

Managing Cogongrass on Rights-of-Way: *a challenge to prevent further spread*

**Wilson Faircloth, Research Agronomist,
USDA Agricultural Research Service, Dawson, Georgia**

Highway and utility rights-of-way (ROW) connect even the most rural areas with major metropolitan areas in the United States. Perhaps just as importantly, these ROWs connect seaports, airports, and international borders with the remainder of the country. This network of ROW has been shown to be pathways for the movement of invasive plant species (Harper-Lore 2003). Rights-of-way, highways in particular, are conducive to invasive grass infestation for several reasons. Grasses are usually the desired species on many ROWs. Perennial species such as bahiagrass (*Paspalum notatum* Fluegge), common bermudagrass [*Cynodon dactylon* (L.) Pers.], and tall fescue (*Lolium arundinaceum* S. J. Darbyshire) are attractive, easy-to-maintain, provide erosion control, safe (low-growing for visibility), and pose a minimal fire hazard. Most of these grasses tolerate occasional mowing. Mechanical and herbicidal control of broadleaved plants is simple and cost-effective on ROW; however, control of an invasive grass within a desirable grass is both challenging and often costly to maintenance personnel.

Movement of cogongrass along ROWs

Wilcut et al. (1988a) first suggested movement of cogongrass along the Interstate 65 ROW in Alabama via seed blown by the prevailing winds. Willard et al. (1990) also acknowledged the importance of ROW maintenance operations in cogongrass dispersal in Florida, however, his research indicated rhizome transport as the primary means of movement. As indicated by the previous researchers, cogongrass is an ideal invader of highway ROWs. Not only may seed move with prevailing winds, but vehicles offer the chance of long-distance dispersal. In addition to providing access to un-infested areas, the presence of cogongrass on ROWs is aesthetically displeasing and poses safety concerns due to its fire hazard. Fire fueled by cogongrass is a liability concern for ROW managers, not only due to smoke management and the safety of motorists, but also due to property loss from adjoining landowners.

Control measures that could be utilized in ROW situations include both mechanical and herbicidal means. Sajise (1972) first reported that mowing cogongrass was only effective in removing aerial portions of plants. Further research indicated that mowing reduced above-ground foliage and total rhizome mass when repeated on a monthly schedule, but the grass remained viable at the end the season (Willard and Shilling 1990). This research would indicate that occasional mowing has little effect on the regenerative capacity of cogongrass. Burnell et al. (2003) demonstrated that weekly mowing of cogongrass reduced the number of plants per unit area by 74%; however, much like Willard and Shilling (1990) cogongrass resprouted, even after two consecutive seasons of treatment. Shallow tillage (less than 3 in. deep), such as discing, may be effective if repeated frequently (Johnson 1999). Repeated deep tillage (greater than 3 in. deep) may control cogongrass by inverting, burying, and exposing rhizomes but is not always possible on a ROW (Chikoye et al. 2000; Wilcut et al. 1988).

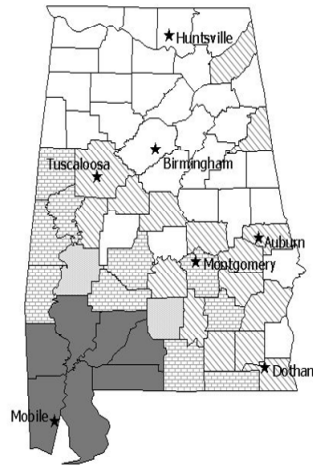
Effective herbicidal control of cogongrass is currently limited primarily to two compounds: glyphosate (Roundup[®], etc...) and imazapyr (Arsenal[®], etc...). Glyphosate has been reportedly used at rates up to 14 lb active ingredient (ai) per acre for non-selective control in a variety of situations (Faircloth et al. 2003; Miller 2000; Peyton et al. 2003). A standard protocol for glyphosate usage on ROW is to apply 3 to 4 lb ai/acre as spot treatments to actively-growing infestations (ALDOT 2002). Willard et al. (1996) demonstrated that two mowings or discings in combination with a single glyphosate application at 3 lb ai/acre reduced rhizome biomass by at least 80% one year after treatment. Re-treatment is necessary and should occur yearly until the rhizome system is depleted (Bryson and Carter 1993; Jose et al. 2002). Imazapyr offers limited selective control of cogongrass in unimproved bahiagrass and bermudagrass (Johnson et al. 1999). Willard et al. (1996, 1997) reported that imazapyr at

0.7 lb ai/acre controlled cogongrass up to two years after treatment. Imazapyr was significantly more effective at comparable rates than glyphosate in a study by Miller (2000). Johnson et al. (1999) obtained 82% control of cogongrass 18 months after treatment with sequential applications of imazapyr at 0.38 lb ai/acre. Mechanical treatments such as discing improved cogongrass control to 91% when used in combination with the above treatments (Johnson et al. 1999).

Given the extent to which cogongrass is found on public ROWs in Alabama (see figure below), it is necessary to develop integrated vegetation management plans for cogongrass.

These plans must include herbicides, mowing, and revegetation with desirable and manageable species.

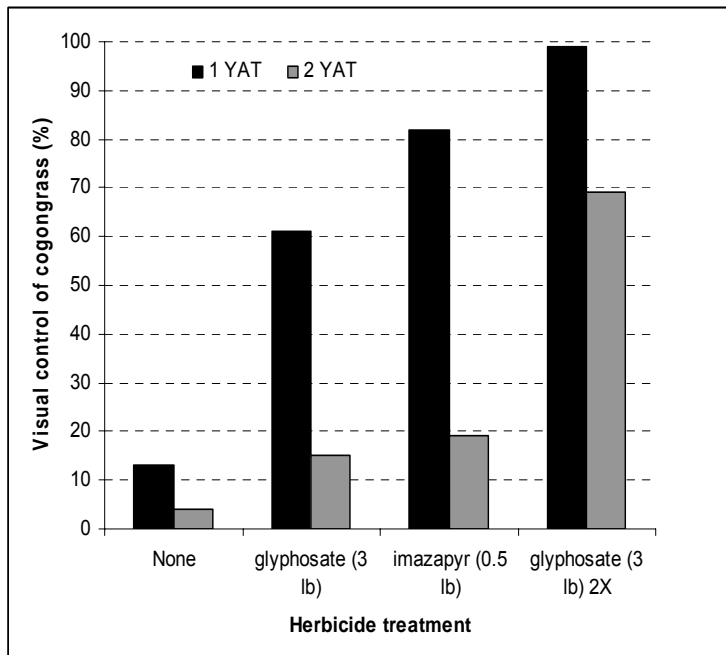
Experiments were begun in 2000 to address just such issues. Many combinations of glyphosate, imazapyr, mowing, and cover crops were tested on severe cogongrass infestations on actual ROWs. The primary objective of these studies was to re-establish bahiagrass or bermudagrass into cogongrass infested areas. These intensive studies were also repeated so that we could make recommendations on the number of years of consecutive treatment needed to eradicate an infestation of cogongrass.



Number of infestations per county



Control of cogongrass was only achieved with three successive years of intense management.



A tank-mix combination of glyphosate plus imazapyr applied in the fall increased visual control and decreased stand density, while not affecting bahiagrass or bermudagrass conversion at one location. Spring re-treatment with glyphosate increased visual control but did not decrease density. Conversion to more desirable grass was achieved at one location only, where drill-seeding was used. Neither bahiagrass nor bermudagrass was favored. Mowing was not an effective treatment alone; however, when performed monthly and combined with herbicide, mowing showed some promise of reducing cogongrass up to two years after treatment (YAT) (see fig at left).

Recommended Best Management Practices (BMPs) for cogongrass infestations on ROWs

As outlined previously, one of the objectives of this research was development of BMPs for cogongrass infestations on ROWs. Recommendations are as follows:

- **Care should be taken to prevent or exclude cogongrass infestations in unaffected areas; this includes but is not limited to, prudent selection of fill soil for earthwork operations and moratoria on the movement of soil from infested areas, or areas within close proximity to known infestations.**
- **The cleaning of earthwork and mowing machinery to remove propagules (seeds and rhizomes) when moving between infested and un-infested areas.**
- **Treatment of infestations with glyphosate (greater than or equal to 3 lb ai/acre) or glyphosate plus imazapyr (1.5 + 0.38 lb ai/acre) in the fall, followed by drill-seeding of a cover crop, followed by spring treatment of regrowth with glyphosate (≥ 3 lb ai/acre) and drill-seeding of a bermudagrass:bahiagrass seed mixture (2:1) at 30 lb/acre. Herbicide application should be made in at least 15 gal/acre of solution to ensure adequate coverage. This treatment program should be repeated yearly for three years.**
- **Mowing of infestations as outlined in typical ROW protocols does not affect growth or survival and does not interfere with herbicide application. Anecdotal evidence suggests mowing should not be conducted when seed heads are present to restrict seed movement on equipment. Mowing will not affect the treatment regime outlined above.**

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