



6-1-2007

## PB1752: Native Warm-Season Grasses

The University of Tennessee Agricultural Extension Service

Follow this and additional works at: [http://trace.tennessee.edu/utk\\_agexfora](http://trace.tennessee.edu/utk_agexfora)

---

### Recommended Citation

"PB1752: Native Warm-Season Grasses," The University of Tennessee Agricultural Extension Service, PB1752-2.5M-6/07 E12-4915-00-017-07, [http://trace.tennessee.edu/utk\\_agexfora/12](http://trace.tennessee.edu/utk_agexfora/12)

The publications in this collection represent the historical publishing record of the UT Agricultural Experiment Station and do not necessarily reflect current scientific knowledge or recommendations. Current information about UT Ag Research can be found at the [UT Ag Research website](#).

This Native Warm - Season Grasses is brought to you for free and open access by the UT Extension Publications at Trace: Tennessee Research and Creative Exchange. It has been accepted for inclusion in Forages by an authorized administrator of Trace: Tennessee Research and Creative Exchange. For more information, please contact [trace@utk.edu](mailto:trace@utk.edu).



\$35



# Native Warm-Season Grasses

Identification, Establishment and Management for  
Wildlife and Forage Production in the Mid-South

a manual for natural resource professionals  
and other land managers





# **Native Warm-Season Grasses**

## **Identification, Establishment and Management for Wildlife and Forage Production in the Mid-South**

**a manual for natural resource professionals  
and other land managers**

Craig A. Harper, Associate Professor/Extension Wildlife Specialist  
The University of Tennessee, Department of Forestry, Wildlife and Fisheries

Gary E. Bates, Professor/Extension Forage Specialist  
The University of Tennessee, Department of Plant Sciences

Michael P. Hansbrough, Private Lands Biologist  
USDA Natural Resources Conservation Service

Mark J. Gudlin, Private Lands Liaison  
Tennessee Wildlife Resources Agency

John P. Gruchy, Research Associate  
The University of Tennessee, Department of Forestry, Wildlife and Fisheries

Patrick D. Keyser, Associate Professor/Center for Native Grasslands Management  
The University of Tennessee, Department of Forestry, Wildlife and Fisheries

© 2007 Craig Harper  
University of Tennessee Extension  
Institute of Agriculture  
Knoxville, Tennessee

ISBN 978-0-9795165-0-4

Produced by the Office of Marketing and Communications Services,  
University of Tennessee Institute of Agriculture  
Designed by Donna Hundley  
Edited by Wanda Russell

Printed by the University of Tennessee Graphic Arts Service

Corresponding Author:        Craig A. Harper  
  Dept of Forestry, Wildlife & Fisheries  
  University of Tennessee  
  Knoxville, TN 37996  
  charper@utk.edu  
  (865) 974-7346

Photos by authors except where noted.

Funding to support printing provided by:



# Contents

<b>Preface .....</b>	<b>vii</b>
<b>Introduction.....</b>	<b>ix</b>
Parts of a grass plant.....	x
<b>Ch. 1 Identification and description.....</b>	<b>1</b>
Big bluestem.....	1
Little bluestem .....	3
Broomsedge bluestem .....	5
Indiangrass .....	6
Switchgrass .....	7
Eastern gamagrass .....	9
Sideoats grama .....	11
Other native warm -season grasses .....	12
<b>Ch. 2 Using native warm-season grasses to enhance wildlife habitat.....</b>	<b>13</b>
Benefits of nwsg over other cover types.....	14
Using nwsg when wildlife is the primary objective.....	21
Using nwsg when wildlife is a secondary objective.....	30
Response of bobwhites to nwsg in USDA programs.....	32
Problems associated with perennial cool-season grasses.....	37
<b>Ch. 3 Using native warm-season grasses as forage for livestock.....</b>	<b>39</b>
Native warm-season grasses for hay .....	39
Native warm-season grasses for grazing.....	45
Landowner “testimonials” .....	54
<b>Ch. 4 Using native warm-season grasses for biofuels .....</b>	<b>59</b>
Production of switchgrass for biofuels.....	62
Harvesting switchgrass for biofuels.....	63
Alternative management strategies.....	64
The future.....	67

<b>Ch. 5 Establishment .....</b>	<b>69</b>
Evaluating the seedbank.....	69
Seed quality, germination and Pure Live Seed (PLS).....	73
A word about surfactants .....	76
Competition control .....	80
pH and fertilizer requirements.....	85
Planting techniques, timing, seeding depth and seeding rate .....	87
Troubleshooting tips when using a no-till drill .....	88
Recommended mixtures for wildlife and forages .....	92
Evaluating establishment success— what to expect.....	97
Checklist before planting nwsg .....	100
<b>Ch. 6 Managing native warm-season grasses and associated early-succession habitat.....</b>	<b>101</b>
Prescribed fire.....	102
Burning and disking to increase invertebrate availability.....	112
Firebreak management .....	113
Disking .....	120
Herbicides .....	125
Mowing and haying .....	135
<b>Conclusion .....</b>	<b>139</b>
<b>Acknowledgements .....</b>	<b>141</b>
<b>Appendix 1.....</b>	<b>143</b>
Use of early-succession fields containing native warm-season grasses and associated forbs by various wildlife species in the Mid-South region.	
<b>Appendix 2.....</b>	<b>149</b>
A brief description of USDA programs provided through the Natural Resource Conservation Service (NRCS) and Farm Service Agency (FSA)	
<b>Appendix 3.....</b>	<b>153</b>
Calibrating sprayers	
<b>Appendix 4.....</b>	<b>159</b>
Herbicides, rates, approximate applications, cost, and manufacturer information	

<b>Appendix 5.....</b>	<b>163</b>
Using no-till technology to establish nwsg	
<b>Appendix 6.....</b>	<b>169</b>
Approximate number of seed per pound for selected grass species	
<b>Appendix 7.....</b>	<b>171</b>
Sources of native warm-season grass seed	
<b>Appendix 8.....</b>	<b>173</b>
Glossary	
<b>Appendix 9.....</b>	<b>181</b>
Suggested reading and references	







## Preface

Native warm-season grasses (nwsg) have received a tremendous amount of attention since the early 1990s, especially among wildlife managers trying to enhance habitat for northern bobwhites, grassland songbirds and other early-successional species. During this time, much work has been devoted to improving methods for establishment, identifying sound management practices and documenting the response of wildlife to habitat restoration efforts. Also noteworthy during this period is the interest nwsg have generated among forage and livestock producers. Research continues to show various nwsg are viable forage for hay production and grazing for several livestock species. This manual is intended to provide in-depth information on identifying, establishing and managing nwsg for natural resources professionals, forage and livestock producers and other landowners attempting to grow and manage nwsg either for wildlife and/or livestock.



## Introduction

Nwsg are grasses historically indigenous to an area that actively grow during the warm months of the year. In the Mid-South, that includes those warm-season grasses that occurred prior to European settlement. Many non-native grasses occur “naturally,” but that doesn’t mean they are native. Naturalized grasses originated outside a particular region, but are able to exist (and often thrive) in the wild (without cultivation) in self-perpetuating populations. Most naturalized grasses in the Mid-South were brought to North America from Europe (tall fescue, orchardgrass), Africa (bermudagrass, crabgrass) or South America (dallisgrass, bahiagrass) as a forage crop.

Grasses are classified as warm- or cool-season based on their chemical pathways for photosynthesis. Warm-season grasses fix energy into 4-carbon units and are referred to as C4 grasses. As a result, their photosynthetic potential is much higher than that of cool-season grasses. They make most of their active growth when minimum daily temperatures reach approximately 60 F and soil temperatures reach 55 F. The optimum temperature for warm-season grass production is 85 – 95 F. Nwsg are dormant during autumn and winter. Cool-season grasses fix energy into 3-carbon units and are referred to as C3 grasses. They make most of their active growth during fall and spring months when the minimum daily temperature is approximately 40 F. The optimum temperature for cool-season grasses production is 60 – 80 F. What this means is warm-season grasses grow more rapidly during a relatively short period, while cool-season grasses grow more slowly during a longer period.

Technically, the term nwsg could include numerous warm-season grasses native to the Mid-South region. Nonetheless, seven species are most commonly promoted for their value as cover for wildlife and/or forage for livestock. These include big bluestem, little bluestem, broomsedge bluestem, indiagrass, sideoats grama, switchgrass and eastern gamagrass. It is important to realize not all of these have the same quality for wildlife habitat or livestock forage. For example, broomsedge offers excellent nesting habitat for bobwhites, but poor forage for livestock.



# Parts of a grass plant

