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Susceptibility of indigenous aquatic plants to alien invasives : competitive interactions as influenced by nutrient levels and density

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ABSTRACT

This research investigated the susceptibility of South African indigenous aquatic plants to competition from invasive species, using the competitive interactions of two sets of aquatic plants as a potential indicator. These interactions were studied in two separate experiments: the submersed weeds, *Hydrilla verticillata* (L.F.) Royle (Hydrocharitaceae) and an indigenous species, *Lagarosiphon major* (Ridley) Moss (Hydrocharitaceae) and; the floating weeds, *Azolla filiculoides* Lamarck (Azollaceae) and the indigenous *Spirodela polyrhiza* (L.) Schleid (Lemnaceae). Plants were grown under differing nutrient levels, and in an addition series of eight different densities, using the reciprocal yield model to estimate competitive ability. The invasive Hydrilla outcompeted Lagarosiphon in terms of mean length, dry mass, and survival. Major algal infestation in the high nutrient level of the Hydrilla/Lagarosiphon experiment altered light and nutrient conditions, which may have played a significant role in the lack of establishment of Lagarosiphon and the poor growth performance of Hydrilla. The invasive Azolla and indigenous Spirodela both performed well in terms of plant mass and increase in number. While Azolla was affected by intraspecific competition, it showed a steady increase in growth and multiplication with an increase in nutrients. The individual mass of Spirodela plants was highest in the low nutrient level, and multiplication rates were greatest in the high nutrient level. Results indicate that the susceptibility of indigenous plants may be increased in high-nutrient systems, and that a continuous monitoring programme of aquatic alien species is vital in protecting our indigenous plants from extinction. This research recommends that the method of investigating competitive interactions between alien and indigenous plants be repeated with a variety of aquatic plants, as a means of anticipating susceptibility to invasions.