

Testing Nitrogen and Iron Based Compounds as an Environmentally Safer Alternative to Control Broadleaf Weeds in Turf

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Abstract : Turfgrass is an important component of urban and rural lawns and landscapes. However, broadleaf weeds such as dandelions (*Taraxacum officinale*) and white clovers (*Trifolium repens*) pose major challenges to the health and aesthetics of turfgrass fields. Chemical weed control methods, such as 2,4-D weedicides, have been widely deployed; however, their safety and environmental impacts are often debated. Alternative, environmentally friendly control methods have been considered, but experimental tests for their effectiveness have been limited. This study investigates the use and effectiveness of nitrogen and iron compounds as nutrient management methods of weed control. In a two-phase experiment, the first conducted on a blend of cool season turfgrasses in plastic containers, the blend included Perennial ryegrass (*Lolium perenne*), Kentucky bluegrass (*Poa pratensis*) and Creeping red fescue (*Festuca rubra*) grown under controlled conditions in the greenhouse, involved the application of different combinations of nitrogen (urea and ammonium sulphate) and iron (chelated iron and iron sulphate) compounds and their combinations (urea × chelated iron, urea × iron sulphate, ammonium sulphate × chelated iron, ammonium sulphate × iron sulphate) contrasted with chemical 2, 4-D weedicide and a control (no application) treatment. There were three replicates of each of the treatments, resulting in a total of 30 treatment combinations. The parameters assessed during weekly data collection included a visual quality rating of weeds (nominal scale of 0-9), number of leaves, longest leaf span, number of weeds, chlorophyll fluorescence of grass, the visual quality rating of grass (0-9), and the weight of dried grass clippings. The results drawn from the experiment conducted over the period of 12 weeks, with three applications each at an interval of every 4 weeks, stated that the combination of ammonium sulphate and iron sulphate appeared to be most effective in halting the growth and establishment of dandelions and clovers while it also improved turf health. The second phase of the experiment, which involved the ammonium sulphate × iron sulphate, weedicide, and control treatments, was conducted outdoors on already established perennial turf with weeds under natural field conditions. After 12 weeks of observation, the results were comparable among the treatments in terms of weed control, but the ammonium sulphate × iron sulphate treatment fared much better in terms of the improved visual quality of the turf and other quality ratings. Preliminary results from these experiments thus suggest that nutrient management based on nitrogen and iron compounds could be a useful environmentally friendly alternative for controlling broadleaf weeds and improving the health and quality of turfgrass.

Keywords : broadleaf weeds, nitrogen, iron, turfgrass

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