

# Control Regimen for Duckweed

## Troublesome Aquatic Weed

Duckweed requires a high level of vigilance, as it often turns into a problem very quickly. Duckweed, the generic term used to describe the family (Lemnaceae) of small aquatic herbs found floating on or just below the surface of still or slow moving streams and ponds, currently has five genera, including *Wolffia*, *Wolffiella*, *Lemna*, *Landoltia*, and *Spirodela*, as well as 38 species identified in the Lemnaceae. Where the water is enriched with nutrients such as nitrogen and phosphates, duckweed can spread very rapidly through vegetative budding of daughter fronds and lakes, ponds, and reservoirs, and canals become covered with an unwanted, unsightly, dense green layer of weed. Because duckweed tends to become a nuisance so quickly, it is advantageous to know the optimal control measures beforehand.

Figure 1:



For many years, Reward<sup>®</sup> landscape and aquatic herbicide has been successfully used to control duckweed. Nevertheless, there have been recent isolated reports from parts of Lake County, Florida of a decline in the level of control, which was not attributable to application, product, or water quality factors. Studies were therefore initiated at the Syngenta Vero Beach Research Center and the University of Florida's Center for Aquatic Plants, Gainesville, to examine the problem and look for solutions.

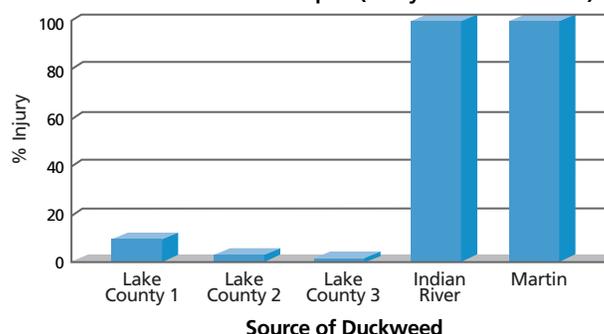
## Assessing this Research

Duckweed samples were collected from Lake, Indian River, and Martin Counties and identified as *Landoltia punctata* (previously *Spirodela punctata*) or dotted duckweed. This non-indigenous species has only recently been identified, based on its morphology, its genetic material, and enzymatic studies as the only member of a separate genus. Originating in Australia and Southeast

Asia, the genus of duckweed was first collected in North America in 1930 from Kansas City, Missouri, but it is now well naturalized in the Southeastern United States, notably in Florida and Georgia.

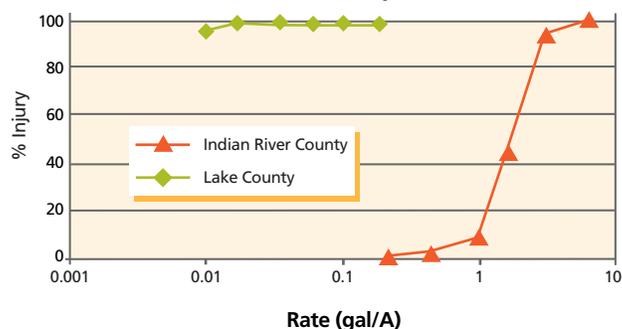
In an initial greenhouse test, these samples showed significantly different responses at 5 days after treatment to a single low dose (0.03 gal/A) of Reward landscape and aquatic herbicide. (See the chart below.) There was little effect on the samples from Lake County, while those from other sources were very sensitive to this very low dose.

Figure 2: Effect of Reward Herbicide (0.03 gal/A) on Dotted Duckweed Samples (5 Days After Treatment)



In a subsequent greenhouse test (seen below), the dose responses for a Lake County sample (no. 1) and the Indian River County samples were compared.

Figure 3: Dose Response of Dotted Duckweed Accessions to Reward (5 Days After Treatment)

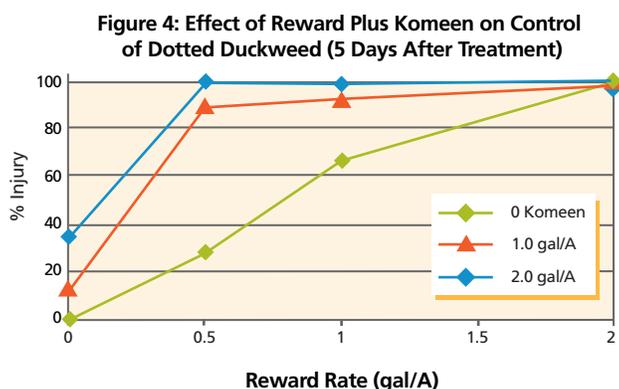


## Further Research

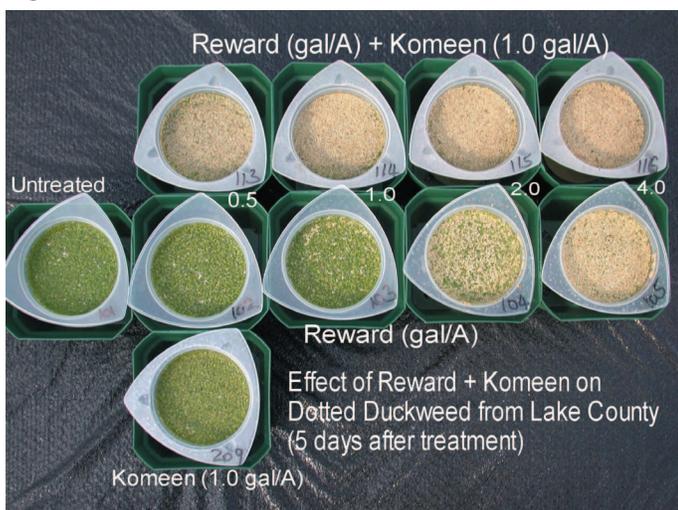
Additional studies were carried out to determine the effect of a mixture of Reward landscape and aquatic herbicide with copper-containing products on control of insensitive, dotted duckweed (see Figure 4). The addition of copper-containing Komeen<sup>®</sup> to Reward landscape and aquatic herbicide significantly improved

control, and in greenhouse tests a rate of 1 gal/A Reward landscape and aquatic herbicide plus 1 gal/A Komeen provided excellent control. The increase in control of insensitive duckweed with the addition of Komeen at 1.0 gal/A was apparent at all rates of Reward landscape and aquatic herbicide, as seen in Figure 5 below. However, to maintain close to 100% control, the rate of 2.0 gal/A Reward herbicide was required. Confirmation of the excellent control of insensitive dotted duckweed provided by Reward landscape and aquatic herbicide plus Komeen in the greenhouse was later found in field applications by University of Florida personnel.

It is apparent that the Lake County sample was significantly less sensitive to Reward landscape and aquatic herbicide than that from Indian River County, and a rate of at least 4 gal/A was required to provide good control. The Indian River sample was controlled at the lowest rate tested, 0.008 gal/A.



**Figure 5:**



## Species Identification Is Key

As different species require unique control measures, it is essential to identify the species of duckweed present before determining the treatment required.

- *Lemna* species always have only one root per frond and are light green in color.
- Common or giant duckweed (*Spirodela polyrrhiza*) has many roots (sometimes 5–20, but most commonly 7–9). The frond is broad, flat, and approximately 1/2" long, with obvious nerves, and there is usually a reddish-purple dot at the base of the nerves on the upper green surface.
- Dotted duckweed (*Landoltia punctata*, seen below) can be distinguished from similar native species with the aid of a 10X hand lens. Its fronds are less than 1/2" long and more elliptical or shoe shaped (Figure 6), and there are several roots (2–5) per frond (Figure 7). This species usually has two or more fronds attached together, and the under-surface is covered with several sunken glands.



**Figure 6.** Dotted duckweed, overhead view



**Figure 7.** Dotted duckweed, view from underneath

## Control Recommendations

- Where *Lemna* or sensitive *Landoltia* populations are found, Reward landscape and aquatic herbicide applied according to label recommendations will continue to provide excellent control.
- Where insensitive dotted duckweed populations are known to be present or are suspected to be present, apply a tank mix of Reward landscape and aquatic herbicide at 2.0 gal/A and Komeen at 1.0 gal/A. Apply in 50–150 gallons of water plus the labeled rate of a 75% or greater non-ionic surfactant per acre. Retreatment may be necessary for plants missed in previous applications and for plants' regrowth.

**Call 1-800-395-8873 to contact your local Syngenta Vegetation Management representative and learn more about Reward landscape and aquatic herbicide.**



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