Selective Herbicides for Managing Moist-Soil Wetlands in the Mississippi Alluvial Valley

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Advancing the Science of Waterfowl Management

Introduction

Moist-soil wetlands are seasonally inundated and dominated by annual and perennial wetland plants (Fredrickson and Taylor 1982, van der Valk 1981). These wetlands provide important food resources for wintering waterfowl in the Mississippi Alluvial Valley (MAV). Moist-soil management requires periodic soil disturbance, primarily through disking, mowing and tilling (Fredrickson and Taylor 1982, Gray et al. 1999), and hydrologic management to setback succession and promote production of annual plants. In turn, these wetlands produce seeds, tubers, and aquatic macro-invertebrates for waterfowl and other wetland dependent wildlife (Baldassarre and Bolen 2006, Fredrickson and Taylor 1982).

However, moist-soil management often requires highly dynamic and multifaceted management to control problem plant species while promoting expansion and competitive advantages of desired species. Beneficial plants, defined as those with relatively high metabolizable energy for waterfowl such as *Echinochloa* spp. (barnyardgrass or "millet,")(Reinecke et al. 1989), can be outcompeted by problematic plants such as swamp smartweed (*Polygonum hydropiperoides*) which can reduce food availability and overall foraging capacity of moist-soil wetlands.

Objectives

Our objectives were to 1) identify the most problematic weed species in moist-soil wetlands in the MAV, and 2) recommend effective herbicides for control of problem plant species.

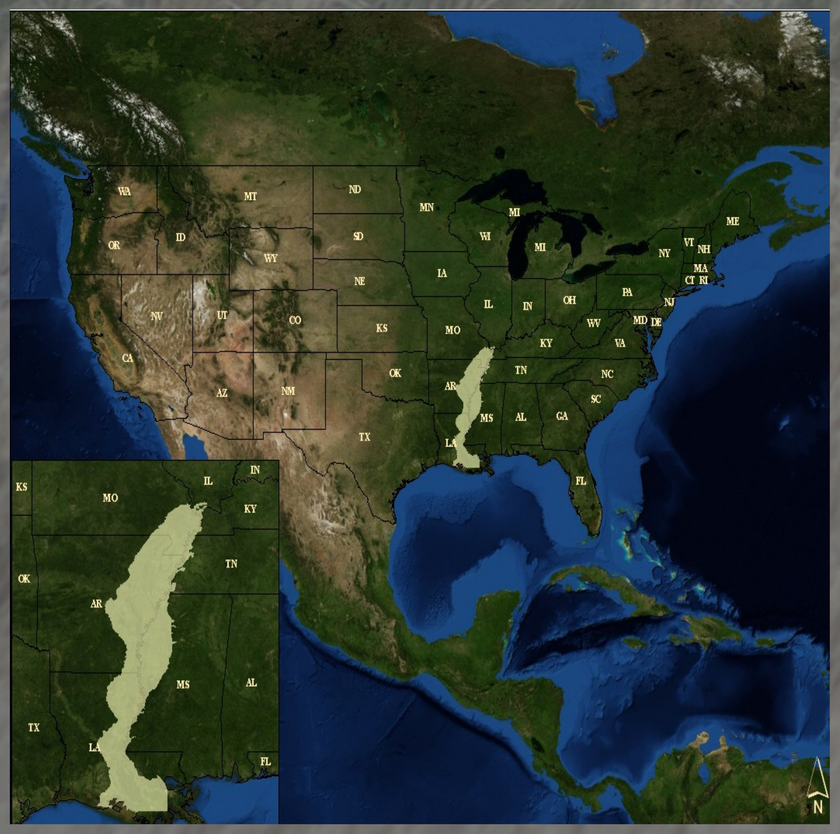

Figure 1. Mississippi Alluvial Valley (MAV)

Methods

We conducted a literature review and surveyed land and waterfowl managers in the MAV to identify problem plants. We also conducted a survey of currently labeled herbicides in the United States of America that have activity on the identified problem plants to establish baseline recommendations for herbicidal control.

Results

Common problem species encountered in MAV moist-soil wetlands were American lotus (*Nelumbo lutea*), alligatorweed (*Alternanthera philoxeroides*), beakrush (*Rhynchospora corniculata*), buttonbush (*Cephalanthus occidentalis*), cattail (*Typha* spp.), common cocklebur (*Xanthium strumarium*), duckweed (*Lemna minor, Spirodela polyrrhiza*), Eurasian watermilfoil (*Myriophyllum spicatum*), hemp sesbania (*Sesbania* exaltata), multiple morningglory species (*Ipomoea* spp.), purple loosestrife (*Lythrum salicaria*), redvine (*Brunnichia ovata*), swamp smartweed (*Polygonum hydropiperoides*), trumpetcreeper (*Campsis radicans*), water primrose (*Ludwigia peploides*, *L. leptocarpa*), and willow (*Salix* spp.). Effective herbicides for the control of these problem plants can be found in Table 1.

Table 1. Problematic weeds in moist soil wetlands in the MAV and effective herbicides for their control.

Problem Species	2,4-D	Aciflurofen	Bentazon	Bromoxynil	Carfentrazone	Dicamba	Diquat	Flumetsulam	Fluridone	Glyphosate	Imazapyr	Triclopyr
Alligatorweed (*Alternanthera philoxeroides*)	*				*		*			*	*	*
Beakrush (*Rhynchospora corniculata*)										*	*	
Buttonbush (*Cephalanthus occidentalis*)										*	*	
Cattail (*Typha* spp.)										*	*	
Common Cocklebur (*Xanthium strumarium*)	*	*	*	*	*	*		*		*	*	*
Duckweed (*Lemna minor*) (*Spirodela polyrrhiza*)					*	*			*		*	
Eurasian watermilfoil (*Myriophyllum spicatum*)	*				*		*		*			*
Hemp Sesbania (*Sesbania exaltata*)	*	*			*	*				*		*
Lotus, American (*Nelumbo lutea*)	*				*					*	*	*
Morningglories (*Ipomoea* spp.)	*	*		*	*	*			*	*	*	*
Purple Loosestrife (*Lythrum salicaria*)	*									*	*	*
Redvine (*Brunnichia ovata*)		*				*				*	*	*
Swamp smartweed (*Polygonum hydropiperoides*)	*	*	*	*	*	*				*	*	*
Trumpet Creeper (*Campsis radicans*)		*				*				*	*	*
Water Primrose (*Ludwigia* spp.)	*				*					*	*	*
Willow (*Salix* spp.)						*				*	*	*

* Signifies herbicidal activity: For specific rates please consult manufacturer's label.
NOTE: It is not intended that any suggested usage in this table be in violation with existing regulations or manufacturer's label:
ALWAYS COMPLETELY READ AND FOLLOW LABEL RECOMMENDATIONS.

Conclusion

Moist-soil management in the MAV has relied on physical and mechanical manipulations such as flooding and disking for managing plant communities (Fredrickson and Taylor 1982, Reid et al. 1999) . Given management constraints, such as inconsistent funding, land availability and vagaries of weather in the MAV, managers may not optimally manage for beneficial plants using disking and water management alone. Instead, we suggest combining these physical manipulations with selective herbicides such as 2,4-D. Research shows herbicides can cost effectively alter the existing plant community within and among years, removing problem species allowing the release of beneficial species (Getsinger et al. 1997).

As demand for land increases and production agriculture increases harvest efficiency; improved management of wetlands is critical to sustain carrying capacity of habitats for migrating and wintering waterfowl. The addition of selective herbicides can increase management efficiency, reduce problematic weed seed germination and production, and provide a larger window to complete management practices Habitat management and enhancement are at the core of waterfowl conservation (Bellrose 1976) and the use of herbicides can be a vital tool to use in current and future management practices.

Figure 2. Pre (left) and Post (right) treatment photos of 2,4-D on *Polygonum hydropiperoides*

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