Monitoring of heavy metals and radionuclides in the environment is of continuing interest to non-proliferation and public health studies. Traditional monitoring efforts often rely upon labor-intensive sample collection and/or costly analysis. Laser Induced Fluorescence (LIF) offers a non-destructive, in-situ alternative, that facilitates the fast and relatively simple repeated monitoring of contamination in biota at various micro-to-macro scales. LIF is less specific than some other established techniques (e.g. absorption spectroscopy), but it comes with other advantages. Specifically, research focused on testing of a portable system consisting of small laser units and a CMOS camera to capture fluorescence response in vegetation as images. The work is aimed at developing the most effective image analysis techniques for stress identification in multiple types of plants contaminated by different metals. Here we report on findings of experiments using mosses (atmospheric metal intake), basil (intake through roots from soil) and azolla (aqueous plant). We compare the effectiveness of batch processing of images, the use of edge detection on the images, baseline determination using a common pool or sample-specific controls, and single- versus two- versus multi-color analysis. We demonstrate that our method is able to distinguish contamination by multiple or individual metals (Zn, Cu, Pb) from environmental stressors, such as drought. Testing has also advanced into determining possible distances between laser and sample, which is relevant for drone-based LIF deployment, and the best laser and filter combinations to capture higher sensitivity to changes in chlorophyll.