Society Science

A Fresh Look at Aquatic Macronutrient Stoichiometry

Aquatic algae production is dependent upon the available concentrations of carbon, nitrogen, and phosphorus, with the Redfield Ratio (106 C/16 N/1 P) generally considered the ‘ideal’ ratio. However, with each nutrient concentration varying independently, it has been easier to discuss the ratios of nutrient pairs than to provide an assessment of the overall stoichiometric ratios.

In a paper recently published in *Agricultural & Environmental Letters*, researchers offer a method to graphically present the carbon/nitrogen/phosphorus ratio for easier visualization. The research team used samples from five tributaries to the River Thames in the United Kingdom that included carbon, nitrogen and phosphorus concentrations. They also included chlorophyll-a concentrations as a proxy for algal productivity.

In these tributaries to the River Thames, the team observed that algae-rich waters did not exist when phosphorus represented less than 13% of the stoichiometric nutrient ratio. Since these sites are relatively rich in carbon and nitrogen, this visualization tool should be used elsewhere to determine if they exhibit similar controls on algal productivity.

The stoichiometric visualization tool can potentially be used by scientists to evaluate the influence of flow-paths (i.e., surface runoff compared to subsurface flow), seasonality or land-use on nutrient stoichiometry, and thus potentially aquatic nutrient thresholds to algal proliferation.


Fluopyram Seed Treatment for Management of Soybean Sudden Death Syndrome

Sudden death syndrome (SDS) on soybean, caused by *Fusarium virguliforme* was discovered in Arkansas in 1971 and has since spread throughout much of the soybean growing region of the United States. Options for management of this disease are limited, and until recently, there was no economically viable fungicide available.

In an article recently published in *Agronomy Journal*, researchers report on the results of a two-year study (2015-2016) conducted at three locations in Wisconsin where the fungicide fluopyram was tested as a soybean seed treatment in combination with a range of soybean planting dates. The trial was evaluated for the presence of SDS and soybean seed yield.

The researchers found that fluopyram reduced visual SDS symptoms by 82-100% when compared to a standard soybean seed treatment. However, a 7% yield response (330 kg ha-1) from fluopyram use was observed at only one location in 2015. These results indicated fluopyram decreases SDS symptom development, but a positive yield response was only observed with high levels of SDS foliar symptom development associated with earlier planting dates.

This study suggests that utilizing early planting dates, cultivars with maximum yield potential, and fluopyram seed treatment can help maximize soybean yield when managing SDS.


View of the River Thames from the Wallingford Bridge. Photo courtesy of D. Smith.


Symptoms of soybean sudden death syndrome. Photo is a screenshot of a YouTube video from University of Wisconsin Integrated Pest and Crop Management (see https://youtu.be/DaDfQplrFxw).