

APPENDIX **B**

The Role of Chemical
Contaminants as
Stress Factors
Affecting SAV

TABLE B-1. Representative evaluation of the role of chemical contaminants as stress factors affecting SAV.

Plant/Animal Species	Test System	Test Type	Contaminants	End Points	Reference
<i>Ceratophyllum</i> , <i>Zizania</i> , Macroinverts (3)	Field mesocosm	Single chemical	Herbicide Atrazine	Nutrients, periphyton biomass and productivity resp., and macrophyte growth	Detenbeck <i>et al.</i> 1996
<i>Elodea densa</i>	Microcosm	Single chemical	Herbicide Isoproturon	PSII chlorophyll Fluorescence (induction) Bioaccumulation	Grouselle <i>et al.</i> 1995
<i>E. densa</i> <i>Ceratophyllum</i>	Ambient Mesocosms	Single chemical	Atrazine	Nutrient levels periphyton biomass	Detenbeck <i>et al.</i> 1996
<i>Elodea nuttallii</i>	Mesocosms	Single chemical	Insecticide Dursban (chlorpyrifos)	Plant biomass Macrophyte populations	Brock <i>et al.</i> 1992
<i>Hydrilla verticillata</i>	Microcosms	Lab	Anthracene sulfometuron methyl cadmium, chromium, copper, manganese, selenium	Peroxidase activity growth (cm)	Byl <i>et al.</i> 1994
<i>H. verticillata</i>	Field Mesocosms	Single chemical + adjuvants	Diquat, diquat + nalquatic Herbicide diquat +submerge Rhodamine	Vertical water-column distribution, HPLC	Langeland <i>et al.</i> 1994

continued

TABLE B-1. Representative evaluation of the role of chemical contaminants as stress factors affecting SAV (*continued*).

Plant/Animal Species	Test System	Test Type	Contaminants	End Points	Reference
<i>H. verticillata</i>	Microcosm	Single chemical Heavy metal	Lead	Conc. cysteine, thiol, glutathione, phytochelatins	Gupta <i>et al.</i> 1995
<i>H. verticillata</i> <i>Vallisneria spiralis</i>	Axenic	Single chemical	Lead Nitrate reduction	Bioaccumulation chlorophyll, protein	Gupta and Chandra 1994
<i>H. verticillata</i>	Microcosms	Single chemical Heavy metal	Cadmium 1.0 μ m-25.0 μ m	Protein, cysteine nitrate reductase, chlorophyll content	Garg 1997
<i>H. verticillata</i>	Polargraphic & fluorometric	Single chemical	Paraquat	O ₂ evolution	Mishra and Sabat 1995
<i>H. verticillata</i>	Field	Single chemical	Acrolein	Biomass	Anderson and Dechoretz 1982
<i>H. verticillata</i>	Axenic	Single chemical sediment & water	Atrazine, lindane, chlordane	(BCF) bioconcentration factors, Chemical translocation	Hinman and Klaine 1992
<i>H. verticillata</i> <i>Myriophyllum spicatum</i>	Flask Microcosm	Single chemical	Flurprimidol, paclobutrazol, uniclazonate	Height, photosynthesis, respiration, chlorophyll	Netherland and Lembi 1992
<i>M. spicatum</i>	Axenic	Single chemical	2,4-D, Atrazine, glyphosate, linuron, thidiazuron	Buds, leaves, roots, & branches	Christopher and Bird 1992

continued

TABLE B-1. Representative evaluation of the role of chemical contaminants as stress factors affecting SAV (*continued*).

Plant/Animal Species	Test System	Test Type	Contaminants	End Points	Reference
<i>M. spicatum</i>	Mesocosm	Single chemical	Heavy metal cadmium	Biomass (dry wts.) Bioacc (spectrophotometry)	Sajwan and Ornes 1996
<i>M. spicatum</i>	Axenic, Mesocosm	Single chemical	Herbicides simazine, Atrazine, metrobuzin terbacil, diuron	O ₂ evolution (BOD)	Selim <i>et al.</i> 1989
<i>Posidonia oceanica</i>	Field collections	Single chemical	Cadmium	T bars content, oxidative metabolism	Hamoutene <i>et al.</i> 1996
<i>Potamogeton folius</i>	Field	Ambient sediment, water	PCBs, cadmium, copper, chromium, cobalt, manganese, organic carbon inputs, mercury, nickel, uranium, zinc contaminant sediment to plant ratio	Bioaccumulations	Stewart <i>et al.</i> 1992
<i>Potamogeton nodosus</i>	Mesocosm	Single chemical	Bensulfuron	Number of winter buds formed	Anderson 1989
<i>Potamogeton pectinatus</i>	Mesocosm	Multichemical	Chlorsulfuron DPX 5648	Fresh wt., dry wt., length	Anderson and Dechoretz 1982
<i>P. pectinatus</i>	Heterotrophic microcosms autotrophic	Single chemical	Atrazine, paraquat, glyphosate, alachlor	Biomass	Fleming <i>et al.</i> 1991

continued

TABLE B-1. Representative evaluation of the role of chemical contaminants as stress factors affecting SAV (*continued*).

Plant/Animal Species	Test System	Test Type	Contaminants	End Points	Reference
<i>P. pectinatus</i>	BOD	Single chemical	Acifluorfen, alachlor, Atrazine, cyanazine, glyphosate, linuron, metolachlor, metribuzin, paraquat, simazine, 2, 4-D	O ₂ evolution IC50	Fleming <i>et al.</i> 1993
<i>P. pectinatus</i>	Microcosms autotrophic	Single chemical	Atrazine	O ₂ evolution biomass	Fleming <i>et al.</i> 1988
<i>P. pectinatus</i>	Microcosm	Single chemical	Atrazine	Fresh wt., dry wt., & rhizome tips	Hall <i>et al.</i> 1997
<i>P. pectinatus</i>	BOD Microcosm	Subchronic Toxicity	Herbicide	Fresh wt., dry wt., rhizome tips & O ₂	Hall <i>et al.</i> 1997
<i>P. pectinatus</i> <i>Myriophyllum sibiricum</i>	Field	Single chemical, Multichemical	Clopyralid, 2,4-D, Picloram, Tordon	Plant weight Flower & turion production	Forsyth <i>et al.</i> 1997
<i>P. pectinatus</i> (turions)	Mesocosms	Single chemical	Fluridone	Plant weight, lengths, turions/plant	Spencer <i>et al.</i> 1989
<i>Vallisneria americana</i>	Field	Acute & chronic	Organochlorine	Multiple	Lovett-Doust <i>et al.</i> 1994
<i>V. americana</i>	Mesocosm	Ambient (sediment)	Sediments, unspecified contaminants	Biomass accumulation	Biernacki <i>et al.</i> 1997