

## **High Impact Publication Selected for Special Recognition in 2020**

**Unit:** Soil and Water Science    **PDF Download(s):** [Publication](#)

**Publication Full Citation:** O'Connell, R. and Wilkie, A.C. 2018. Comparing harvest productivity of the filamentous alga *Oedogonium* with microalgae. *Journal of Undergraduate Research* 20(1):1-9.

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**Publication Impact:** Photosynthetic algae have exceptional potential for remediating waste resources and transforming solar energy into vital carbon-based resources, including foods, fibers, feeds, fertilizers, pharmaceuticals, and biofuels. Algal cultivation is not restricted to arable land or potable water, allowing creative use of marginal lands, saline aquifers, wastewaters, and oceans for bioresource production. Utilizing waste resources abates environmental burdens and eliminates the need for adding synthetic nutrients in the algal culturing medium. The growth rate of algae greatly exceeds that of other photosynthetic organisms. Further, cultivation of algae has significant potential to capture CO<sub>2</sub> and reduce greenhouse gas emissions. Filamentous algae show promise as an optimal species due to the relative ease of harvesting their long thin filaments compared to smaller cells of microalgae. This research project compared the harvest productivity of the filamentous alga *Oedogonium* with two established microalgae cultures. The algae were cultivated in three open raceway ponds, with the addition of CO<sub>2</sub>. *Oedogonium* harvest productivity exceeded both microalgal ponds at 13.7 gVSS/m<sup>2</sup>-day compared to 9.3 and 9.5 gVSS/m<sup>2</sup>-day for the microalgae. This research demonstrates that *Oedogonium* is an efficient organism for carbon capture and biomass production due to its high productivity rates relative to microalgae. This paper has high impact not only because of the scholarly quality of the research, but because the paper and the research were the result of an undergraduate research project. Undergraduate research is one of the high-impact practices in undergraduate education championed by the Association of American Colleges and Universities because of its effect on student learning and engagement. The goal is to involve students with actively contested questions, empirical observation, cutting-edge technologies, and the sense of excitement that comes from working to investigate important questions. Undergraduate research contributes significantly to the learning and development of the student, building self-confidence and fostering initiative, creativity, and accomplishment. Other benefits of active research for the student result from interaction with and guidance from a mentor, learning how scientists think, finding how to overcome challenges, and learning about careers in science. For this research, the student author learned new laboratory skills in sampling and microscopy, successfully performed a series of experiments, compiled and analyzed the data, wrote an honors thesis, presented posters at research symposia, and published this quality article. The publication and the research process that led to it has impacted the student author's motivation to work on future key environmental problems, as well as other students influenced by her as a role model. The opportunity provided for an undergraduate to do the research that led to this paper also has an impact on UF's efforts to raise the bar on undergraduate education by promoting this high-impact practice. The student author's video on the research described in this paper is currently highlighted on the UF Center for Undergraduate Research website (<https://cur.aa.ufl.edu/>) as a prime example of the impact that research can have for undergraduate students. As of January 17th 2020, this paper has 316 Abstract page views and 203 downloads since online publication, December 12th 2018.