Invasive Plant Species Management: Development of a Novel Identification System

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Through a combination of genetic barcoding with morphological recognition we developed a novel method to more accurately identify invasive plant species than conventional methods. By utilizing Midwest Invasive Species Information Network (MISIN) and SEEK by iNaturalist, image recognition technology, we were able to field survey plants through morphological observation. The assumed species were then DNA barcoded at the following genomic sites: ITS, rbcL, matK, and trnH-psbA. Each plant species had four genomic sites sequenced for barcoding purposes, resulting in 109 sequences, 80.4% were accepted to the National Library of Medicine under Biotechnology Information. Within the 25 species (including the five found later to be officially non-invasive species), 73.1% were accurately identified by pure morphological methods. Moreover, through genetic identification, the highest percent accuracy was achieved by ITS with 75.0%. The combined search with morphologically observed taxid with genetic sequencing resulted with a 100.0% accuracy species identification. Use of this model can be applied to any region around the world, and allows for proper removal of invasive plant species. Furthermore it can be used as a tool for early detection of invasive plant species at points of entry for the first time ever.

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