



## Weed Science Society of America

---

Introduction and Spread of Johnsongrass in the United States

Author(s): C. G. McWhorter

Source: *Weed Science*, Vol. 19, No. 5 (Sep., 1971), pp. 496-500

Published by: [Weed Science Society of America](#) and [Allen Press](#)

Stable URL: <http://www.jstor.org/stable/4041684>

Accessed: 29/09/2014 15:48

---

Your use of the JSTOR archive indicates your acceptance of the Terms & Conditions of Use, available at <http://www.jstor.org/page/info/about/policies/terms.jsp>

JSTOR is a not-for-profit service that helps scholars, researchers, and students discover, use, and build upon a wide range of content in a trusted digital archive. We use information technology and tools to increase productivity and facilitate new forms of scholarship. For more information about JSTOR, please contact support@jstor.org.



*Weed Science Society of America* and *Allen Press* are collaborating with JSTOR to digitize, preserve and extend access to *Weed Science*.

<http://www.jstor.org>

# Introduction and Spread of Johnsongrass in the United States<sup>1</sup>

C. G. McWHORTER<sup>2</sup>

**Abstract.** An extensive search of the literature and records was conducted to determine when and how johnsongrass (*Sorghum halepense* (L.) Pers.) was introduced into the United States. Previous authors surmised that johnsongrass was imported from the Mediterranean area, but my search revealed that no agriculturist from the United States had worked in the Mediterranean region before 1840. Although Dr. James B. Davis assisted the Turkish Empire in cotton culture in the 1840's, there is evidence that johnsongrass was grown throughout the Southeast by 1830 if not before. Documentation of the initial introduction and distribution was hampered by the use of more than 40 common names for this weed in the nineteenth century. At least eight different Latin names were used to identify johnsongrass in the 1800's. The use of johnsongrass as a common name on a national basis resulted from a letter written by Herbert Post of Selma, Alabama, in 1874 to George Vasey, an employee of the U. S. Department of Agriculture in Washington. In 1880, John Haralson of Selma, Alabama, wrote to D. L. Phares of Woodville, Mississippi, that johnsongrass was the common name used in his area. These letters were published in the Monthly Report of the U. S. Department of Agriculture and in Farmers Book of Grasses, respectively; the wide attention that these received resulted in the common name of johnsongrass. The name was derived from that of William Johnson, a farmer of Marion Junction, Alabama, who presumably introduced it into Alabama. By the late nineteenth century, the presence of johnsongrass was almost nationwide. Many reports testify to the severity of the problem caused by this weed in the late 1800's. Its pernicious nature led to the first Federal appropriation specifically for weed control in 1900, and to the first report on johnsongrass control, prepared by C. R. Ball in 1902.

## INTRODUCTION

JOHNSONGRASS is one of the most harmful weeds in the world (15). One of the most troublesome of all plants introduced into the United States, it is costly to control (14, 21).

Early authorities believed that johnsongrass was native to the Mediterranean region from the Madeira islands to Asia Minor and southeastern Europe (23). They also believed that closely related forms originated in India, the Malay Peninsula, and the Philippines (23). Later authorities stated that johnsongrass was indigenous only to the Mediterranean region (26). Now it is generally agreed that johnsongrass was introduced into the United States early in the nineteenth century, but the exact date is unknown.

<sup>1</sup>Received for publication January 20, 1971. Cooperative Investigations of the S. Weed Sci. Lab., Plant Sci. Res. Div., Agr. Res. Serv., U.S. Dep. of Agr. and Delta Branch of the Mississippi Agr. and Forestry Exp. Sta., Stoneville, Mississippi.

<sup>2</sup>Plant Physiologist, Plant Sci. Res. Div., Agr. Res. Serv., U. S. Dep. of Agr., Stoneville, Mississippi 38776.

My interest in the introduction and distribution of johnsongrass resulted from research with various ecotypes collected throughout this country (20, 21). Research revealed no references, either to "Johnson grass"<sup>3</sup> or to *Sorghum halepense* in literature from the middle of the nineteenth century. The purpose of my research was to determine how the common name johnsongrass became adopted and to establish the approximate date of first introduction.

*Confusion with other grasses before development of the common name johnsongrass.* It is difficult to establish the presence of johnsongrass in the United States prior to 1875, because of the large number of names used for this species. At least eight different Latin names (4, 26) have been used for johnsongrass (Table 1). Over 40

Table 1. Various latin names used to identify johnsongrass\*.

Latin name	Abbreviated naming authority and reference
<i>Holcus halepensis</i> .....	Linn., Sp. Pl., ed. 1, 1047 (1753)
<i>Andropogon arundinaceus</i> .....	Scop., Fl. Carn. ed. 2, 274 (1772)
<i>Blumenbackia halepensis</i> .....	(Linn.) Koel., Descr. Gram. 29 (1802)
<i>Milium halepense</i> .....	(Linn.) Cav., Descr. Pl. 306 (1802)
<i>Sorghum halepense</i> .....	(Linn.) Pers. Syn. Pl. 1, 101 (1805)
<i>Andropogon sorghum</i> .....	(Linn.) Brot. Subsp. halepensis Hack. in DC., Monogr. Phan 6, 501 (1889)
<i>Andropogon halepensis</i> .....	(Linn.) Brot. var. genuinus (Hack.) Stapf in Hook. f., Fl. Brit. Ind. 7, 183 (1896)
<i>Andropogon halepensis</i> .....	(Linn.) Brot. var. typicus Asch. et Graebn. Syn. Mitteleur. Fl. 2, Abt. 1, 47 (1898)

\*From Bor (4) and Snowden (26).

common names have been used. Those used most commonly include guinea (or guineae) grass, false guinea grass, new guinea grass, true guinea grass, Samoa grass, Cuba grass, Egyptian grass, Means grass, Meanie grass, Alabama guinea grass, Georgia guinea grass, evergreen millet, Arabian millet, Egyptian millet, green valley grass, Australian millet, Morocco millet, Arabian evergreen millet, bankruptcy grass, St. Mary's grass, and Syrian grass. Names used most commonly before 1874 were guinea grass and Means grass. Use of this large number of scientific and common names makes it impossible to know the specific plant to which an author referred in the old literature. Even so, knowledge of the johnsongrass growth habit augments the belief that many of the early references of the common names mentioned above were actually made regarding *Sorghum halepense*.

Johnsongrass commonly grows 6 to 8-ft tall, spreads rapidly, and produces an extensive rhizome system (20); therefore, it is difficult to confuse with other species.

<sup>3</sup>Johnsongrass was usually written as Johnson grass until publication of the first report on standardization of common and botanical names of weeds by the Weed Sci. Soc. of Amer. in July 1960, when it was changed to Johnsongrass. In October 1966, this was changed to johnsongrass in a later subcommittee report by the Weed Sci. Soc. of Amer. Thus, Johnson grass is used in this manuscript only as a quotation or to illustrate the method of spelling from 1880 to 1960.

Plant descriptions written in the middle of nineteenth century that used the common names listed above so accurately described johnsongrass that it would be difficult to imagine that many of these descriptions were of any other grass.

In 1849, N. D. Smith of Washington, Arkansas, wrote that he had grown guineae grass for 7 years (25). He said that this grass was a native of Africa and was first imported from the island of Jamaica for bird seed. His plants "grew to a height of 8 feet and may be cut 4 feet high and 4 times in a season yielding 2 tons/acre at each cutting" (25). He also described propagation by root stocks. Such descriptions probably referred to johnsongrass because no other forage grasses that produce such massive growth are known in the Southeast. N. D. Smith and other authors in the middle of nineteenth century referred to Loudon's *Encyclopedia of Agriculture* for an illustration of the described grass. Loudon's *Encyclopedia* (19) neither illustrates nor describes *Sorghum halepense*; however, such mistakes are understandable, considering that the illustrations in old publications were from wood carvings. Wood-carved illustrations were of good quality for that period, but did not permit detail enough for accurate identification. Also, early publications did not provide adequate taxonomic notes.

In 1855, Dr. A. B. Crook stated that guinea grass looked "precisely like the Means grass"<sup>4</sup>. Dr. C. W. Howard claimed in 1875 "that which is ordinarily termed guinea grass, is the *Sorghum halepense*, by some persons also called the Means grass" (16). Statements of this type in the Commissioner of Patent Reports<sup>5</sup> and early reports of the U. S. Department of Agriculture suggest that the terms Means grass and guinea grass usually referred to johnsongrass.

The first written use of the name johnsongrass was made in 1874 by John Haralson of Selma, Alabama, in a letter to George Vasey (28, 29). This, and a subsequent letter from Herbert Post of Selma, Alabama, to D. L. Phares in Woodville, Mississippi, (22) were extremely important factors in the establishment of the common name johnsongrass, and in the development of the story by Ball (3) concerning its introduction. In his letter of 1874 (later reproduced by George Vasey) (28), John Haralson requested an identification and analysis of the grass sample he submitted and stated that it was known locally as Johnson Grass. He said it was also known as Cuba grass, guinea grass, and guinea corn, and added that "the name given it here is from the man who brought it to this country many years ago, whose name was Johnson—" (28). George Vasey acknowledged that this was *Sorghum halepense*. In 1875, George Vasey and Peter Collier published additional descriptions and chemical analyses (34).

<sup>4</sup>A. B. CROOK, "Essay on Southern Grasses", an address delivered before the South Carolina Institute in Charleston, South Carolina, in 1855. A copy is on deposit in the South Caroliniana Library, University of South Carolina, Columbia, South Carolina.

<sup>5</sup>Prior to the creation of the U. S. Department of Agriculture under the Administration of President Abraham Lincoln in 1862, agricultural reports were published in the Annual Report of the Commissioner of Patents.

In 1880, Herbert Post wrote to D. L. Phares and stated that he managed the original "Johnson farm" near Selma, Alabama, on which johnsongrass had grown for 40 years (22). He stated that this grass also was known as Cuba grass, guinea grass, Egyptian grass, and Means grass. Mr. Post claimed that:

"Governor Means of South Carolina obtained some of the seed from Turkey as early as 1835 where it was called guinea grass. He planted it on his plantation, where it is still called Means grass. In 1840 or 45, Mr. Johnson of this place being in South Carolina brought some of the seed with him and sowed it on his farm here, whence it derived the name Johnson grass, by which it is now most commonly called" (22).

D. L. Phares published this letter and added, "it seems pretty well agreed now however to call this Johnson grass and leave the name guinea grass for the *Panicum jumentorum* to which it properly belongs" (22). He emphasized that it should be known as johnsongrass by adding:

"—in many periodicals and books and in letters and in common usage this grass has been far more generally called guinea grass than the true guinea grass itself, thus causing vast confusion. It is therefore assuredly time to call each by its right name" (22).

Dr. Phares made two additional interesting claims: (a) that johnsongrass was grown in southwest Mississippi before 1830 and (b) that N. B. Moore of Augusta, Georgia, had grown johnsongrass before 1834 (22). These claims, in addition to that of N. D. Smith (25), would have placed johnsongrass in several states by the time it was reportedly first introduced into the United States according to Ball (3).

*The role of the Means family in the introduction of johnsongrass.* I attempted to verify the story, related by C. R. Ball in 1902 (3), regarding the introduction of johnsongrass, because hundreds of authors have cited him on this subject since 1902. It is pertinent, therefore, to quote from his introduction (3):

"Johnson grass was introduced into this country from Turkey about the year 1830—possibly a little later. It is said that Governor Means of South Carolina, received a request from the Sultan of Turkey to send someone to the Ottoman Empire to instruct the Turks in the art of raising cotton. When the man sent by Governor Means returned he brought with him from Turkey the seeds of a number of plants which were in cultivation there, and among them was a seed of the now famous Johnson grass. About the year 1840 Colonel William Johnson, the owner of a large plantation at Marion Junction, near Selma, Alabama, was on a visit to South Carolina, and on his return brought with him a quantity of Johnson Grass seed which he sowed on his farm in the fertile bottom lands of the Alabama River" (3).

I was aided in my research by three historical societies in South Carolina and by the other organizations listed under Acknowledgements. I was unable to find evidence that Gov. Means was associated with the introduction

of johnsongrass. An unpublished manuscript<sup>6</sup> provided considerable information on the Means family but did not furnish information that associated Governor Means with the original introduction of johnsongrass. Similarly, an investigation by the National Archives and Records Service<sup>7</sup> failed to reveal evidence that anyone was sent overseas on appointment with any relationship to agriculture prior to 1840. Thus, I was unable to find evidence to support Ball (3) that johnsongrass was first brought into the country by a farmer who was sent to assist the Ottoman Empire in cotton production.

If subsequent evidence proved that John H. Means sent a farmer to Turkey after becoming governor, it would have no direct relevance to the initial introduction. He did not become Governor of South Carolina until about 1855<sup>6</sup> and johnsongrass probably had been in the United States for several decades before that time. Even so, there was an association between johnsongrass and the Means family.

William Burney Means (brother of John H. Means) moved from South Carolina to Louisiana and, in letters, frequently asked John H. Means to also move<sup>6</sup>. John Means apparently wanted to move in 1850 and said that the offer was "very tempting" but that he would not move unless he could sell "my lands for any price that would be an inducement for me to sell, for the big grass has inspired such a terror that no one will even look at it"<sup>6</sup>. He continued, "when the grass runs me off, then I must seek a home in the West and then I will try to get near you"<sup>6</sup>. He was later elected Governor and volunteered for the Army of the Confederacy. He was killed in battle in Virginia<sup>6</sup>. The "big grass" that prevented sale of his property probably was johnsongrass.

Possibly C. R. Ball (3) and other authors felt that Governor Means sent someone to Turkey because a distant relative, James Bolton Davis, was engaged to go to Turkey. James Davis' trip was sponsored through the U. S. Department of State and not by Governor Means<sup>8</sup>. On his return from Turkey, James Davis introduced several plant species into the United States although their exact identity is unknown (8). A descendant of James Davis related a story told in her

<sup>6</sup>ELIZABETH D. ENGLISH. History of the Means Family. Unpublished manuscript on deposit in the South Carolina Library, University of South Carolina, Columbia, South Carolina. Miss English, a descendant of the Means family, owns several letters written by Governor John H. Means, a few of which are reproduced in her manuscript.

<sup>7</sup>In a letter dated April 27, 1967, Mr. Richard S. Maxwell, Acting Assistant Director of Social and Economic Record Division, National Archives and Records Service in Washington, D. C., related "the records of the Department of Agriculture in the National Archives include several volumes of letters received, reports and essays of the Agricultural Section of the Patent Office". "There is only one letter received for the period prior to 1840", but this letter did not concern travel of anyone to the Mediterranean area.

<sup>8</sup>In a letter dated June 23, 1965, Mr. W. Neil Franklin, Chief Diplomatic, Legal, and Fiscal Branch of the National Archives and Records Service in Washington, D. C., verified to Mrs. H. D. Carroll of Streetman, Texas, that Dr. James Bolton Davis and Dr. J. Lawrence Smith departed the United States in August 1846 after being engaged by the Secretary of State at the request of the Sultan of Turkey to proceed to Turkey to introduce the culture of cotton into his dominion. The sum of \$2500 was placed at their disposal by the Sultan for expenditures. Dr. Davis remained in Turkey until February 1849.

family for generations that James Davis "brought back fine Swiss watches packed in johnsongrass seed"<sup>9</sup> to protect the watches during shipment.

The earliest story concerning the initial introduction is related by Elizabeth English<sup>6</sup>. She cited Albert Beam as saying that Means grass was introduced by Thomas Means, the father of John H. Means, when he ordered hemp seed from Egypt soon after the Revolutionary War. Soon after its introduction on the Means Plantation in Fairfield County, South Carolina, it became known as Egyptian grass, Means grass, and the damned Means grass<sup>6</sup>. Elizabeth English also presented a possible relationship between the Means family and the Mr. Johnson for whom johnsongrass was named<sup>6</sup>. Isabella Means Foote, a sister of Thomas Means, had two daughters who became the first and second wives of Burr Johnstone. After his marriage he moved to Alabama and perhaps, according to Elizabeth English, was the Mr. Johnson for whom johnsongrass was named<sup>6</sup>.

*Other possible sources of introduction or distribution.* Individual farmers also introduced new plants into the United States. In 1849, Thomas Affleck, a farmer in Georgia, reported that he had imported over 40 kinds of grasses from Europe (1). He said that guinea grass was one of the most promising.

In the formative years of the U.S. Department of Agriculture, other governmental agencies introduced foreign plant material. In 1873, Frederick Watts wrote that the United States Consul at Kingston, Jamaica, purchased guinea grass seed for shipment into the United States (35). He compared the description of this grass to guinea grass in Arkansas (25). Most likely the grass he described was johnsongrass.

Many individuals could have introduced johnsongrass seed throughout the nineteenth century because people traveled freely and there were no early quarantines on the introduction of plant material. Passports were not required for private citizens to travel from the United States until World War I with the exception of a brief period during the Civil War<sup>7</sup>.

Johnsongrass and other weed seed could have been distributed as contaminants in the free exchange of crop seed among and by agricultural organizations during the late-nineteenth century. An early law, for example, charged the U. S. Commissioner of Agriculture with the responsibility of distributing seeds to agriculturists on an invitational basis (18). Much of this responsibility was assumed by members of Congress who dispersed over 600,000 seed samples in a single year (18). Most of these were to farmers and gardeners for private use. During the same 1-year period the Seed Division of the U.S. Department of Agriculture distributed over 1.1 million seed samples (including those distributed by Congressmen). These included wheat, oats, barley, broom-corn, grasses, rice, millet, sorghum, and others from which it would have been exceedingly difficult to remove johnsongrass or other contaminating seeds with the technology available in the 1870's (Table 2). Free

<sup>9</sup>Mrs. H. D. Carroll of Streetman, Texas, related in a letter dated March 9, 1966, that James Bolton Davis used johnsongrass seed to pack and protect fine Swiss watches on his return to the United States from Turkey.

McWHORTER : INTRODUCTION OF JOHNSONGRASS

Table 2. Brief summary of seed samples distributed by the Seed Division of the U.S. Department of Agriculture from July 1, 1877 to June 30, 1878<sup>a</sup>.

Seeds distributed	Distribution outlets for seed samples					Total
	Members of Congress	Agricultural societies	Statistical correspondents	Granges	Misc.	
			(No. of Samples)			
Vegetables...	420,856	43,157	52,535	0	152,786	669,334
Flowers.....	132,368	40	0	0	69,189	201,597
Wheat.....	7,823	13,204	16,004	1,358	12,287	50,676
Oats.....	3,144	4,648	6,064	0	3,309	17,165
Barley.....	1,250	2,164	8,248	1,614	1,443	14,719
Rye.....	694	98	5,436	0	958	7,186
Broom-Corn	1,358	24	0	0	239	1,621
Grass.....	3,051	0	5,248	0	3,689	11,988
Millet.....	356	0	0	0	0	356
Sorghum.....	3,313	28	0	1,610	2,784	7,735
Total of 20						
Others.....	61,317	7,930	26,856	9,552	27,854	133,509
Grand totals.	635,530	71,293	120,391	14,134	274,538	1,115,886

<sup>a</sup>These data are summarized from information on p. 38 of LeDuc (18).

samples in 1877 to 1878 (18) also included opium poppy (343 samples), tea (1,304 samples), hemp (339 samples), and chufa nuts (perennial sedges) (7,860 samples) (18).

I did not review the old seed records concerning importations before reorganization made plant introduction a function of the Division of Botany, Section of Seed and Plant Introduction, in 1897-98. After reorganization there are several entries of johnsongrass seed from Russia in Inventory Number 1 (1898). In subsequent inventory lists, there are dozens of cases of johnsongrass being brought into this country from many foreign countries.

It seems likely that the Civil War aided in the distribution of johnsongrass throughout the South. Cavalry forces for both the Union and the Confederacy fed off the land and could have transported johnsongrass throughout the entire Southeast. Johnsongrass was established in the Selma, Alabama, area before the Civil War. Selma was a major ammunition depot for the Confederacy. The largest mounted group formed during the Civil War was assembled to destroy Selma as an important munitions base (7). According to Bruce Catton (7), General Wilson commanded 13,000 mounted men for this mission, but according to Clifford Dowdey (11), Wilson had 22,000 men. A substantial supply of hay would have been required during even a brief visit to Salem. Johnsongrass seed could have been dispersed in the hay and by way of the digestive tract of the horses over an area of several thousand square miles after leaving.

Johnsongrass apparently was spread to some extent on recommendation of authorities who suggested the planting of johnsongrass rhizomes to help reclaim "worn out" fields that eroded severely while fallowed during the Civil War (2).

By the latter part of the nineteenth century, johnsongrass had been widely distributed throughout the country. Between 1880 and 1895 it was grown in Kansas, Utah (31), Texas (30), New Mexico, California, Iowa, Nebraska (33), Michigan (10), Montana (32), Wyoming (6), and South Dakota (24) in addition to all the southeastern states. Johnsongrass probably spread rapidly because of the availability of seed after the Civil War. In 1887 George Vasey stated that "Johnson Grass seed may be obtained of nearly all seedsmen under that name" and cited Hiram Sibley and Company of Chicago, Illi-

nois, as selling johnsongrass seed in Nebraska and Iowa (33).

Other reasons given for the widespread distribution of johnsongrass were flooding of low-lying areas and transportation of contaminated small grains or baled hay. Johnsongrass seed escaped from railroad box cars causing general distribution along rights-of-way. Johnsongrass created a severe weed problem in Texas where rust-proof oats were produced for sale outside the state. These oats were "largely raised on land where Johnson grass was flourishing" (3).

Farmers in Texas in the 1890's demanded public action against johnsongrass, resulting in passage of Texas House Bill 173 by the 24th Texas Legislature in 1895 (3). This bill made "it a penal offense for any person in this State to unlawfully sow, scatter or place on land not his own the seed or roots of Johnson grass or Russian thistles, or willfully or knowingly sell or give away hay, straw, oats, or grain containing or intermixed with the seeds or roots of Johnson grass" (3). Those violating the law were guilty of a misdemeanor and "punished by fine of not less than \$25 or not more than \$1000" (3). Additional action was taken by the 27th legislature of Texas in 1901 with passage of House Bill 470 which was to "prohibit railroad and railway companies or corporations in this State from permitting Johnson grass or Russian thistles from going to seed upon their right of way, and fixing a penalty" (3).

The pernicious nature of johnsongrass was demonstrated after it was introduced to the island of Samoa by the author Robert Louis Stevenson (27). It was introduced to Guam as Samoa grass. After several years of research on Guam it was reported in 1910 that "it had thus far shown no superiority over other species" but because of "its tendency to spread and hold the ground even under cultivation it will not be distributed for general planting until its habits in Guam are better known" (27). Even with this vigilance it was reported in 1922 that johnsongrass was "the worst weed" on Guam (5).

Employees in the U.S. Department of Agriculture recognized that johnsongrass was a severe weed and stated in 1896 that it was one of the six weeds about which they received the greatest number of complaints (9). They hoped to initiate research to control johnsongrass but acknowledged in 1900 that:

"the new lines of work called for in the last appropriation bill, that is, experiments and reports on the best method of extirpating Johnson grass and the investigations of animal foods, have been begun in a preliminary way, but as no additional funds were provided, the work can not be properly undertaken until suitable appropriations are made" (17).

Funds were appropriated in 1900<sup>10</sup> and the proposed research was described in 1901 (12). This was apparently the first Federal appropriation for weed control research and led to the summary on johnsongrass control by C. R. Ball in 1902 (3).

B. T. Galloway acknowledged in 1904 that "Johnson grass is the worst weed in the South" (13). Perhaps it is

<sup>10</sup>House Bill No. 121, 56th Congress, first session, making appropriations for the Department of Agriculture.

still the worst weed in the South. Federal and state agencies and industry have cooperated to provide a number of practices and techniques for johnsongrass control, but no system has been developed to eradicate this pest economically.

## ACKNOWLEDGMENTS

I gratefully acknowledge the assistance of many individuals who contributed considerable time to this literature research. Special thanks are extended to Mrs. Granville T. Prior, Secretary of the South Carolina Historical Society, Charleston, South Carolina; Mr. W. B. Patrick, Vice President of the Fairfield County Historical Society, Windsboro, South Carolina; Mr. Charles E. Lee, Director of the South Carolina Archives Department, Columbia, South Carolina; Dr. E. L. Inabinett, Director of the South Carolinana Library, University of South Carolina, Columbia, South Carolina; Miss Elizabeth D. English, Presbyterian Home, Summerville, South Carolina; Mrs. H. D. Carrol, Streetman, Texas; and to the National Archives and Records Service, Washington, D.C. Appreciation is expressed also to Mrs. W. L. Barrentine who reviewed several hundred of the earlier reports issued by the Commissioner of Patents and the U.S. Department of Agriculture.

## LITERATURE CITED

- AFFLECK, THOMAS. 1850. Hay—Essay on grasses for the South. p. 156. *In* The Report of the Commissioner of Patents for the Year 1849, Part II. Agriculture (Washington, D.C.).
- ANONYMOUS. 1889. Alabama Agr. Exp. Sta. Bull. 6 (New Series). 7 p.
- BALL, CARLETON R. 1902. Johnson Grass: Report of investigations made during the season of 1901. U. S. Dep. of Agr., Bur. of Plant Ind. Bull. 11. 24 p.
- BOR, N. L. The grasses of Burma, Ceylon, India, and Pakistan, excluding Bambuseae. Pergamon Press, New York. 767 p.
- BRIGGS, GLENN. 1922. Sorghums in Guam. Guam Agr. Exp. Sta. Bull. 3. Washington. 144 p.
- BUFFUM, B. C. 1893. Grasses and forage plants. Wyoming Exp. Sta. Bull. 16. 28 p.
- CATTON, BRUCE. 1965. Never Call Retreat. (Centennial History of the Civil War, Vol. 3). Doubleday, Garden City, N. Y. 433 p.
- CLARK, W. A., W. G. HINSON, and D. P. DUNCAN. 1916. James Bolton Davis, p. 223-229. *In* History of the State Agricultural and Mechanical Society of South Carolina (1839-1845). R. L. Bryan Co., Columbia, S.C.
- COVILLE, FREDERICK V. 1896. Weed investigations, p. 96-97. *In* Ann. Rep. of the Secretary of Agr. (U.S. Government Printing Office, Washington).
- COZIER, A. A. 1894. Millet. Michigan Agr. Exp. Sta. Bull. 117. 64 p.
- DOWDEY, CLIFFORD. 1960. The land they fought for: The South as the Confederacy. Doubleday, Garden City, N.Y. 385 p.
- GALLOWAY, B. T. 1901. Extermination of johnson and other noxious grasses, p. 73. *In* Ann. Rep. of the U.S. Dep. of Agr. (U.S. Government Printing Office, Washington).
- GALLOWAY, B. T. 1904. Johnson grass, p. 128-129. *In* Ann. Rep. of the U.S. Dep. of Agr. (U.S. Government Printing Office, Washington). 560 p.
- HAMILTON, K. C. 1969. Repeated, foliar applications of herbicides on johnsongrass. *Weed Sci.* 17:245-250.
- HOLM, L. 1969. Weed problems in developing countries. *Weed Sci.* 17:113-118.
- HOWARD, C. W. 1875. A manual of the cultivation of the grasses and forage plants at the South. Walker, Evans, and Cogswell, Charleston, S.C. 30 p.
- LAMSON-SCRIBNER, F. 1900. New lines of work, p. 89-90. *In* Ann. Rep. of the U.S. Dep. of Agr. (U.S. Government Printing Office, Washington).
- LEDUC, WILLIAM G. 1897. Distribution of seeds, p. 32-38. *In* Ann. Rep. of the Comm. of Agr. for 1878. (U.S. Government Printing Office, Washington).
- LOUDON, J. C. 1844. An Encyclopedia of Agriculture, 5th ed. Longman, Brown, Green, and Longmans, London. 1375 p.
- MCWHORTER, C. G. 1971. Growth and development of johnsongrass ecotypes. *Weed Sci.* 19:141-147.
- MCWHORTER, C. G. 1971. Control of johnsongrass ecotypes. *Weed Sci.* 19:229-233.
- PHARES, D. L. 1881. Farmers Book of Grasses. J. C. Hill Printing Co., Starkville, Miss. 148 p.
- PIPER, CHARLES V. 1928. Cultivated grasses of secondary importance. U.S. Dep. of Agr. Farmers Bull. 1433. 42 p.
- SHEPHERD, J. S. and T. A. WILLIAMS. 1895. Native and introduced forage plants in South Dakota. South Dakota Agr. Exp. Sta. Bull. 40. 208 p.
- SMITH, N. D. 1850. Hay, p. 293. *In* the Agricultural Report for 1849, Report of the Commissioner of Patents (Washington, D.C.).
- SNOWDEN, J. D. 1936. The Cultivated Races of Sorghum. Adlard and Som, Ltd., London. 240 p.
- TRUE, A. C. 1910. Report of the Director of the Office of Experiment Stations (Guam Station), p. 756. *In* The Ann. Rep. of the U.S. Dep. of Agr. for the year ending June 30, 1910. (Government Printing Office, Washington, D.C.).
- VASEY, GEORGE. 1875. Johnson grass, p. 379-380. *In* Monthly Report of the U.S. Dep. of Agr. for August and September, 1874 (Botanical Notes). (U.S. Government Printing Office, Washington).
- VASEY, GEORGE. 1875. Johnson grass, p. 158. *In* the Report of the Botanist, Monthly Reports of the U.S. Dep. of Agr. for the Year 1874. (Washington, D.C.).
- VASEY, GEORGE. 1882. Johnson Grass, p. 239-240. *In* the Report of the Botanist Ann. Rep. of the Comm. of Agr. for 1881-1882. (U.S. Government Printing Office, Washington).
- VASEY, GEORGE. 1884. The agricultural grasses of the United States. U.S. Dep. of Agr. Rep. 32. Washington. 144 p.
- VASEY, GEORGE. 1885. Johnson Grass in Montana, p. 74-75. *In* the Report of the Botanist, U.S. Agr. Rep. for 1885. (Washington, D.C.).
- VASEY, GEORGE. 1887. Special grasses and forage plants for the South and Southwest—Johnson Grass, Sorghum Halepense, p. 15-18 of Bull. 3. *In* Special Reports, Misc., and Statistical (Vol. 14) of the U.S. Dep. of Agr. (U.S. Government Printing Office, Washington).
- VASEY, GEORGE and PETER COLLIER. 1879. Report of the Botanist and Chemist on grasses and forage plants, p. 168-169. *In* the Ann. Rep. of the U.S. Comm. of Agr. for 1878. (U.S. Government Printing Office, Washington).
- WATTS, FREDRICK. 1873. Grasses-tests of the Department on Seeds, p. 237-240. *In* the Rep. of the U.S. Comm. of Agr. for the year 1873 (Washington, D.C.).