

Projected Changes in Invasive Weed Species in the Northeastern U.S.

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Increasing temperatures due to climate change could lead to changes in invasive weed species' range and distribution within the Northeast and present future challenges for land managers. The Northeast region of the United States is experiencing an increase in average temperatures and consequently, the warming of winters [1]. The projected shifting of invasive weed species due to climate change is of utmost importance for early detection rapid response (EDRR) programs to be aware of what species have the potential to become new invaders to the Northeast. EDRR programs are those responsible for identifying and controlling new invasions in geographic regions and would benefit from a priority list of potential invasive weeds.

The migration of many invasive weed species may accelerate due to their dispersal methods, competitiveness, and genetic diversity [2, 3]. It's likely that with warmer winter temperatures, troublesome southern perennial weeds can survive the winter which previously limited its distribution and spread northward into the Northeast [4]. Additionally, summer annual weeds, which were previously inhibited in northward migration by the limiting growing degree days, will be able to complete their life cycles in expanding northern regions. Increasing January minimum temperatures in the Northeast puts it at higher risk of increased new invasions compared to other regions of the U.S due to reduced cold-limitation [5]. For example, kudzu is a perennial vine creeping northward and will continue to spread as winter warms [6]. Other projected migrating weeds including itchgrass and cogongrass will be able to spread northward, successfully overwinter, and begin to proliferate within the region due to warmer winter temperatures. As warming occurs, weed species will experience an accelerated rate of

development and biomass accumulation resulting in increased relative competitiveness with native plants [7]. Therefore, efforts to control the spread of these migrating invasive weeds are most prudent.

Due to the large list of invasive species that have the potential to invade the Northeast, it is helpful to prioritize which species pose the greatest risk to the region and inform practitioners. High priority species, based on their level of potential impact, include bur chervil, giant reed, slender wild oat, water primrose, and elmleaf blackberry [8]. These species have the greatest negative impact to natural areas in New York and southern New England states due to recent invasion or anticipated introduction pathways in which the species will spread and establish. Without EDRR, these species could negatively impact the natural ecosystems, alter plant communities, disrupt or shift food chains, and affect nutrient cycling [9]. The use of risk, environmental impact, and socioeconomic assessments will provide a framework to prioritize invasive species and reduce the pool of targets to proactively prevent invasion of species with highest potential impact on the region. From there, EDRR programs can inspect areas, spread awareness, and begin to eradicate any new arrivals. To prevent the spread of established invasive weeds, barrier zones and quarantines can be established followed by actions to suppress the weeds. Current management strategies can be improved by open and reactive communication strategies, one of which could be the creation of a high impact invasive species list to disseminate to appropriate parties.

As the climate changes, the distribution of weedy invasive species will begin to shift and complicate management practices. Invasive species pose great threats to the ecosystems of the Northeast. Creating awareness of high priority species for professionals to detect will provide greater opportunities for EDRR and prevention. The habitats these invasive species may spread

to are vulnerable and indicate that developing impact assessments and best management practices for these species before invasion will lessen the impact and prevent the spread. Further work to develop control and prevention methods will be needed as the climate changes and the threat increases.

References

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