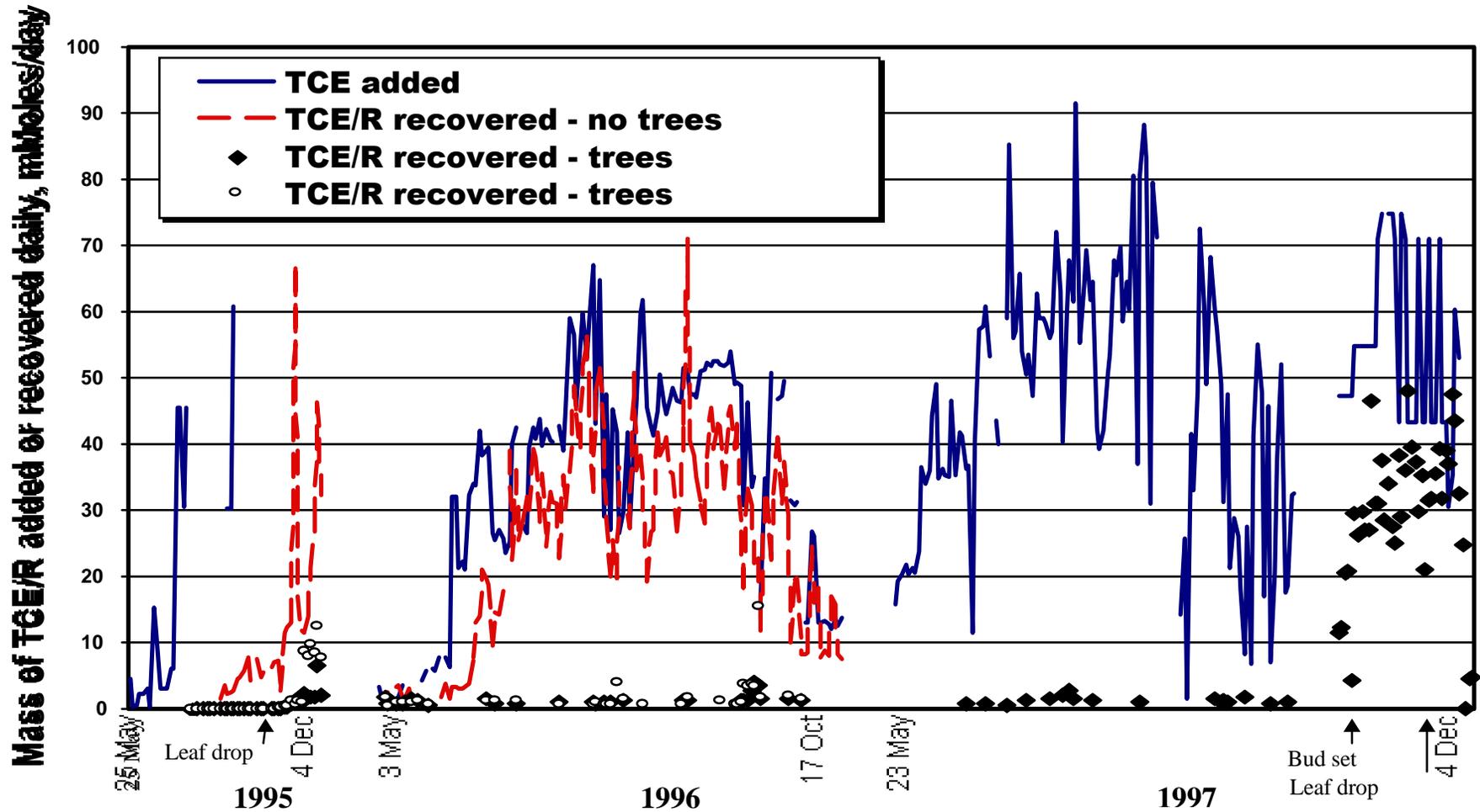
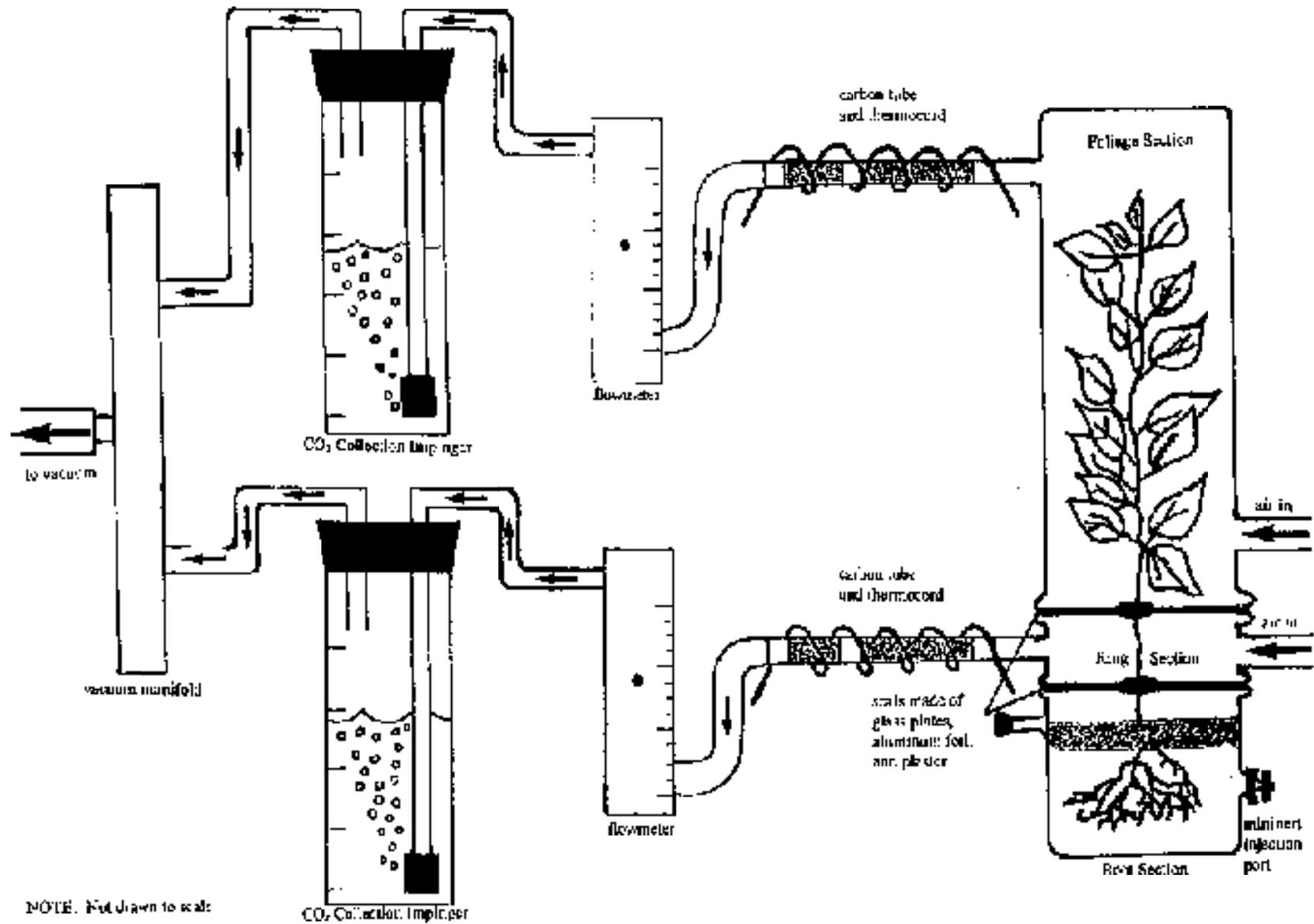


# Loss of TCE and Its Reductive Dechlorination Products (TCE/R) in Test Beds



# Laboratory Bioreactors for Study of Phytoremediation of Volatile Organics



# Air Emissions of Chlorinated Solvents from Poplar Used for Phytoremediation

	<b>Concentration in Air</b> $\mu\text{g}/\text{m}^3$ (average $\pm$ standard error of the mean)	
	<b>Method</b>	
<b>Chlorinated Solvent</b>	<b>Leaf Bags<sup>a</sup></b>	<b>Open Path FTIR<sup>b</sup></b>
<b>Trichloroethylene</b>	17 $\pm$ 25	ND 262
<b>Carbon Tetrachloride</b>	ND 12	ND 62

ND = none detected at the indicated detection limits,  $\mu\text{g}/\text{m}^3$

<sup>a</sup>Leaf bag method: Individual leaves were enclosed in Teflon bags with air pumped through at 2 L/min for 30 min to 2 hr. Air from bag passed through a heated, activated carbon trap. Chlorinated solvents were trapped in the carbon and extracted in  $\text{CS}_2$  for analysis by GC-ECD. Recoveries of known amounts added to the bags were 88% for carbon tetrachloride and 90% for TCE.

# Phytoremediation of Chlorinated Hydrocarbons: Research at the University of Washington

Stuart E. Strand, Milton P. Gordon, Lee A. Newman,  
Robert S. Crampton, Sharon L. Doty, Ram A. Hashmonay,  
Paul Heilman, Indulis A. Muiznieks, Tanya Shang,  
Xiaoping Wang, Michael G. Yost

College of Forest Resources, Department of Biochemistry,  
Department of Environmental Health, University of Washington,  
Seattle, WA, Washington State University, Puyallup, WA

# Transformation of TCE by Pure Cultures of Poplar Cells

		TCE, μg/g	Trichloro- ethanol, μg/g	Dichloroacetic acid, μg/g	Trichloroacetic acid, μg/g	% Non- extractable*	%CO <sub>2</sub> *
<b>Controls</b>	<b>Pellet</b>	ND	ND	ND	ND	NA	NA
	<b>Supernatant</b>	ND	ND	ND	ND	NA	NA
	<b>Total without cells</b>	NA	NA	NA	NA	NA	ND
<b>Exposed</b>	<b>Pellet</b>	ND	0.07 ±0.01	26 ±19	ND	NA	NA
	<b>Supernatant</b>	1.00 ±1.41	0.44 ±0.46	0.99 ±0.86	0.03 ±0.02	NA	NA
	<b>Total with Cells</b>	NA	NA	NA	NA	0.15 ±0.07	1.5 ±0

Averages of 2 or 3 observations ± standard deviation of the mean.

NA = data not available or not applicable, ND = none detected.

\*%CO<sub>2</sub> and %Nonextractable data obtained in a separate experiment with radiolabeled TCE.

Chloral hydrate was assayed, but not detected in any tissue sample.

# Fate of TCE Taken Up by Plants in Bioreactors

Plant	Average TCE Transpired, % of total dose	Average TCE Fixed in Plant Tissue, % of total dose	Fraction of TCE Uptake Fixed in Plant Tissue
Poplar H11-11	0.81	0.26	24%
Black Locust	0.69	0.35	34%