

OFFICIAL ABSTRACT and CERTIFICATION

The Effect of Aster amellus and Carex morrowii on the Absorption of Metals in the Groundwater

Candace Arneaud/Izza Malik

Commack High School, Commack, NY, USA

The accumulation of heavy metals is recorded yearly along the coast of Long Island to ascertain any potential health concerns. One way to address the issue of heavy metal pollution is through phytoremediation. Phytoremediation utilizes either terrestrial or aquatic green plants to remove, contain, inactivate, or degrade environmental pollutants. The purpose of the investigation was to determine whether terrestrial plants Aster amellus (Aster) and Carex Morrowii (Japanese Sedge) could be possible phytoremediators. These plants were chosen because other plants within their families have shown signs of phytoremediation. The plants were tested to be an adequate phytoremediator based off their ability to absorb levels of arsenic, chromium, barium, lead, silver, mercury, selenium, and cadmium, which were administered to the soil prior to experimentation. The concentration of heavy metals was measured each week for six weeks using the Bruker S1 Titan XRF spectrometer. The soil and various sections of the plants aerial shoots were tested to determine any uptake of the metal solution. Statistical tests including bioconcentration factor and accumulation factor were evaluated in addition to taking x-ray samples. Aster amellus illustrated the most success after testing. The bioconcentration factor of barium, arsenic, chromium, and lead were significant enough to label Aster amellus a phytoremediator. While, Carex morrowii, lacked evidence to support that it could be a successful phytoremediator.

Category
Pick one only—
mark an "X" in box
at right

- Animal Sciences ☐
- Behavioral & Social Sciences ☐
- Biochemistry ☐
- Biomedical & Health Sciences ☐
- Biomedical Engineering ☐
- Cellular & Molecular Biology ☐
- Chemistry ☐
- Computational Biology & Bioinformatics ☐
- Earth & Environmental Sciences ☐
- Embedded Systems ☐
- Energy: Chemical ☐
- Energy: Physical ☐
- Engineering Mechanics ☐
- Environmental Engineering ☐
- Materials Science ☐
- Mathematics ☐
- Microbiology ☐
- Physics & Astronomy ☐
- Plant Sciences ☒
- Robotics & Intelligent Machines ☐
- Systems Software ☐
- Translational Medical Sciences ☐

1. As a part of this research project, the student directly handled, manipulated, or interacted with (check ALL that apply):
 - ☐ human participants ☐ potentially hazardous biological agents
 - ☐ vertebrate animals ☐ microorganisms ☐ rDNA ☐ tissue
2. I/we worked or used equipment in a regulated research institution or industrial setting: ☒ Yes ☐ No
3. This project is a continuation of previous research. ☐ Yes ☒ No
4. My display board includes non-published photographs/visual depictions of humans (other than myself): ☐ Yes ☒ No
5. This abstract describes only procedures performed by me/us, reflects my/our own independent research, and represents one year's work only: ☒ Yes ☐ No
6. I/we hereby certify that the abstract and responses to the above statements are correct and properly reflect my/our own work. ☒ Yes ☐ No

This stamp or embossed seal attests that this project is in compliance with all federal and state laws and regulations and that all appropriate reviews and approvals have been obtained including the final clearance by the Scientific Review Committee.

