROVANDA VESICULOSA*

LUBOMIR ADAMEC  
Academy of Sciences of the Czech Republic  
Institute of Botany  
Dukelská 145  
CZ-379 82 Třeboň, Czech Republic

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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<sup>-1</sup> but was mostly within 1.0—2.7 meq l<sup>-1</sup>. A high CO<sub>2</sub> 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 CO<sub>2</sub> 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 CO<sub>2</sub> user; its CO<sub>2</sub> compensation point of photosynthesis was 5.9—8.2 M. Its net photosynthesis depended on CO<sub>2</sub> according to the Michaelis-Menten kinetics. The K<sub>m</sub> was 165±77 μM CO<sub>2</sub> and the maximum photosynthesis 99±10 mmol kg<sup>-1</sup> (FW) h<sup>-1</sup>. Thus, it is a CO<sub>2</sub> user and high CO<sub>2</sub> concentration in the environment can ensure rapid growth. It was found to be markedly photophilous: its light compensation point was 6.0 W m<sup>-2</sup> 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.

<sup>1</sup>From *Aquatic Botany*, 1997, in press, with with kind permission from Elsevier Science NL, Amsterdam, The Netherlands.

Lake	n	[O <sub>2</sub> ] (mM)	pH	TA (meq l <sup>-1</sup> )	[CO <sub>2</sub> ] (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.

[CO<sub>2</sub>], CO<sub>2</sub> 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!