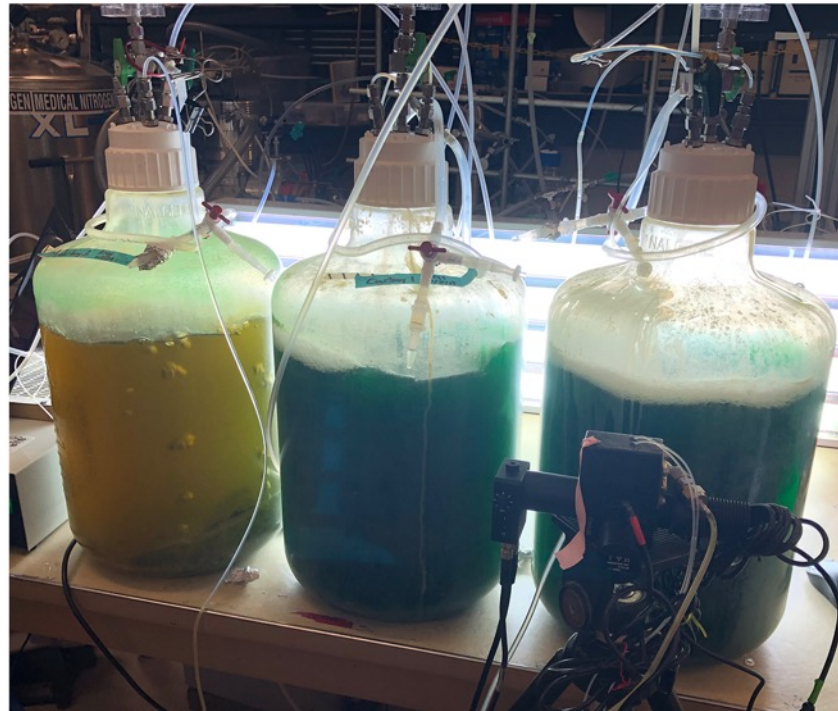
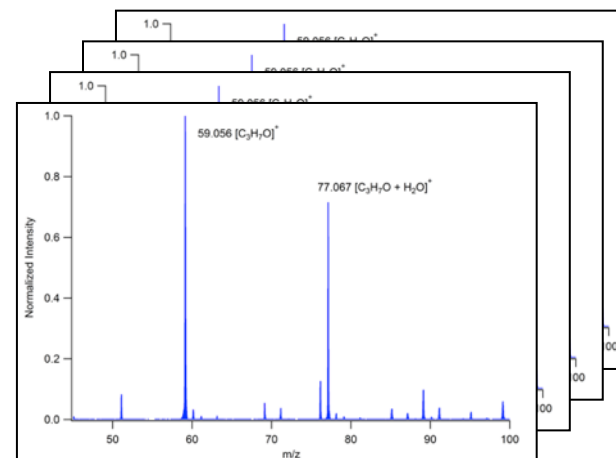
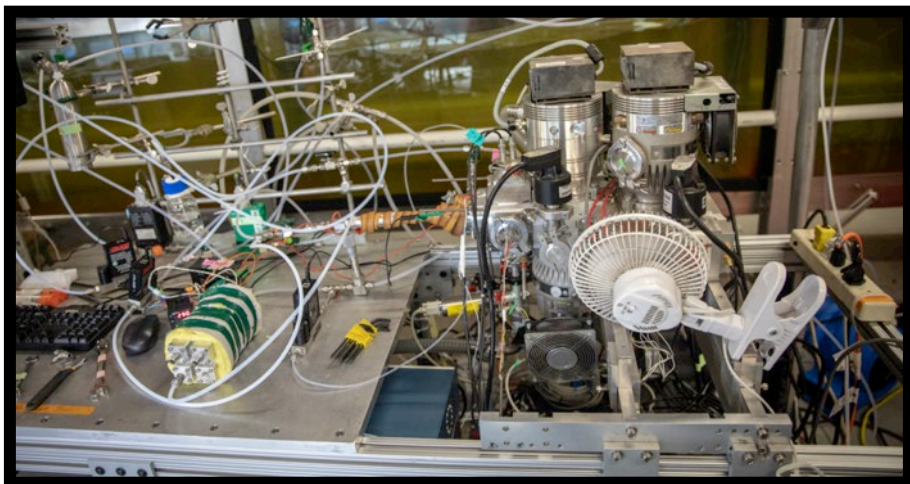
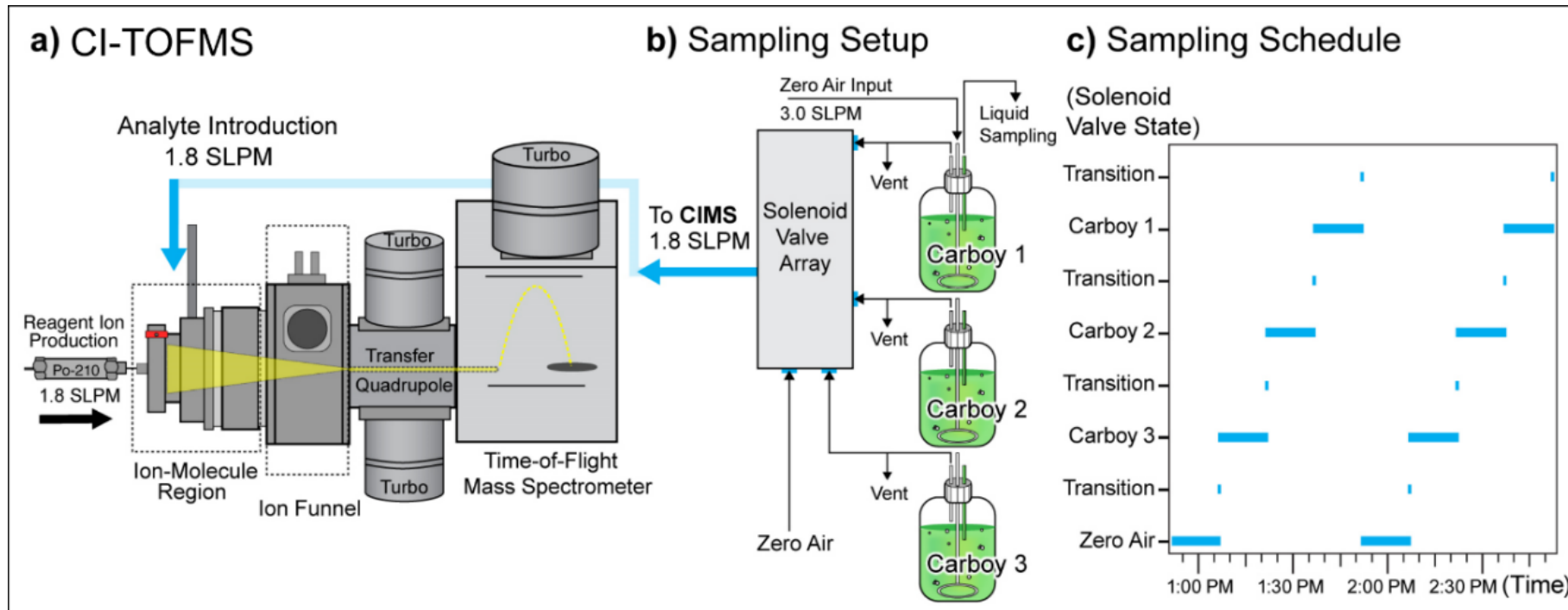


Application of Chemical Ionization Mass Spectrometry for Rapid Multivessel Monitoring of Algal Health and Grazer Infection State



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Chemical Ionization Mass Spec (CIMS)



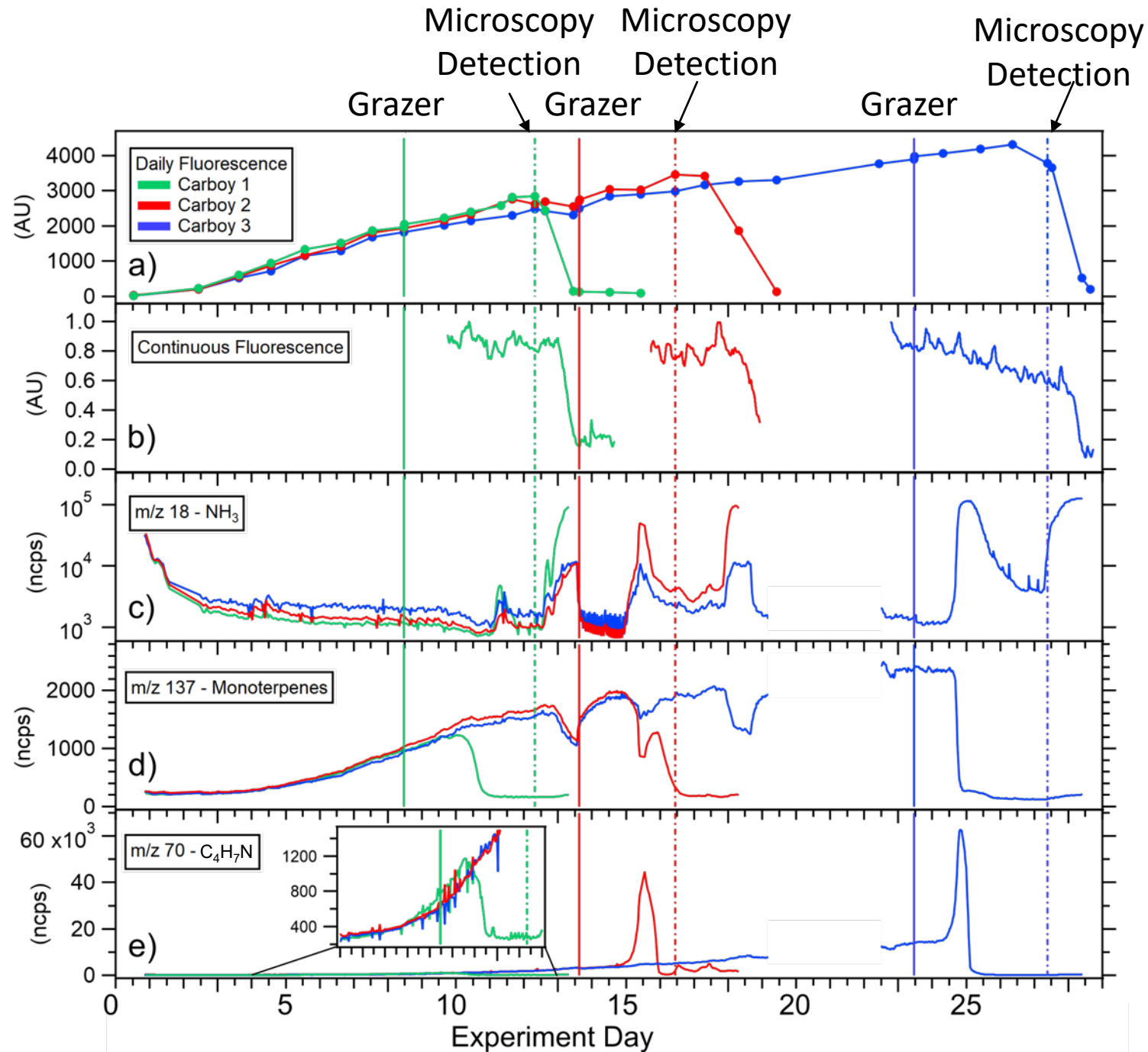
65,000 * s⁻¹ for >2 months

- Automated
- No Manual Sampling
- No Liquid Sampling
- Scalable
- Real Time Responses

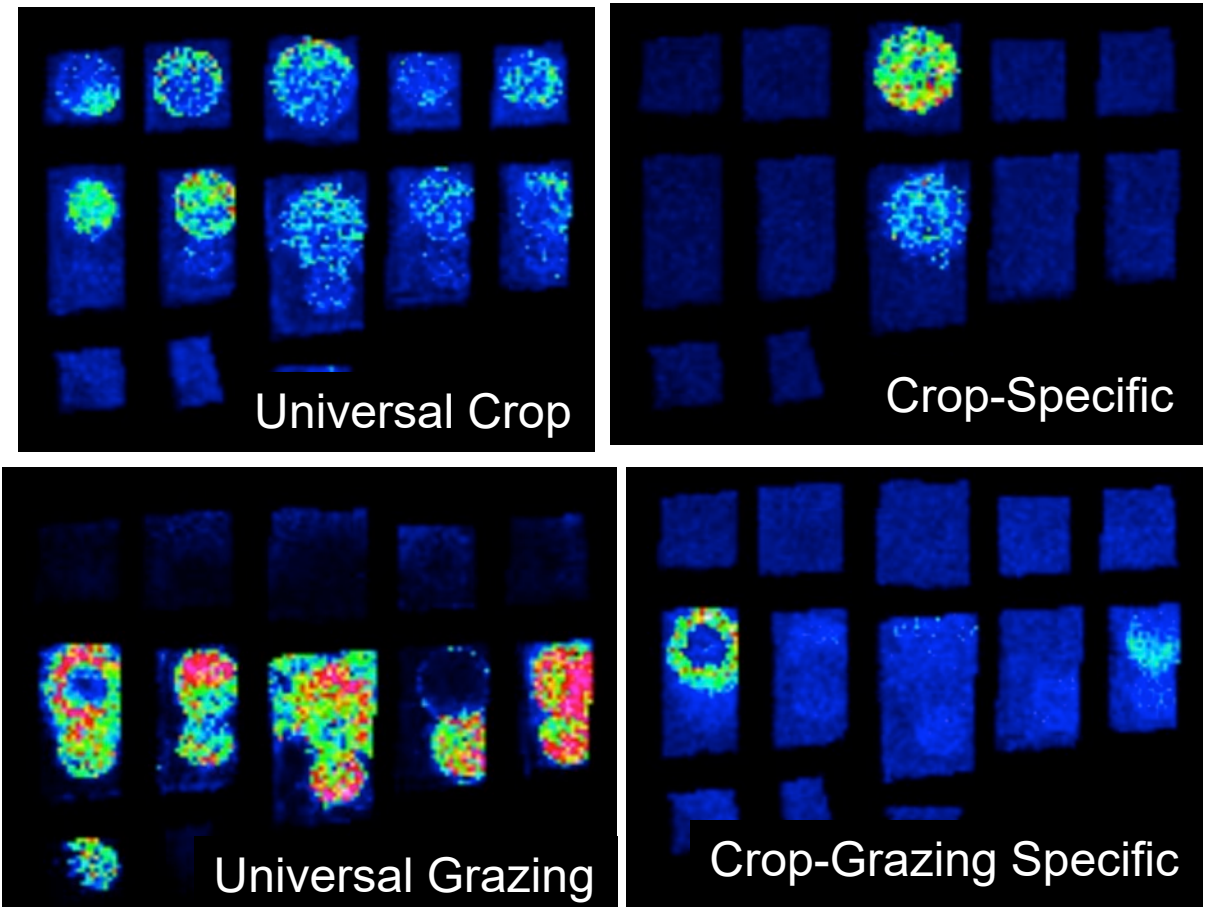
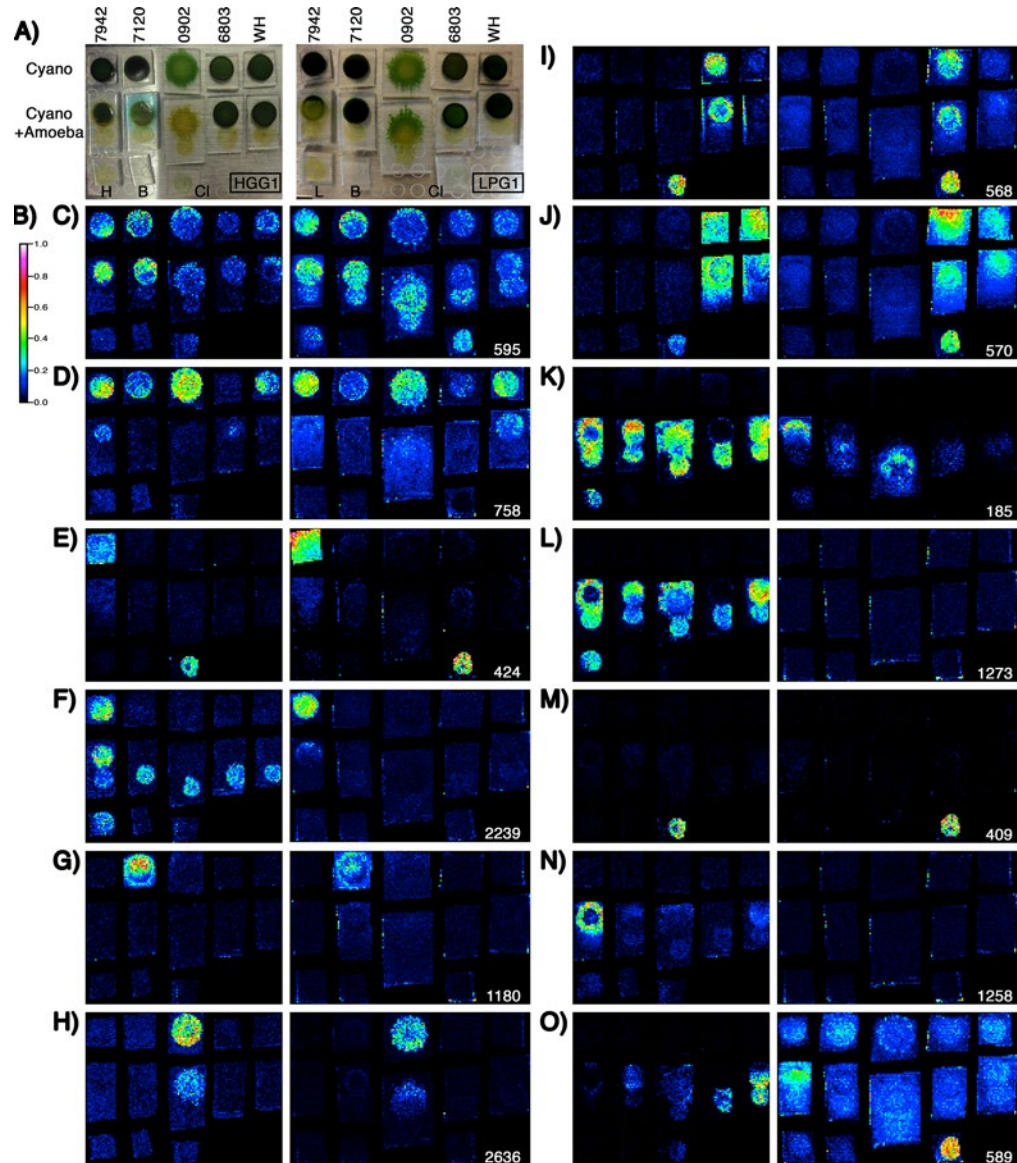
CIMS Detects Predation Days Before the Crash & Microscopic Detection

- Daily fluorescence captures death phase with poorest resolution
- Continuous fluorescence slower than microscopy, faces challenges
- NH_3 in nutrient diminishes in beginning
 - Peaks twice after infection
- Monoterpenes decrease sharply after infection
- $\text{C}_4\text{H}_7\text{N}$ – (Pyrroline) sharply increases in higher-density algae, but not significantly in lower density

Can also monitor general state of health – have observed circadian rhythms & signatures of exponential growth



Database of Crop & Predator-Specific Signatures Will Help Monitoring and Identification





Dr. Robert Pomeroy



Dr. Kimberly Prather



Luis
Camarda

Jon
Sauer

Laura
Lowe

Summer
Sherman



U.S. DEPARTMENT OF
ENERGY