THE PANICOIDEAE OF MICHIGAN

Thesis for the Degree of M. S.

MICHIGAN STATE COLLEGE

Thomas Henry Paton Marshall

1952

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THE PANICOIDEAE OF MICHIGAN

By

Thomas Henry Paton Marshall

AN ABSTRACT

Submitted to the School of Graduate Studies of Michigan
State College of Agriculture and Applied Science
in partial fulfillment of the requirements
for the degree of

MASTER OF SCIENCE

Department of Botany and Plant Pathology

Year 1952

Approved Charles L. Gilly

Thomas Henry Paton Marshall

The purpose of this report is to present a modern floristic treatment of the subfamily Panicoideae (Gramineae) as it occurs in Michigan. The genera considered are Setaria, Cenchrus, Echinochloa, Digitaria, Leptoloma, Paspalum, Panicum, Andropogon, Sorghum, Sorghastrum and Tripsacum. The genera Pennisetum and Zea are also included because, although they are not a persistent part of the state flora, they may be encountered occasionally as escapes from cultivation.

Specimens from the herbaria of Michigan State College, Cranbrook Institute of Science, Division of Botany and Plant Pathology of the Canadian Department of Agriculture, Houghton Lake Wildlife Experiment Station, Michigan State Normal College, University of Michigan, University of Notre Dame and Western Michigan College were examined. The "Manual of the Grasses of the United States", edition 2, by A. S. Hitchcock and A. Chase (1951) was used as a basis for identification of specimens. Other manuals and papers were consulted for additional information.

Approximately 1900 specimens, representing 11 genera and 63 species were examined.

All available publications on the flora of Michigan, beginning with J. Wright's catalogue (1839), were searched for references to the Panicoideae in the state. The only important state-wide publication on the Michigan flora is

that of W. J. Beal (1904), in which numerous members of the Panicoideae are listed.

Keys to the tribes, genera and species of Michigan Panicoideae are included in this report. They are designed especially for the Michigan taxa and were adapted from the keys in the Manual by Hitchcock and Chase. Each species is individually treated. Following the currently accepted binomial is a list of synonyms, a brief note on habitat and data on collections and unconfirmed reports. A distribution map is included for each species at the end of the report.

The Michigan Panicoideae may be divided into six groups based on distribution. These groups are: species of statewide distribution; species of the southern half of the lower peninsula with scattered distribution in the upper peninsula; species of the entire lower peninsula; species of the southern half of the lower peninsula; species of restricted distribution or of rare occurrence; introduced weeds or waifs.

A cumulative map showing the number of species per county is also included in the report.

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The author wishes to express his thanks to Dr. Charles L. Gilly, under whose direction this study was undertaken. In recognition of his unfailing interest and generous assistance these results are hereby dedicated to him.

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He also wishes to thank Dr. Rogers McVaugh of the University of Michigan for his hospitality and encouragement while studying the materials at the University of Michigan Herbarium.

He wishes to thank all the curators who made available for study the collections of Michigan Panicoideae from their several herbaria.

Thanks are also due to Mr. Philip G. Coleman for his help in making the photographic reproductions of the maps, to Mr. M. L. Guenther for assistance with one of the maps, and to Drs. G. B. Wilson, H. T. Darlington, L. H. Harvey, and others for their helpful suggestions and assistance of various kinds.

INTRODUCTION

The subfamily Panicoideae is the smaller of the two subfamilies in the family Gramineae. It consists of the three tribes, Paniceae, Andropogoneae, and Tripsaceae. The Paniceae comprise the most primitive of these three taxa and, according to Bews (1929), are probably derived from the Bambuseae. They are, in the main, tropical or subtropical grasses which are found in habitats ranging from marshes to fairly dry sandy locations. The Andropogoneae, derived from the Paniceae and having more advanced characteristics, form another group which is primarily tropical and subtropical. They reach their greatest floristic importance in the drier savannas of those regions and extend into similar habitats in the Northern Hemisphere. The third tribe, the Tripsaceae, is considered by some authors to be merely a subtribe under the Andropogoneae. It is a small group of highly specialized monoecious grasses, again primarily of tropical and subtropical distribution with a few temperate zone outliers.

In general, the Gramineae are a difficult group taxonomically and the Panicoideae are probably the most difficult members of the family because of their high degree of specialization. The problem is further complicated in Michigan by the fact that only the fringe members of the subfamily are to be found here.

HISTORICAL BACKGROUND

The historical study of the Panicoideae in Michigan began, as indeed did all floristic studies in Michigan, with the publication of John Wright's catalogue (1839). In this work fifteen taxa of the subfamily were listed as occurring in the two southernmost tiers of counties. Subsequent to this publication, and as a result of more extensive collection, numerous catalogues and lists were published. Some of these were local floras and some were general statewide treatments. The more important of these were published by E. C. Almendinger (1876), W. J. Beal and C. F. Wheeler (1892), E. J. Cole (1901), F. P. Daniels (1904), C. A. Davis (1898, 1900), C. K. Dodge (1900) and N. H. Winchell (1861).

In 1904 Dr. W. J. Beal published his "Michigan Flora". This annotated checklist was a compilation of floristic data from several herbaria in the state, from lists of local flora furnished by various contemporary botanists, and from previous publications. A supplement was published a few years later by Dr. Beal (1908). Although leaving much to be desired as regards completeness, and both nomenclatural and distributional accuracy, these two publications are still the only sources of information on the

flora of the state as a whole. In these two papers are found the names of forty-one of the Panicoideae known to occur, or reported to occur, in Michigan.

During the forty-four years that have elapsed since the publication of the supplement to "Michigan Flora", the knowledge of the vegetation of the state has been extended by both more extensive and more intensive collecting which have resulted in a great increase in the number of records and specimens on deposit in various herbaria. Several important groups of plants have been the subject of study by botanists in the state and many reports of the flora of different localities within the state have been published. Among the more important of these are county or regional floras by M. T. Bingham (1945), H. T. Darlington (1921, 1923), C. K. Dodge (1921a, b, c, d), C. R. and F. N. Hanes (1947), and B. A. Walpole (1924). Numerous other papers which contain references to members of the Panicoideae in Michigan are cited in subsequent pages of this report and in the bibliography.

One important group of Michigan plants, which has not been reported upon from the floristic point of view is the grasses. This is unfortunate, since in all of the adjoining states -- Ohio, Indiana, Illinois, and Wisconsin -- the patterns of distribution are known, either as the result of general floristic or specialized agrostological publications.

It seems indeed strange that W. J. Beal, although he was the author of "Grasses of North America" (1896), never published a similar work on the grasses of Michigan.

MATERIALS AND PROCEDURES

To obtain information to fill in at least a portion of the distributional pattern for the grasses of Michigan, a study of the widely scattered literature references and an examination of herbarium voucher speciamens was undertaken.

In making this study the available published literature was searched for referenoes to the occurrence of Panicoideae in Michigan. The bibliography published by H. T. Darlington in his "Taxonomic and Ecological Work on the Higher Plants of Michigan" (1945) was extremely valuable as a guide to the pertinent publications. Another source for reports of occurrence of these grasses is the unpublished card file (Michigan State College, 1950) in the Beal-Darlington Herbarium, Michigan State College. This is a valuable source since it contains records of determinations of plants sent in for identification and frequently these are from areas not covered by published reports. A letter from Dr. Albert DeLisle (1951) contained information on a number of collections in southwestern Michigan.

All of the mounted and unmounted specimens of Panicoideae in the Beal-Darlington Herbarium were examined as were all of the specimens loaned to the author by the curators of

the herbaria at the following institutions: Cranbrook Institute of Science, Bloomfield Hills, Michigan; Division of Botany and Plant Pathology, Department of Agriculture, Ottawa, Ontario, Canada; Houghton Lake Wild Life Experiment Station, The Heights, Michigan; Michigan State Normal College, Ypsilanti, Michigan; University of Michigan, Ann Arbor, Michigan; University of Notre Dame, Notre Dame, Indiana; and Western Michigan College, Kalamazoo, Michigan. In addition, the author spent several days at the University of Michigan studying certain materials in the herbarium. The herbaria of Albion College, Albion, Michigan and C. F. and R. N. Hanes, Schoolcraft, Michigan, were not examined because of lack of time and finances.

Altogether, approximately 1900 specimens were examined in the preparation of this treatment of Michigan Panicoideae.

COMMENTS ON HABITATS AND DISTRIBUTION

Habitats

The Panicoideae are generally considered to be plants of sandy, sterile, open ground. This generality holds true for the majority of the species found in Michigan. Although habitat notes are given for each species in the taxonomic portion of this report, it seems appropriate to mention here a few species found in habitats which are markedly different than that which is usual for the subfamily.

There are a few species which are usually found in wet places, bogs, marshes, edges of streams and lakes, and other similar spots. These include: Echinochloa walteri, Panicum agrostoides, Panicum dichotomiflorum, Panicum implicatum, Panicum lucidum, Panicum microcarpon, and Panicum spretum.

Moist locations with fairly good soil, such as the edges of woods, are the habitat of another group, including: Panicum boreale, Panicum clandestinum, Panicum flexile, Panicum oligosanthes, Panicum tennesseense, and Tripsacum dacyloides.

Notable among the typical woodland species are: Panicum ashei, Panicum boscii, Panicum commutatum, and Panicum latifolium.

Distribution

The distribution of the Panicoideae in the immediately adjoining states and in the United States as a whole is well known and this information is readily available in a number of publications (C. C. Deam, 1929, 1940; M. L. Fernald, 1950; N. C. Fassett, 1951; A. S. Hitchcock and A. Chase, 1951; G. N. Jones, 1945; J. H. Schaffner, 1932). Therefore, it was not considered necessary to include this information for each species in this treatment.

In addition to the detailed listing of specimens in the taxonomic portion of this treatment, a series of maps (Maps 2-64) was prepared to show the distribution of each species. On these maps the presence of the species was indicated for each county and island from which a specimen was examined; literature reports, not confirmed by specimens, are not indicated on these maps. A summary, by counties, of the known distribution within Michigan is also included (Map 1).

Distributional Patterns

An examination of the distribution maps of Michigan Panicoideae included in this report reveals several more or less distinct patterns of distribution. These may be designated as follows:

1. Species of statewide distribution.
2. Species of the southern half of the lower peninsula, with scattered distribution in the upper peninsula.
3. Species of the entire lower peninsula.
4. Species of the southern half of the lower peninsula.
5. Species of restricted distribution or of rare occurrence.
6. Introduced weeds or waifs.

It is of interest to note that no species is restricted to the upper peninsula; this is as expected because of the tropical-subtropical affinities of the subfamily.

The delimitation of the groups of species representative of each of the patterns is, of course, somewhat arbitrary and is based on the specimens which the author has examined. As will be brought out later in this report, the collecting in Michigan has been lamentably insufficient, and serious errors in the distributional pattern of individual species may be attributable to this cause. The author does not wish to speculate at this time on possible causes for the distributional patterns which are shown here, since such speculation should be based on a consideration of a much larger segment of the state flora. However, in the

following paragraphs the general distribution of the species assigned to each of the pattern-groups will be mentioned.

Species of statewide distribution. These species all have general distributions, in which Michigan is well included, running from Maine or Nova Scotia in the east to Wisconsin, Minnesota or farther west, and thence southward. Included in this group are the following seventeen species:

Andropogon gerardii
" scoparius
Cenchrus pauciflorus
Panicum boreale
" capillare
" depauperatum
" huachucae
" implicatum
" linearifolium
Panicum meridionale
" pseudopubescens
" subvillosum
" tsugetorum
" virgatum
" werneri
" xanthophysum
Sorghastrum nutans

Species of the southern half of the lower peninsula with scattered distribution in the upper peninsula. These species, in part, have the same general distributions as those of the preceding group. Some of the species have slightly more southern patterns, however, so that Michigan representatives are on or near the northern edge of their range. This pattern, in some instances, suggests the possibility that the upper peninsula distribution has arisen as a result of an incursion from Wisconsin. On the other hand, it may be only indicative of the relatively small amount of

collecting in much of the northern half of the lower peninsula. Eight species are included in this group as follows:

Panicum clandestinum	Panicum flexile
" columbianum	" perlongum
" dichotomiflorum	" praecocius
" dichotomum	" scribnerianum

Species of the entire lower peninsula. These species also have essentially the same general distribution as the first group. The four following species are in this group:

Panicum latifolium	Panicum tennesseense
" lindheimeri	" villosissimum

Species of the southern half of the lower peninsula. The general distributions of these species are such that Michigan lies very close to the northern edge or is actually on the northern limit of their range. In Michigan these species extend northward as far as a line running westward from the southern end of Saginaw Bay. This group consists of the following nine species:

Echinochloa walteri	Panicum oligosanthes
Leptoloma cognatum	" philadelphicum
Panicum agrostoides	" sphaerocarpon
Panicum commutatum	Paspalum pubescens
" leibergii	

Species of restricted distribution or of rare occurrence. Most of these species occur here on the limit of their

range or as outliers separated from their main distributional areas. None of these species are represented by specimens from more than three counties. Species which apparently are confined to the southeastern or southwestern sections of the lower peninsula are so indicated by parenthetical abbreviations just below. Fourteen species are included:

Andropogon virginicus (S.W.)
Digitaria filiformis (S.W.)
Panicum addisonii
" albemarlense
" ashei
" barbulatum (S.W.)
" bicknellii (S.E.)
Panicum boscii
" commonsianum (S.W.)
" deamii (S.W.)
" lucidum (S.E.)
" microcarpon (S.E.)
" spretum
Tripsacum dactyloides (S.E.)

Tripsacum dactyloides perhaps should be included in the next group since both specimens seen were collected along railroads and the distribution given for the species by Cutler and Anderson (1941) is more southern.

Introduced weeds or waifs. This group consists of eleven species which have become naturalized or have been collected as escapes from cultivation. The species are:

Digitaria ischaemum
" sanguinalis
Echinochloa colonum (rare)
" crusgalli
Panicum miliaceum
Setaria italica
Setaria lutescens
" verticillata
" viridis
Sorghum halepense
" vulgare

TAXONOMIC TREATMENT

Nomenclatural Considerations

The basis of the taxonomic treatment of the genera and species included in this study has been the Manual of the Grasses of the United States, ed. 2 (Hitchcock and Chase, 1951). The nomenclature used herein is essentially in accordance with this manual. However, since the eighth edition of Gray's Manual (Fernald, 1950) is so widely used, a comparison of the nomenclature of the two volumes is of interest to workers in agrostology. The nomenclature of the taxa found in Michigan, accepted by Fernald, agrees with Hitchcock and Chase except as indicated in the following list; the name used by Fernald is given first in each case, followed by the equivalent name used both in Hitchcock and Chase and in the present treatment.

Cenchrus longispinus (Hack.) Fern. = *C. pauciflorus* Benth.

Panicum columbianum Scribn. = *P. tsugetorum* Nash

" *commonsianum* var. *addisonii* (Nash) Fern. = *P. addisonii* Nash

" *commutatum* var. *ashei* (Pears.) Fern. = *P. ashei* Pears.

" *dichotomum* var. *barbulatum* (Michx.) Wood = *P. barbulatum* Michx.

Panicum lanuginosum var. fasciculatum (Torr.) Fern., in part = P. huachuchae Ashe

" lanuginosum var. fasciculatum (Torr.) Fern., in part = P. tennesseense Ashe

" lanuginosum var. implicatum (Scribn.) Fern. = P. implicatum Scribn.

" lanuginosum var. lindheimeri (Nash) Fern. = P. lindheimeri Nash

" oligosanthes var. scribnerianum (Nash) Fern. = P. scribnerianum Nash

" villosissimum var. pseudopubescens (Nash) Fern. = P. pseudopubescens Nash

" wilcoxianum Vasey, in part = P. deamii Hitchc. and Chase

Paspalum ciliatifolium var. muhlenbergii (Nash) Fern. = P. pubescens Nash

Setaria glauca (L.) Beauv. = S. lutescens Weig.

The names listed above from Gray's Manual, together with other synonyms applied to Michigan Panicoideae by various authors and collectors, have been included under the currently accepted names. The synonymy also includes the names of varieties that the author believes do not merit separate consideration for various reasons. The list of synonyms given for a particular species is generally not complete, but all of the names which the author has found applied to Michigan species and has been able to assign to their correct places are included. While tracing synonymy many references in addition to Hitchcock and Chase were consulted. Some of the more important of these references are: W. J. Beal (1896),

N. L. Britton and A. Brown (1898), A. Chase (1906, 1908a, 1908b, 1911), J. T. Henrard (1951), A. S. Hitchcock (1915, 1931), F. Lamson-Scribner (1888, 1900a, 1900b, 1901a), and G. V. Nash (1909, 1912, 1915).

The problem of recognition of varieties was considered by the author during the earlier phases of the study. As more and more specimens were examined, it became apparent that one could only recognize these varieties by erecting arbitrary and artificial limits. Since the concept of a species as currently held by this writer is broad enough to allow for a certain degree of natural variability, he was unwilling to recognize a series of subspecific entities in a group already burdened with taxa of specific rank.

The keys which the author uses are especially designed for the Michigan taxa. They were adapted, with a minimum of alteration, from those found in edition 2 of the "Manual of the Grasses of the United States". This author found them quite satisfactory and can find no legitimate reason to drastically alter them.

Doubtfully and Erroneously Reported Species

A number of references to species that apparently do not occur in Michigan were found in the literature. In some cases it was possible, by examination of specimens, to attribute such reports to misidentification. Other reports

were for species which might possibly occur in Michigan, but for which no corroborating specimens were seen by the author. The status of such species must remain doubtful until voucher specimens are obtained.

These doubtful or erroneously reported species have been excluded from the keys and species lists in this paper. A list of the excluded species, with remarks concerning them, follows the treatment of each genus for which they have been reported.

Numerical Summary of Genera and Species

Thirteen genera were included in this study for the sake of completeness, although two of them cannot be said to constitute a persistent part of the flora of the state. Approximately 1900 specimens were examined which represented 11 genera and 63 species. W. J. Beal (1904) included eight genera and 41 species of Panicoideae in the Michigan flora. The genus Leptoloma which Beal omitted is definitely indigenous and fairly widespread in the southern half of the lower peninsula. As for the other two genera which were not included in the 1904 flora, Sorghum includes an introduced weed and a cultivated waif and the single species of Tripsacum also may be an introduction.

Additional species in various genera, not reported by Beal, are Echinochloa colonum, Digitaria filiformis and

Andropogon virginicus; none of these is at all common. The greatest difference, with respect to number of species, is to be found in the genus Panicum where Beal listed eighteen fewer taxa than are given in this report. This is due in part to additional collection, and in part to revisions and new descriptions of the type that make two species grow where only one species grew before.

An attempt has been made to summarize the information contained in the lists of specimens examined and in the species distribution maps in a graphic manner. By means of a cumulative map (Map 1), it was thought that an idea of the concentration of the number of species per county could be obtained. In the preparation of this map it soon became apparent that, while it does show the number of species known from each county, it shows even more graphically the need for additional collecting in this state. Nine counties, more than ten percent of the counties in the state, have no known representatives of the Panicoideae. Thirty-nine counties, nearly half of the counties in the state, have five or fewer known species. This is certainly not due to the distribution of the grasses, as the number of species known from Keweenaw, Cheboygan, and Emmet counties will show. It means, simply, that much more work needs to be done in the field before an adequate knowledge of the Michigan flora can be obtained.

Explanation of Abbreviations

On the following pages are found the data gathered from perusal of the literature and examination of the specimens. These data were organized into separate sections for each taxon under consideration.

Under the heading, "Specimens examined," the following information is given: 1. county in which the specimen was collected (if the specimen was collected on an island, it is recorded under a subhead following the county to which the island is politically attached); 2. the abbreviation for the collector's name and the collector's number, when known; 3. in parentheses, the abbreviation for the herbarium in which the specimen is deposited and the herbarium number for those herbaria using a number system.

Under the heading, "Unconfirmed reports," are listed reports, from the literature and other sources, which were not corroborated by specimens. These are listed by county and island in the same manner as the data on specimens examined. The name of the author of the report is followed by a date in parentheses which refers to the bibliography.

For the sake of conciseness in the portion of this report which follows, abbreviations were used to indicate the herbaria in which the specimens are deposited and to indicate the collectors of the specimens. For the eight

herbaria single letters are used which are placed in parentheses as indicated above. For the 123 collectors, groups of one to three letters are used.

Abbreviations of herbaria

A Division of Botany and Plant Pathology, Canadian Dept. of Agriculture
C Cranbrook Institute of Science
D University of Notre Dame
H Houghton Lake Wildlife Experiment Station
M University of Michigan
N Michigan State Normal College
S Michigan State College
W Western Michigan College

Abbreviations of Collectors

A	Austin
AD	A. Dachnowski
ADG	A. D. Geis
AJP	A. J. Pieters
AM	A. Murie
ARW	A. R. Wheeler
BAW	B. A. Walpole
BB	B. Barlow
B&D	E. A. Bessey & H. T. Darlington
B&W	W. J. Beal & C. F. Wheeler
CAB	C. A. Brown
CAD	C. A. Davis
CB	C. Billington
CCD	Mrs. C. C. Deam
CDL	C. D. LaRue
CDM	C. D. McLouth
CDR	C. D. Richards
CFW	C. F. Wheeler
CG	Mrs. C. Goodrich
CHK	C. H. Kauffman
CHS	C. H. Stocking
CKD	C. K. Dodge
CMR	C. M. Rogers
COE	C. O. Erlanson

COG	C. O. Grassl
CRB	C. R. Ball
CWB	C. W. Bazuin
C&C	S. H. Camp & D. R. Camp
C&S	S. A. Cain & Segadas-Vianna
DAP	D. A. Pelton
DC	D. Clarke
DCl	D. Clark
DCo	D. Cooley
DH	D. Higley
DiA	S. DiAngelo
DMB	D. M. Brooks
DML	D. M. Lynch, Jr.
DSF	W. G. Dore, H. A. Senn & Frankton
D&F	W. G. Dore & Frankton
D&H	W. B. Drew & R. S. Hauser
D&M	W. G. Dore & R. McVaugh
EAB	E. A. Bessey
ECA	E. C. Almendinger
EJC	E. J. Cole
EJH	E. J. Hill
ELM	E. L. Morris
ErE	E. W. Erlanson & S. H. Emerson
ERL	E. R. Lake
EWE	E. W. Erlanson
E&E	J. H. Ehlers & L. Ehlers
FAL	F. A. Loew
FCG	F. C. Gates
FCl	F. Clements
FCo	F. Cobb
FEW	F. E. Woods
FGG	F. G. Gustafson
FJH	F. J. Hermann
FPD	F. P. Daniels
F&P	M. L. Fernald & A. S. Pease
GAL	G. A. Loughridge
GBS	G. B. Sudworth
GDI	"GDI" (initials only)
GDS	G. D. Sones
GL	G. Lauff
GLA	G. L. Ames
GS	G. Stewart
GWB	G. W. Bradford
GWP	G. W. Parmalee
G&V	E. H. Graper & E. O. Vaughan

HCS	H. C. Skeels
HHI	H. H. Iltis
HMC	H. M. Campbell
HSP	H. S. Pepoon
HTD	H. T. Darlington
HWT	H. W. Thomson
H&M	P. A. Hyypio & J. T. Massengale
IJC	I. J. Contrall
IK	I. Knobloch
JBM	J. B. McFarlin
JCE	J. C. Elliot
JD	J. Dawson
JHE	J. H. Ehlers
JMS	J. M. Sutton
JTB	Mrs. J. T. Boyce
K&K	C. H. Kauffman & B. Kanouse
LAK	L. A. Kenoyer
LHB	L. H. Becker
LHH	L. H. Harvey
LHP	L. H. Pennington
LHS	L. H. Shinners
LKL	L. K. Ludwig
LR	L. Ryel
MC	M. Craig
MCR	M. C. Reis
MEM	M. E. McDonald
MHC	M. H. Clark
MHW	M. H. Winchell
MP	M. Pengelly
MS	1st Michigan Survey
MTB	M. T. Bingham
MTH	M. T. Hall
N	Niswander
PAH	P. A. Hyypio
PJP	P. J. Podolski
P&H	G. W. Parmalee & P. A. Hyypio
R	Ransom
RM	R. McVaugh
RRD	R. R. Dreisbach

S	Sanson
SHC	S. H. Camp
S&S	H. C. Skeels & J. Shaddick
THM	T. H. P. Marshall
VMS	V. M. Spalding
WAM	W. A. McMullen
WBD	W. B. Drew
WC	W. Cook
WGC	W. G. Dore
WHL	W. H. Lovejoy
WJB	W. J. Beal
WSC	W. S. Cooper
W&H	C. F. Wheeler & G. H. Hicks
W&L	C. F. Wheeler & Longyear
?	Collector unknown

KEY TO THE TRIBES OF THE PANICOIDEAE

1. Glumes membranaceous, the sterile lemma like the glumes in texture.....Paniceae (p. 24)

1. Glumes indurate, fertile lemma and palea hyaline or membranaceous, the sterile lemma like the fertile one in texture

   2. Spikelets in pairs, one sessile and perfect, the other pedicillate and usually staminate or neuter; the pedicillate one sometimes absent.....Andropogoneae (p. 82

   2. Spikelets unisexual, the pistillate below, the staminate above.....Tripsaceae (p. 90

TRIBE PANICEAE

Key to the Michigan Genera

1. Spikelets subtended or surrounded by 1 to many distinct or more or less connate bristles, forming an involucre

   2. Bristles persistent, the spikelets deciduous ..1. *Setaria*

   2. Bristles falling with the spikelets at maturity

      3. Bristles not united at base, slender, often plumose .....2. *Pennisetum*

      3. Bristles united into a burlike involucre, bristles retrorsely barbed .....3. *Cenchrus*

1. Spikelets not subtended by bristles

   4. Glumes or sterile lemma awned .....4. *Echinochloa*

   4. Glumes and sterile lemma awnless

      5. Fruit cartilaginous-indurate, flexible

         6. Spikelets in slender racemes more or less digitate at the summit of the culms .....5. *Digitaria*

         6. Spikelets in panicles .....6. *Leptoloma*

      5. Fruit chartaceous-indurate, rigid

         7. First glume absent, spikelets subsessile in spike-like racemes .....7. *Paspalum*

         7. First glume present, spikelets usually in panicles .....8. *Panicum*

1. *SETARIA* Beauv. Ess. Agrost. 51, 178, *t.* 13, *f.* 3. (*nom. gen. conserv.*). 1812; non Ach. (1798) nec Michx. (1803).

Chaetochloa Scribn. U. S. Div. Agrost. Bul. 4: 38. 1897.

A genus of about 100 species in the warmer regions of the world plus a few weedy species in the temperate regions. Four of the latter are found in Michigan

Key to the Michigan Species

1. Bristles below each spikelet numerous, at least more than 5; fruit strongly rugose.....1. S. lutescens

1. Bristles below each spikelet 1 to 3, or by abortion of the spikelets, 4 or 6; fruit smooth or rugulose

   2. Bristles more or less retorsely scabrous.....2. S. verticillata

   2. Bristles antrorsely scabrous only

      3. Panicle cylindric, tapering above, green; spikelets falling entire.....3. S. viridis

      3. Panicle lobed or interrupted, often large and heavy, purple or yellow; fruit deciduous from glumes and sterile lemma.....4. S. italica

1. Setaria lutescens (Weig.) Hubb. Rhodora 18: 232. 1916.

   Panicum lutescens Weig., Obs. Bot. 20. 1772.

   Setaria glauca Beauv. Ess. Agrost. 51, 178, 1812.

   Chaetochloa lutescens (Weig.) Stuntz, U. S. D. A., B. P. I. Inventory seeds 31: 36, 86. 1914.

   Chaetochloa glauca var. purpurea Farwell, Mich. Acad. Sci. Pap. 26: 5. 1941.

Yellow Bristle grass. Cultivated soil and waste places; a common garden weed. Map no. 2.

Specimens examined: BAY CO. GWB(S). BERRIEN CO. CB (S14288, M). CHARLEVOIX CO. THM 612(S124340). CHEYBOGAN CO. JHE 1119(M, S14720). CLINTON CO. GWP 409(S). GOGEBIC CO. B&D 2623(S14753); HTD(M). GRATIOT CO. CAD(S14748). HOUGHTON CO. OAF 11536(C14403). INGHAM CO. WJB(N); MC 875(S); FAL(S). JACKSON CO. THM 1631(S124370). KALAMAZOO CO. ADG(S). KALKASKA CO. LR 75(H, S124721). KENT CO. S&S(S14751). KEWEENAW CO. OAF(S61535); FJH 761(M). LAPEER CO. THM 1670(S124371). LENAWEE CO. WJB 24(S14735); JTB 4(S), 15(S). LIVINGSTON CO. DML(S123212). MACOMB CO. DCo(S61534). MONROE CO. MEM 5391(S). OAKLAND CO. CB(W); MTB(C1052); OAF 728b(M), 2837(C14407), 2988 (C14406), 7286(C14405); GWP 1923(S). ST. CLAIR CO. CKD 262(S14736), s.n.(M, S14328). SHIAWASEE CO. GWP 360(S). VAN BUREN CO. HSP 561(S14733). WASHTENAW CO. OAF 7521(C14404); DH(M); AJP 152(M). WAYNE CO. OAF 537b(C1054, M); PAH 243(S), 249(S).

Unconfirmed reports: CHIPPEWA CO. C. K. Dodge (1921c). GENESEE CO. MSC file (1950). HURON CO. Charity Is. C. K. Dodge (1911). MACKINAC CO. Mackinac Is. C. K. Dodge (1913). MARQUETTE CO. C. K. Dodge (1918). ST. JOSEPH CO. F. P. Daniels (1904b). SCHOOLCRAFT CO. C. K. Dodge (1921b). TUSCOLA CO. C. K. Dodge (1921d).

2. Setaria verticillata (L.) Beauv. Ess. Agrost. 51, 178. 1812.

Panicum verticillatum L. Sp. Pl. ed. 2. 1: 82. 1762.

Chaetochloa verticillata Scribn. U. S. D. A. Div. Agrost. Bul. 4: 39. 1897.

Chaetochloa verticillata var. breviseta (Godr.) Farwell, Mich. Acad. Sci. Pap. 1: 86. 1921.

Bur Bristlegrass. Dumps and waste places; a rather uncommon weed. Map no. 3.

Specimens examined: HOUGHTON CO. WDG(A). INGHAM CO. P&H 3(S). KENT CO. CWB 7097(S120307). MUSKEGON CO. CWB 4942 (C11168). WASHTENAW CO. JHE 2777(M); FJH 9264(M); BAW(S14718). WAYNE CO. CB 18(M), s.n.(C1060, W); OAF 5570½(M), 5577½(M), s.n.(C1061).

Unconfirmed reports: KALAMAZOO CO. C. R. & F. N. Hanes (1947). OAKLAND CO. MSC file (1950).

3. Setaria viridia (L.) Beauv. Ess. Agrost. 51, 178. 1812.

Panicum viride L. Syst. Nat. ed. 10. 2: 870. 1759.

Chaetochloa viridis Scribn. U. S. D. A. Div. Agrost. Bul. 4: 39. 1897.

Chaetochloa viridis var. breviseta (Doell) Farwell, Mich. Acad. Sci. Pap. 1: 86. 1923.

Green Bristlegrass. Cultivated soil and waste places; a common garden weed. Map no. 4.

Specimens examined: BAY CO. GWB(S). CHEBOYGAN CO. JHE 169(M), 620(M), 1096(M, S14719), 1118(M); FCG 383(S14742). CLINTON CO. DMB(S). DELTA CO. CFW(S61532). GOGEBIC CO. B&D 2622(S14743), 2734(M). HOUGHTON CO. FJH 1575(M); CDR

2621 (M). INGHAM CO. WJB(N, S14744, S14760); MC 894(S); FAL(S); THM 869(S124018); N(S14739); R(S14747); HCS(S14756); ? (S61531). JACKSON CO. THM 1643(S124369). KALAMAZOO CO. G&V 113 (S14754). KENT CO. CWB 5155(C11169), 5809(S120304). KEWEENAW CO. OAF(S14741). LAKE CO. THM 1628(S124420). LAPEER CO. DML(S123211). MARQUETTE CO. BB(S14738); MTB(C9249). MISSAUKEE CO. JCE(S). MONROE CO. MEM 5301(S), 5685(S). OAKLAND CO. CB(C1053, C1055); MTB(C1063, C1064, C1065); OAF 5607a(M); GWP 1923(S). ST. CLAIR CO. CKD 260(S14757), s.n.(M, S14326). SHIAWASEE CO. GWP 379(S). TUSCOLA CO. S(S14759). VAN BUREN CO. HSP 469(S14746). WASHTENAW CO. JD(M); OAF 7058(M); THM 1664(S124368); BAW(M). WAYNE CO. OAF 593e(C1067), 629a(C1062,M), 629c(C1066), 5398½(M), s.n. (C1056).

Unconfirmed reports: BERRIEN CO. MSC file (1950). CHIPPEWA CO. C. K. Dodge (1921c); MSC file (1950). EMMET CO. F. C. Gates & J. H. Ehlers (1925) MSC file (1950). HURON CO., Charity Is. C. K. Dodge (1911). MACKINAC CO. Mackinac Is. C. K. Dodge (1913). MUSKEGON CO. C. D. McLouth (1896). SCHOOLCRAFT CO. C. K. Dodge (1921b).

4. Setaria italica (L.) Beauv. Ess. Agrost. 51, 170, 178. 1812.

Panicum italicum L. Sp. Pl. 56. 1753.

Panicum germanicum Mill. Gard. Dict. ed. 8. Panicum No. 1. 1768.

Chaetochloa italica Scribn. U. S. D. A. Div. Agrost. Bul. 4: 39. 1897.

Setaria italica f. praecox (Alef.) Farwell, Mich. Acad. Sci. Rep. 22: 179. 1921.

Setaria italica var. germanica f. metzgeri (Koern.) Farwell, Mich. Acad. Sci. Rep. 22: 179. 1921.

Chaetochloa italica f. praecox (Alef.) Farwell, Acad. Sci. Pap. 1: 86. 1923.

Chaetochloa italica var. germanica f. metzgeri Farwell, Mich. Acad. Sci. Pap. 1: 86. 1923.

Foxtail Millet. Escaped from cultivation. Map no. 5.

Specimens examined: BAY CO. GWB(S). EMMET CO. JHE 1207 (M, S14724). INGHAM CO. WJB(S14728); MC 882(S), 892(S); CFW(S14731). KENT CO. GDI(M); GDS(S14334). KEWEENAW CO. OAF(S14729). LENAWEE CO. CHS(M). ST. CLAIR CO. CKD(M). WASHTENAW CO. BAW(M). WAYNE CO. CB(C1059); OAF 593a(C1057, S14721), 593d(C1058), 7813(M).

Unconfirmed reports: CASS CO. MSC file (1950). CHEBOYGAN CO. F. C. Gates & J. H. Ehlers (1925). OAKLAND CO. M. T. Bingham (1945). ST. JOSEPH CO. E. P. Daniels (1904b).

Excluded Species

Setaria faberii Herrm. Reported for Michigan by Hitchcock and Chase (1951), but no specimens were seen by the author. It is a rapidly spreading weed and probably occurs in Michigan.

Setaria geniculata (Lam.) Beauv. Reported by Farwell

(1941) under the synonym Chaetochloa geniculata var. purpurascens (Ell.) Farwell. No specimens were seen. This species has a somewhat more southern distribution and probably does not occur in Michigan.

2. PENNISETUM L. C. Rich. in Pers. Synops. 1: 72. 1805.

One species, P. villosum R. Br., is cultivated for ornament and escapes occasionally. It has been reported for Michigan by Hitchcock and Chase (1951), but the author has seen no specimens. The genus is included here for the convenience of those who might encounter this grass in Michigan.

3. CENCHRUS L. Sp. Pl. 55. 1753.

About 25 species of the American tropics and subtropics. One species extends northward into cooler temperate regions and is found in Michigan.

1. Cenchrus pauciflorus Benth. Bot. Voy. Sulph. 56. 1840.

Cenchrus tribuloides of many Michigan authors, but not of L. (1753).

Cenchrus carolinianus of many Michigan authors, but probably not of Walt. (1788).

Cenchrus echinatus var. tribuloides of some Michigan authors, but not of Torr. (1823).

Cenchrus longispinus (Hack.) Fern. Rhodora 45: 388. 1943.

Sandbur. Sandy open ground; often a troublesome weed. Map no. 6.

Specimens examined: BAY CO. CWB(S). BERRIEN CO. GLA (M). CALHOUN CO. WJB(S14449). CHEBOYGAN CO. JHE 1221(M). CLARE CO. HTD 744(S14453). DELTA CO. AD(M). GRATIOT CO. CAD(S12748). INGHAM CO. WJB(N); WGD 10369(A); THM 971 (S124423); GWP 415(S). IOSCO CO. GAL 4173(A). IRON CO. E&E 1221(S14445). JACKSON CO. THM 1638(S124414). KALAMAZOO CO. D&H M130(S). KENT CO. HCS(S14447); S&S(S120130). LENAWEE CO. CB(C792); JTB 105(S). LIVINGSTON CO. JHE 5198 (M); FJH 6445(M); DML(S123213). MACOMB CO. DCo(S14450). MENOMINEE CO. COG 2526(M), 2539(M). MONROE CO. FJH(S14452); MEM 5297(S), 5394(S). NEWAYGO CO. RM 9862(M); THM 1613 (S124413). OAKLAND CO. CB(C741, W); MTB(C743, C744); OAF 5618b(M); JMS 119(M). SAGINAW CO. DC1(S61536). ST. CLAIR CO. CKD(M). WASHTENAW CO. EDA(M-2 sheets); FCo(M); FJH 9173(D21941, M); RM 7594(M); AJP 141(M), s.n.(M); BAW(M). WAYNE CO. OAF(C9706, M-2 sheets); H&M 187(S123952); GS (S14444, S14446); ?(M).

Unconfirmed reports: CHIPPEWA CO. C. K. Dodge (1921c). CLINTON CO. MSC file (1950). EMMET CO. F. C. Gates & J. H. Ehlers (1925). MACKINAC CO. Mackinac Is. C. K. Dodge (1913). MANISTEE CO. F. P. Daniels (1904a). MARQUETTE CO. C. K. Dodge (1918). MUSKEGON CO. C. D. McLouth (1904a). PRESQUE ISLE CO. MSC file (1950). SCHOOLCRAFT CO. C. K. Dodge (1921b). ST. JOSEPH CO. MSC file (1950). TUSCOLA CO. C. K. Dodge (1921d).

Excluded Species

Cenchrus tribuloides L. The many reports of this species for Michigan are based on misidentifications of C. pauciflorus Benth.

4. ECHINOCHLOA Beauv. Ess. Agrost. 53, t. 11. 1812.

A genus of twenty annual or perennial tropical and sub-tropical species, some of which extend northward into the temperate regions. Three of the latter are weedy species found in Michigan.

Key to the Michigan Species

1. Racemes simple, 1 to 2 cm. long; spikelets crowded in about 4 rows; the awn of the sterile lemma reduced to a short point .....1. E. colonum

1. Racemes more or less branched, usually more than 2 cm. long; spikelets irregularly crowded and fascicled, usually not arranged in rows, the awn of the sterile lemma variable

   2. Sheaths smooth; panicles erect and stiff; spikelets conspicuously hispid .....2. E. crusgalli

   2. Sheaths, at least the lower, hispid or scabrous; panicle dense and nodding; spikelets long-awned .....3. E. walteri

1. Echinochloa colonum (L.) Link. Hort. Berol. 2: 209. 1833.

Panicum colonum L. Syst. Nat. ed. 10. 2: 870. 1759.

Jungle Rice. Waste places. Map no. 7.

Specimen examined: WAYNE CO. OAF 9305(C14464).

Unconfirmed report: VAN BUREN CO. MSC file (1950).

2. Echinochloa crusgalli (L.) Beauv. Ess. Agrost. 53, 161. 1812.

Panicum crusgalli L. Sp. Pl. 56. 1753.

Panicum crusgalli var. purpureum Pursh, Fl. Amer. Sept. 66. 1814.

Panicum crusgalli var. muticum Ell. Bot. S. C. and Ga. 1: 114. 1816.

Panicum crusgalli var. mitis (Pursh) Peterm. Fl. Lips. 82. 1838.

Panicum crusgalli var. muricatum (Michx.) Farwell, Mich. Acad. Sci. Rep. 6: 210. 1904.

Echinochloa crusgalli var. frumentacea (Roxb.) W. F. Wright, Cent. Dict. Sup. 810. 1909.

Echinochloa muricata (Michx.) Fernald, Rhodora 17: 106. 1915.

Echinochloa crusgalli f. mitis (Pursh) Farwell, Mich. Acad. Sci. Rep. 21: 349. 1920

Echinochloa crusgalli f. purpurea (Pursh) Farwell, Mich. Acad. Sci. Rep. 21: 349. 1920.

Echinochloa crusgalli var. muricata (Michx.) Farwell, Mich. Acad. Sci. Rep. 21: 350. 1920.

Echinochloa crusgalli var. zelayensis (H.B.K.) Hitchc. U. S. D. A. Bul. 772: 238. 1920.

Echinochloa pungens (Poir.) Rydb. Brittonia 1: 81. 1931.

Echinochloa crusgalli f. zelayensis (H.B.K.) Farwell, Mich. Acad. Sci. Pap. 26: 4. 1941.

Barnyard Grass. Moist open places, ditches, cultivated fields and waste ground; a common garden weed. The high degree of variability which this species exhibits is responsi-

ble for the multiplicity of names which have been assigned to its various phases. Map no. 8.

Specimens examined: ALGER CO. WGD 10410a(A). BARRY CO. IK(S). BAY CO. GWB(S). BERRIEN CO. GLA(M); CB(S14458); HTD 1690(S14470). BRANCH CO. JS(S14489). CASS CO. CB (C1068); HTD(S14488); ?(S14487). CHARLEVOIX CO. Beaver Is. MCR 1131(C777). CHEBOYGAN CO. JHE 189(M), 619(M), 1106 (M, S14459); MP(M). CHIPPEWA CO. FJH 7028(M). CLINTON CO. GL 25 (S); B&W(N); CFW(C14083). GOGEBIC CO. B&D(M, S14465). GRATIOT CO. CAD(S14468). HOUGHTON CO. OAF 11533(C14010); FJH 1576(M); CDR 2627(M). INGHAM CO. WJB 381(S14467), s.n. (S13088); MC 848(S), s.n.(S); FAL(S); THM 866(S124016); GWP 247(S); CFW(S14463); W&H(S14490, S14499). JACKSON CO. MS(M). KENT CO. CWB 1933(S122474), s.n.(S); S&S(S14498). KEWEENAW CO. OAF 648(C14011), s.n.(S93934). LAKE CO. THM 1630 (S124417). LAPEER CO. THM 1672(S124416). LENAWEE CO. WJB 13(S93935); JTB(S). LIVINGSTON CO. DML(S123207, S123208, S123209, S123210). MACKINAC CO. WGD 10386(A); Bois Blanc Is. MTB(C776). MACOMB CO. DCo(S61509, S61510, S93931, S93938). MARQUETTE CO. AD(M); OAF 648d(C13786). MECOSTA CO. RRD 5256(M). MENOMINEE CO. COG 2519(M), 2520(M). MONTCALM CO. CFW(S61508). MONROE CO. OAF 7075(C14012); MEM 5520(S), 5551(S), 5565(S). MUSKEGON CO. ?(S14469). OAKLAND CO. CB(W); MTB(C778, C779); OAF 648c(C13787), 6353 (C13783, M), 6850(C13785, M). SCHOOLCRAFT CO. WGD(A).

ST. CLAIR CO. WC(M); CKD 234(S14460), s.n.(M-2 sheets, S14471, S14472). VAN BUREN CO. HSP 533(S14464). WASHTENAW CO. ECA(M-2 sheets); FCo(M); JD(M); OAF 5342(C13781); FGG(M); THM 1663(S124415); AJP 136(M); HWT(M-2 sheets); BAW(M, S14457); ?(M). WAYNE CO. CB(C775, C780); OAF 648a(C13788, M), 648b(C13983, M), 1701(C13782, M), 1701½(C13784), 1782 (C13779), 1881(M), 1881½(C13792, M), 7817(C13791, M), 8741 (C13789), 8748(C13780, M).

Unconfirmed reports: CLARE CO. MSC file (1950). EMMET CO. F. C. Gates & J. H. Ehlers (1925). GENESEE CO. MSC file (1950). HILLSDALE CO. MSC file (1950). HURON CO. Charity Is. C. K. Dodge (1911). KALAMAZOO CO. C. R. & F. N. Hanes (1947), MSC file (1950). LEELANAU CO. MSC file (1950). MIDLAND CO. MSCfile (1950). NEWAYGO CO. MSC file (1950). OSCEOLA CO. MSC file (1950). OSCODA CO. MSC file (1950). OTTAWA CO. MSC file (1950). WEXFORD CO. MSC file (1950).

3. Echinochloa walteri (Pursh) Heller, Cat. N. Amer. Fl. ed. 2. 21. 1900.

Panicum walteri Pursh. Fl. Amer. Sept. 66. 1814.

Panicum crusgalli var. hispidum A. Gray, Man ed. 5. 649. 1881; perhaps not of Ell. (1816).

Panicum crusgalli var. walteri (Pursh) Farwell, Mich. Acad. Sci. Rep. 3: 36. 1901.

Echinochloa walteri f. laevigata Wieg. Rhodora 23: 62. 1921.

Echinochloa crusgalli var. hispida (Muhl.) Farwell, Amer. Midl. Nat. 9: 262. 1925.

Echinochloa crusgalli var. hispida subvar. laevigata (Wieg.) Farwell, Amer. Midl. Nat. 9: 262. 1925.

Wet places and waste ground; an infrequent weedy species. Map no. 9.

Specimens examined: BERRIEN CO. GLA(M). GRATIOT CO. CAD(M). INGHAM CO. CFW(M). KALAMAZOO CO. LAK(W). MONROE CO. OAF 7075(M); MEM 5468(S). ST. CLAIR CO. WC(M); WSC (S14462); CKD 230(S14461), s.n.(M-2 sheets). WASHTENAW CO. CB(M). WAYNE CO. OAF 1679(C13790, M), s.n.(M).

Unconfirmed reports: CLINTON CO. W. J. Beal and C. F. Wheeler (1892). KENT CO. E. J. Cole (1901). MUSKEGON CO. C. D. McLouth (1896).

Excluded Species

Echinochloa crusgalli f. longiseta Farwell. Reported by Farwell (1920), this name is based upon Panicum crusgalli var. longisetum Trin., a taxon not known to occur in America. Farwell probably had Panicum longisetum Torr. (= Echinochloa walteri f. laevigata Wieg.) in mind.

Echinochloa cruspavonis (H.B.K.)Schult. Reported by Farwell (1920) under the synonym Echinochloa crusgalli f. sabulonum (Trin.) Farwell. Farwell later (1921) corrected the latter name to E. crusgalli f. sabulicola (Trin.) Farwell. The Farwell collection, no. 1701½, upon which this report is based is an example of Echinochloa crusgalli.

5. DIGITARIA Heist. ex Fabr. Enum. Pl. Hort. Helm. 207. 1759.

Syntherisma Walt. Fl. Carol. 76. 1788.

A genus of over 100 species in the warmer regions of both hemispheres, some extending into the temperate regions. Three species are found in Michigan.

Key to the Michigan Species

1. Rachis wingless or with a very narrow margin..... 1. D. filiformis

1. Rachis winged or with a flat margin as wide as the central rib

2. Sheaths glabrous; spikelets 2 mm. long ..... 2. D. ischaemum

2. Sheaths pilose; spikelets 2.5 mm. long ..... 3. D. sanguinalis

1. Digitaria filiformis (L.) Koel. Descr. Gram. 26. 1802.

Panicum filiforme L. Sp. Pl. 57. 1753.

Syntherisma filiformis (L.) Nash, Torr. Bot. Club Bul. 22: 420. 1895.

Sandy fields and sterile open ground. Rare in Michigan. Map no. 10

Specimen examined: CASS CO. MS(M).

Unconfirmed reports: INGHAM CO. C. F. Wheeler and E. F. Smith (1881), W. L. McAtee (1923).

2. Digitaria ischaemum (Schreb.) Schreb. ex Muhl. Descr. Gram. 131. 1817.

Panicum lineare Krock. Fl. Siles. 1: 95. 1787; not of L. (1762).

Panicum ischaemum Schreb. in Schweiger, Spec. Fl. Erland. 16. 1804.

Digitaria humifusa Pers. Syn. Fl. 1: 85. 1805.

Panicum glabrum Gaudin, Agrost. Helv. 1: 22. 1829.

Panicum humifusum (Pers.) Kunth, Rev. Gram. 1: 33.

Panicum glabrum var. mississippiense Gatt. ex Scribn. Tenn. Agr. Expt. Stat. Bul. 7: 39. 1844.

Syntherisma linearis (Krock.) Nash, Torr. Bot. Club Bul. 22: 420. 1895.

Syntherisma ischaemum (Schreb.) Nash, N. Amer. Fl. 17: 151. 1912.

Digitaria ischaemum var. mississippiensis (Gatt.) Fernald, Rhodora 22: 103. 1920

Smooth Crabgrass. Waste places; often a troublesome lawn and garden weed. Map no. 11.

Specimens examined: BAY CO. GWB(S). BERRIEN CO. CB (M). CASS CO. FCG 1480(M). CLINTON CO. GWP 409(S). GOGEBIC CO. EAB(S14454); B&D 2658(M, S14761). INGHAM CO. WJB(S14767, N). IOSCO CO. GAL 4198(A). LAKE CO. THM 1629 (S124418). LIVINGSTON CO. DML(S123205). MACOMB CO. DCo (S61526). MENOMINEE CO. COG 2748(M). NEWAYGO CO. D&H M291(S). OAKLAND CO. CB(C771, M, W); OAF 1576(C13803), 4584(C13800, M), 7168(C13797), 7618(M), 7632(C13804, M), s.n.(C772). ROSCOMMON CO. HTD 549(S14762). ST. CLAIR CO.

CKD(M-2 sheets). VAN BUREN CO. HSP 594(S14765). WASHTENAW CO. OAF 5354(C13799, M); FJH 9135(M); THM 1662(S124410). WAYNE CO. A(S14763); OAF 7245(C13798, M), 1576a(C13801), 12312(M).

Unconfirmed reports: ANTRIM CO. MSC file (1950). CHEBOYGAN CO. C. K. Dodge (1921a). CHIPPEWA CO. C. K. Dodge (1921c). DELTA CO. MSC file (1950). KALAMAZOO CO. C. R. and F. N. Hanes (1947). KENT CO. E. J. Cole (1901), MSC file (1950). LENAWEE CO. MSC file (1950). MARQUETTE CO. C. K. Dodge (1918). MUSKEGON CO. C. D. McLouth (1896). OTTAWA CO. MSC file (1950). SAGINAW CO. MSC file (1950). SCHOOLCRAFT CO. C. K. Dodge (1921b). SHIAWASEE CO. MSC file (1950).

3. Digitaria sanguinalis (L.) Scop. Fl. Carn. ed. 2. 1: 52. 1772.

Panicum sanguinale L. Sp. Pl. 57. 1753.

Syntherisma sanguinalis (L.) Dulac. Fl. Haute. Pyr. 77. 1867.

Digitaria sanguinalis var. repens (Asch. & Graebn.) Farwell, Amer. Midl. Nat. 10: 23. 1926.

Crabgrass. Fields, gardens and waste places; a troublesome garden and lawn weed. Map no. 12.

Specimens examined: BERRIEN CO. GLA(M); CB(M, S14455). EMMET CO. JHE 1208(M, S14770). INGHAM CO. WJB(N); MC 859 (S); FAL(S); THM 867(S124017); GWP 414(S). JACKSON CO. THM

1637(S124412). KALAMAZOO CO. ARW 3604(M); MS(M). KENT CO. HCS(S14766); GLS(M). LENAWEE CO. JTB 7(S). LIVINGSTON CO. DML(S123206). MENOMINEE CO. COG 3033(M). MONROE CO. MEM 5299(S), 5395(S). NEWAYGO CO. EAB 1033(S14771); THM 1605 (S124411). OAKLAND CO. MTB(C774). ST. CLAIR CO. CKD(M, S14456). VAN BUREN CO. HSP 560(S14767). WASHTENAW CO. JD (M); OAF 1267a(C13793); AJP 135(M); PJP(M); ?(M). WAYNE CO. CB(C773); OAF 1267(C13794), 7634(C13802, M), 7635(C13796, M), 8640(C13795); PAH 252(S).

Unconfirmed reports: CALHOUN CO. MSC file (1950). CHIPPEWA CO. C. K. Dodge (1921c). GENESEE CO. MSC file (1950). GRAND TRAVERSE CO. MSC file (1950). HILLSDALE CO. MSC file (1950). HURON CO. H. T. Darlington (1900). Charity Is. C. K. Dodge (1911). LAPEER CO. MSC file (1950). MECOSTA CO. MSC file (1950). MUSKEGON CO. C. D. McLouth (1896). OTTAWA CO. MSC file (1950). ST. JOSEPH CO. F. P. Daniels (1904b).

6. LEPTOLOMA Chase, Biol. Soc. Wash. Proc. 19: 191. 1906.

A genus of five species, three of which are Australian. The others occur in central and southern United States and Mexico; one of the latter is found in Michigan.

1. Leptoloma cognatum (Schult.) Chase, Biol. Soc. Wash. Proc. 19: 192. 1906.

Panicum cognatum Schult. Mantissa 2: 235. 1824.

Fall Witchgrass. Dry soil and sandy fields. Map no. 13.

Specimens examined: BERRIEN CO. HTD 1731(S14474). INGHAM CO. GWP 408(S). JACKSON CO. THM 1635(S124408). KENT CO. CWB 2020(S122472). LAPEER CO. THM 1673(S124406). LIVINGSTON CO. DML(S123204). NEWAYGO CO. THM 1611(S124409). OAKLAND CO. HMC(S124014); DSF 10362(A); THM 1681(S124405). ST. JOSEPH CO. GWP 2498(S). WASHTENAW CO. THM 1657 (S124407).

Unconfirmed report: KALAMAZOO CO. C. R. and F. N. Hanes (1947).

7. PASPALUM L. Syst. ed. 10. 855. 1759.

A genus of over 200 species, mostly in tropical America, with a few species in the Old World. Only one species is found in Michigan.

1. Paspalum pubescens Muhl. in Willd. Enum. Pl. 89. 1809.
Paspalum muhlenbergii Nash in Britt. Man. 75. 1901.
Paspalum ciliatifolium var. muhlenbergii (Nash) Fern. Rhodora 36: 20. 1934.

Open ground, old fields, pastures and open woodlands. Map no. 14.

Specimens examined: BARRY CO. GWP 1103(S), 1120(S). KENT CO. CWB 6195(S), 6632(S120308). VAN BUREN CO. FCG 1343(M); HSP 138(S14168), 372(S14169). WASHTENAW CO. FJH

9172(M); THM 1652(S124372); GWP 2569(S). WAYNE CO. OAF 944a(C, M), 1435(C14525, C16320, S14164, S14165), 1435a (C13827), 1473a(M), 1622a(C14429, M), 1758a(C13825, M), 1781 (C13826, M).

Unconfirmed reports: INGHAM CO. C. F. Wheeler and E. F. Smith (1881). KALAMAZOO CO. C. R. and F. N. Hanes (1947).

Excluded Species

Paspalum laeve Michx. The report of this species for Van Buren Co. by W. J. Beal (1904) is based on the misidentification of a specimen of P. pubescens.

Paspalum setaceum Michx. The reports for this species from Wayne Co. by W. J. Beal (1904), O. A. Farwell (1901) and C. F. Wheeler and E. F. Smith (1881) are based on misidentifications of specimens of P. pubescens.

8. PANICUM L. Sp. Pl. 55. 1753.

A very large genus, including about 500 species, of the tropics, subtropics and warmer parts of the temperate regions. Nearly 200 species occur in North America, of which at least 43 species are found in Michigan.

Key to the Michigan Species

1. Basal leaves distinctly different from those of the culm, forming a winter rosette, or the blades elongate (Subgenus DICANTHELIUM)

2. Blades elongate, no winter rosette formed

3. Blades not more than 5 mm. wide; branching from the base or the lower nodes (Section DEPAUPERATA)

4. Spikelets about 3.5 mm. long, beaked ..... 1. P. depauperatum

4. Spikelets 3.2 mm. long or less, not beaked

5. Culms single or few in a tuft; spikelets turgid, 2.7 to 3.2 mm. long ..... 2. P. perlongum

5. Culms in large tufts; spikelets not turgid, 2.2 to 2.7 mm. long

6. Sheaths pilose; spikelets 2.2 to 2.7 mm. long, pilose ..... 3. P. linearifolium

6. Sheaths glabrous; spikelets 2.2 to 2.3 mm. long, glabrous or sparingly pilose ..... 4. P. werneri

3. Blades 5 to 9 mm. wide; branching from middle or upper nodes (Section BICKNELLIANA) One species ..... 5. P. bicknellii

2. Blades not elongate, basal leaves forming a winter rosette

7. Spikelets turgid, blunt, strongly nerved (Section OLIGOSANTHIA)

8. Panicle narrow, the branches erect

9. Blades papillose-hispid ..... 6. *P. leibergii*

9. Blades glabrous on both surfaces ..... 7. *P. xanthophysum*

8. Panicle about as wide as long, the branches spreading

10. Spikelets narrowly obovate, 3.5 to 4 mm. long; plants appressed-pubescent .. 8. *P. oligosanthes*

10. Spikelets broadly obovate, 3.2 to 3.3 mm. long; pubescence, where present, not appressed ..... 9. *P. scribnerianum*

7. Spikelets not turgid, blunt, or strongly nerved

11. Ligule of conspicuous hairs, usually 3 to 5 mm. long

12. Sheaths glabrous, or only the lowermost somewhat pubescent (Section SPRETA)

13. Panicle narrow, one-fourth to one-third as wide as long ..... 10. *P. spretum*

13. Panicle open, two-thirds as wide as long, or more ..... 11. *P. lindheimeri*

12. Sheaths strongly pubescent (Section LANUGINOSA)

14. Spikelets not more than 2 mm. long

15. Culms conspicuously pilose with long, horizontally spreading hairs; spikelets 1.8 to 1.9 mm. long ..... 12. *P. praecocius*

15. Culms variously pubescent, if pilose the hairs not long and horizontally spreading

16. Vernal blades glabrous or nearly so on the upper surface .... 13. *P. tennesseense*

16. Vernal blades pubescent on the upper surface, sometimes pilose near the base and margins only

17. Spikelets 1.3 to 1.5 mm. long

18. Autumnal phase widely decumbent-spreading, forming a mat ..... 14. P. albemarlense

18. Autumnal phase erect or leaning, never forming a mat

19. Axis of panicle pilose, branches tangled, the lower drooping ..... 15. P. implicatum

19. Axis of panicle puberulent only, the branches not tangled, the lower ascending .. 16. P. meridionale

17. Spikelets 1.6 to 2 mm. long

20. Upper surface of blades pilose; spikelets 1.8 to 2 mm. long; autumnal phase decumbent-spreading ..... 17. P. subvillosum

20. Upper surface of blades appressed-pubescent or pilose toward base only; spikelets 1.6 to 1.8 mm. long; autumnal phase not decumbent-spreading ..... 18. P. huachucae

14. Spikelets 2.2 mm. long or more

21. Pubescence on culms horizontally spreading; autumnal phase freely branching ..... 19. P. villosissimum

21. Pubescence on culms appressed or ascending; autumnal phase sparingly branching ..... 20. P. pseudopubescens

11. Ligule obsolete or nearly so

22. Spikelets nearly spherical at maturity (Section SPHAEROCARPA)
One species ..... 21. P. sphaerocarpon

22. Spikelets usually obovate or elliptic

23. Blades cordate; spikelets 2.5 mm. long or longer

24. Spikelets 2.5 to 3 mm. long; sheaths glabrous or minutely puberulent (Section COMMUTATA)

25. Culms crisp-puberulent; spikelets about 2.5 mm. long ..... 22. P. ashei

25. Culms glabrous or softly puberulent; spikelets 2.7 to 3.2 mm. long ..... 23. P. commutatum

24. Spikelets 2.7 to 5 mm. long, if less than 3 mm. long then sheaths hispid, otherwise sheaths glabrous or softly villous (Section LATIFOLIA)

26. Sheaths strongly papillose-hispid; spikelets 2.7 to 3 mm. long ..... 24. P. clandestinum

26. Sheaths glabrous or softly villous; spikelets 3.4 mm. long or longer

27. Nodes glabrous; spikelets 3.4 to 3.7 mm. long ..... 25. P. latifolium

27. Nodes bearded; spikelets 4 to 4.5 mm. long ..... 26. P. boscii

23. Blades not cordate; spikelets less than 2.5 mm. long

28. Sheaths crisp- or appressed-pubescent (Section COLUMBIANA)

29. Spikelets 2 to 2.9 mm. long, elliptic

30. Spikelets 2.8 to 2.9 mm. long ..... 27. P. deamii

30. Spikelets 2 to 2.4 mm. long

31. Spikelets 2.2 to 2.4 mm. long; panicle open, the branches spreading ..... 28. P. commonsianum

31. Spikelets 2 to 2.1 mm. long; panicle dense, the branches ascending ..... 29. P. addisonii

29. Spikelets not more than 1.9 mm. long, obovate

    32. Spikelets 1.8 to 1.9 mm. long ..... 30. *P. tsugetorum*

    32. Spikelets 1.5 to 1.6 mm. long ..... 31. *P. columbianum*

28. Sheaths glabrous or ciliate only in the autumnal phase (Section DICHOTOMA)

    33. Nodes, at least the lower, bearded

        34. Spikelets 1.5 to 1.8 mm. long, glabrous (occasionally pubescent) ..... 32. *P. microcarpon*

        34. Spikelets 2 mm. long or more

            35. Spikelets glabrous

                36. Autumnal phase erect; primary blades rarely more than 5 mm. wide ..... 33. *P. dichotomum*

                36. Autumnal phase topheavy, reclining; primary blades 6 to 10 mm. wide ..... 34. *P. barbulatum*

            35. Spikelets pubescent ... 35. *P. boreale*

    33. Nodes not bearded

        37. Spikelets pubescent

            38. Culms erect, never becoming vinelike ..... 35. *P. boreale*

            38. Culms soon prostrate, vinelike, the branches divaricate ..... 36. *P. lucidum*

        37. Spikelets glabrous

            39. Culms soon prostrate .. 36. *P. lucidum*

            39. Culms erect, or the autumnal phase topheavy, never prostrate

40. Autumnal phase erect; primary blades rarely more than 5 mm. wide; second glume shorter than fruit and sterile lemma ..... 33. P. dichotomum

40. Autumnal phase topheavy-reclining; primary blades 6 to 10 mm. wide; second glume equalling fruit and sterile lemma .... 34. P. barbulatum

1. Basal leaves similar to the culm leaves, not forming a winter rosette and the blades not elongate (Subgenus EUPANICUM)

41. Panicle much-branched, diffuse; spikelets mostly long-pedicellate, not secund on the branches

42. Sheaths papillose-hispid; weedy annuals (Section CAPILLARIA)

43. Panicles drooping; spikelets 4.5 to 5 mm. long ..... 37. P. miliaceum

43. Panicle erect; spikelets not more than 4 mm. long

44. Panicles more than half the height of the entire plant

45. Panicles narrow, usually less than half as broad as long ..... 38. P. flexile

45. Panicles as broad as long .. 39. P. capillare

44. Panicles not more than one-third the entire height of plant ..... 40. P. philadelphicum

42. Sheaths not papillose-hispid, mostly glabrous

46. First glume short, one-fourth to one-third as long as the spikelet, truncate or broadly triangular; plants annual, lacking rhizomes (Section DICHOTOMIFLORA)
One species ..... 41. P. dichotomiflorum

46. First glume acuminate, at least half the length of the spikelet; plants rhizomatous perennials (Section VIRGATA)
One species ..... 42. P. virgatum

41. Panicle with few, nearly simple primary branches; spikelets short-pedicellate, appressed and secund along the branches; plants perennial; sheaths flattened (Section AGROSTOIDEA)
One species ..... 43. P. agrostoides

1. Panicum depauperatum Muhl. Descr. Gram. 112. 1817.

Panicum strictum Pursh, Fl. Amer. Sept. 1: 69. 1814; not of R. Br. (1810).

Panicum depauperatum var. psilophyllum Fern. Rhodora 23: 192. 1921.

Panicum strictum var. psilophyllum (Fern.) Farwell, Mich. Acad. Sci. Pap. 26: 5. 1941.

Open sterile woods and sand blowouts. Map no. 15.

Specimens examined: ALLEGAN CO. EAB 2670(S123999); LAK(W). ALPENA CO. B&D 2079(S14629). BERRIEN CO. CB(M, W). CASS CO. CFW(S14602). CHEBOYGAN CO. CCD 28601(M); JHE 1526½(M), 1966(M); FCG 49(S14654); HHI 2842(C16375); MP 45(M). DELTA CO. F&P 3072(M). DICKINSON CO. F&P 3068 (M). EMMET CO. RM 9060(C11796, M). KALAMAZOO CO. LAK(W-3 sheets). KALKASKA CO. WJB 18(S14613). KENT CO. CWB 2836(C12119), 2934(C12152), 4593(C11077), 5359(C12114); EJC (M, S14568). KEWEENAW CO. OAF 11338(C14021), 12438(C14401); FJH 8086(M); FEW 3586(M). Isle Royale. CAB 3614(M), 3676 (M). LAKE CO. CWB 6858(C12106). LIVINGSTON CO. OAF 5850 (M). LUCE CO. RM 9540(M). MACKINAC CO. THM 1616(S124378), 1617(S124379). MACOMB CO. DCo 281(S14482). MARQUETTE CO. MTB(C9178); CKD 450(C912, M). MECOSTA CO. RRD 5002(M); GWP 1092(S). MENOMINEE CO. COG 2875(M). MISSAUKEE CO.

B&D(S124001). MONTCALM CO. CAD(M); GWP 965(S). MUSKEGON CO. WJB(S14630). NEWAYGO CO. CWB 5042(C12116, C12117), 5411(C12115), 5413(C12121), 5479(C12120); THM 1603(S124375). OAKLAND CO. MTB(C913); OAF 3984(C14392), 6504(C14391, M), 6959(C14521, C16325, M). ONTONAGON CO. HTD(S14484, S14485, S14632). OSCODA CO. WJB 19(S14614). OTTAWA CO. CWB 717 (S122478). PRESQUE ISLE CO. JHE 7015(M); THM 647(S124339, S124341). SCHOOLCRAFT CO. CMR 7219(S). ST. CLAIR CO. CKD 232(S55551), s.n.(M, S13492); OAF 4970(C14016, M), 5498 (C14015, M); BAW(S14589). TUSCOLA CO. CKD(M). VAN BUREN CO. CHK(M). WASHTENAW CO. CB(D219143, (M); OAF 5850 (C14022).

Unconfirmed reports: ALGER CO. MSC file (1950). CHIPPEWA CO. C. K. Dodge (1921c). MANISTEE CO. F. P. Daniels (1904a). ST. JOSEPH CO. F. P. Daniels (1904b).

2. Panicum perlongum Nash, Torr. Bot. Club Bul. 26: 575. 1899.

Panicum strictum var. perlongum (Nash) Farwell, Amer. Midl. Nat. 11: 44. 1928.

Prairies and dry soil. Map no. 16.

Specimens examined: ALLEGAN CO. LAK(W). JACKSON CO. W&L(S14611). KALAMAZOO CO. LAK(W-2 sheets). KEWEENAW CO. OAF 755(C14020), 840½(C14023). LIVINGSTON CO. JHE 5047(M); DML(S123197). NEWAYGO CO. THM 1610(S124376). OAKLAND CO. OAF 3970(C14532), 3987(C14531). ST. CLAIR CO. OAF 2210

(C14031, M). WAYNE CO. OAF 755a(C14030), 5619(M), 6157 (C14529, M).

Unconfirmed reports: BERRIEN CO. A. DeLisle (1951). HOUGHTON CO. MSC file (1950). WASHTENAW CO. B. A. Walpole (1924).

3. Panicum linearifolium Scribn. in Britt. and Br. Ill. Fl. 3: 500. 1898.

Panicum strictum var. linearifolium (Scribn.) Farwell, Amer. Midl. Nat. 11: 44. 1928.

Dry woods. Map no. 17.

Specimens examined: ALLEGAN CO. CWB 5312(S). CALHOUN CO. WJB(S14567). CHEBOYGAN CO. JHE 458(M), 1532(M), 1972 (M). EATON CO. CB(W-2 sheets). GRATIOT CO. CAD(M, S14663). INGHAM CO. WJB(N, S61507); B&D 177(S14610); CAD(C10536); OAF 6540(C14540, M); GHH(S14569). KALAMAZOO CO. LHH 1774(M). KEWEENAW CO. OAF 597(C14029). LAPEER CO. OAF 6652(C14538, M); THM 1668(S124398). LIVINGSTON CO. DML(S123196). MACOMB CO. OAF 5899(C14019, M). OAKLAND CO. CB(M, W); OAF 4998 (C14026, M), 3986(C14520), 6190(C14539, M); JMS 106(M). ROSCOMMON CO. B&D 331(S14609). SCHOOLCRAFT CO. RM 10962 (C13764, M). ST. CLAIR CO. CB(M); BAW(S14588). WAYNE CO. CB(C937); OAF 5619(C14530), 6158(C14024, M), 6159(C14425, M), 12225½(M).

Unconfirmed report: WASHTENAW CO. B. A. Walpole (1924).

4. Panicum werneri Scribn. in Britt. and Br. Ill. Fl. 3: 501. 1898.

Panicum strictum var. linearifolium subvar. werneri (Scribn.) Farwell, Amer. Midl. Nat. 11: 44. 1928.

Sterile woods and knolls. Map no. 18.

Specimens examined: ALPENA CO. B&D 1887(S14596). CHEBOYGAN CO. JHE 1967(M). EATON CO. OAF 6562(C14038). GRATIOT CO. CWB 6506(C12104, S), 6507(C12147, S), 6508 (C11082, S). INGHAM CO. OAF 6562(M). KEWEENAW CO. F&P 3071(M). OAKLAND CO. CB(C964, C965); MTB(C931). ST. CLAIR CO. OAF 5497(C14027). VAN BUREN CO. CHK(M). WAYNE CO. CB(C930); OAF 4530a(C14025), 4532a(C14533), 5598a(C14535), 5601a(C14534), 9072(C14018, M), 9417(C14017, M).

Unconfirmed report: GENESEE CO. O. A. Farwell (1918).

5. Panicum bicknellii Nash, Torr. Bot. Club Bul. 24: 193. 1897; et in Britt. and Br. Ill. Fl. 3: 497. 1898.

Panicum bushii Nash, Torr. Bot. Club Bul. 26: 568. 1899.

Panicum bicknellii var. bushii (Nash) Farwell, Mich. Acad. Sci. Pap. 1: 85. 1923.

Dry sterile or rocky woods. Map no. 19.

Specimens examined: ST. CLAIR CO. OAF 5497(M). WAYNE CO. OAF 4530a(M), 4532a(M).

Unconfirmed reports: KALAMAZOO CO. C. R. and F. N. Hanes (1947). WASHTENAW CO. B. A. Walpole (1924).

6. Panicum leibergii (Vasey) Scribn. U. S. Div. Agrost. Bul. 8: 6, pl. 3. 1897.

Panicum scoparium var. leibergii Vasey, U. S. Div. Bot. Bul. 8: 32. 1889.

Prairies. Map no. 20.

Specimens examined: KALAMAZOO CO. LHH 1768(M). MONROE CO. MEM 5296(S). ST. CLAIR CO. CKD 154(S14478). WASHTENAW CO. OAF 7371(C14005, M); BAW(C14102, S14586).

7. Panicum xanthophysum A. Gray, N. Amer. Gram. & Cyp. 1: no. 28. 1834.

Sandy or gravelly soil. Map no. 21.

Specimens examined: ARENAC CO. CFW(S14649). BAY CO. GWB(S). BENZIE CO. WJB(S14502). CHEBOYGAN CO. FCG(S14633); JHE 448(M), 753(M), 961(M, S14582), 1525(M); THM 395(S124020); MP 42(M); CFW(N, S61517). EMMET CO. THM 807(S124305). GOGEBIC CO. B&D 2719(S14594). GRAND TRAVERSE CO. CFW (S14674). GRATIOT CO. CAD(M). JACKSON CO. THM 1648 (S124389), 1650(S124390). KEWEENAW CO. OAF 764(C14402); FEW 3586(M). Isle Royale CAB 3623(M); JBM 2411(M). LAKE CO. WJB(S14648). MARQUETTE CO. MTB(C9177); CKD(M). MENOMINEE CO. CAD(M); COG 2840(M). MISSAUKEE CO. B&D(S124006). MONTCALM CO. CAD(C10544, M); CFW(S14522, S14635). MUSKEGON CO. CWB 6593(C12151). ONTONAGON CO. EAB(S14595, S14634). OTSEGO CO. RM 9650(M). ST. CLAIR CO. CKD 246(S14593), s.n. (M-2 sheets). WASHTENAW CO. THM 1665(S124396).

Unconfirmed reports: MANISTEE CO. W. J. Beal (1904), F. P. Daniels (1904a). ROSCOMMON CO. MSC file (1950).

8. Panicum oligosanthes Schult. Mantissa 2: 256. 1824.

Panicum pauciflorum Ell. Bot. S. C. and Ga. 1: 120. 1816; not of R. Br. (1810).

Sandy, moist woods. Map no. 22.

Specimens examined: CLINTON CO. GWP 427(S). HILLSDALE CO. D&H M256(S). ST. CLAIR CO. CB(W). ST. JOSEPH CO. D&H M95(S).

9. Panicum scribnerianum Nash, Torr. Bot. Club Bul. 22: 421. 1895.

Panicum macrocarpon Torr. Fl. North and Mid. U. S. 143. 1823; not of LeC. (1818).

Panicum scoparium Wats. & Coult. ex Nash, Torr. Bot. Club Bul. 22: 421, as synonym. 1895; not of Lam. (1798).

Panicum oligosanthes var. scribnerianum (Nash) Fern. Rhodora 36: 80. 1934.

Sandy soil or dry prairies. Map no. 23.

Specimens examined: ALLEGAN CO. LAK(W). BARRY CO. D&H M6(S). BAY CO. B&W(S14647). BERRIEN CO. HTD 1247 (S14714). CASS CO. HSP 150(S14659); CFW(S61520). CLINTON CO. CFW(C14086, S14644, S61519). DELTA CO. OAF 4785a(M). IONIA CO. CFW(S61538). JACKSON CO. SHC(S14645); GHH (C14101); THM 1640(S124384); GWP 1342(S). KALAMAZOO CO. LAK(W). KENT CO. CWB 2904(C12150), 2946(C12149), 5262

(C13148), 5799(S120306). LIVINGSTON CO. DML(S123194). MONROE CO. OAF 4951(C14523, C16322), 5826(C14546), 5827 (C14543). MUSKEGON CO. CDM(S14642). OAKLAND CO. OAF 3969½ (C14397), 5051(C14394, M); THM 1678(S124402). OTTAWA CO. CWB 7813(C13237). ST. CLAIR CO. CB(C948); CKD(M-2 sheets); OAF 5495(C14545, M), 7416(C14547, M). VAN BUREN CO. CHK(M); HSP(S14660). WASHTENAW CO. CB(M); D&H M219(S); EWE 5287(M, S121519); OAF 5238(C14393), 5287(M), 5338(M), 5826(M); THM 1651(S124392), 1660(S124394); BAW(S14587). WAYNE CO. CB (C947, M); OAF 1610(C14398), 4527b(C14396), 4785a(C14395), 4591(M), 6160(C14544, M), 12250(M), 12251(M), 12251½(M); CMR 7366(S).

Unconfirmed reports: HURON CO. Charity Is. C. K. Dodge (1911). MARQUETTE CO. A. Dachnowski (1907). TUSCOLA CO. C. K. Dodge (1921d).

10. Panicum spretum Schult, Mantissa 2: 248. 1824.

Wet, sandy soil. Map no. 24.

Specimens examined: PRESQUE ISLE CO. JHE 6161(M); LHH 665(M).

11. Panicum lindheimeri Nash, Torr. Bot. Club Bul. 24: 196. 1897.

Panicum lanuginosum var. lindheimeri (Nash) Fern. Rhodora 36: 77. 1934.

Dry sandy or sterile woods and open ground. Map no. 25.

Specimens examined: ALPENA CO. F&P 3082(M). BERRIEN CO. EJH 87(M). CHEBOYGAN CO. JHE 7117(M). GRAND TRAVERSE CO. CFW(S14678, S14679). HURON CO. CKD(M-3 sheets). JACKSON CO. THM 1649(S124390). KENT CO. CWB 5607a(C12107, C12136, S). MONTMORENCY CO. HTD(S). MUSKEGON CO. CDM (S14532). ST. CLAIR CO. CKD(M). WAYNE CO. OAF 8972(M).

Unconfirmed reports: MACKINAC CO. Bois Blanc Is. C. K. Dodge (1921a). TUSCOLA CO. C. K. Dodge (1921d).

12. Panicum praecocius Hitchc. and Chase, Rhodora 8: 206. 1906.

Dry prairies and clearings. Map no. 26.

Specimens examined: BERRIEN CO. CKD 189(M). BRANCH CO. WBD M93(S). GENESEE CO. DCl 4012(S13236). GRATIOT CO. CAD(S14480). INGHAM CO. GWP 202(S), 212(S), 567(S). JACKSON CO. GWP 704(S). KALAMAZOO CO. D&H M28(S); LHH 1763(M); LAK(W). KEWEENAW CO. OAF 596½(C14536). LIVINGSTON CO. CB(C939); DML(S123195); AM(M). MACOMB CO. OAF 5881 (C14450). MENOMINEE CO. COG 3108(M). MIDLAND CO. RRD 5876 (C14098). OAKLAND CO. MTB(C940, C941); OAF 3462(C14390). ONTONAGON CO. HTD(M). WASHTENAW CO. OAF 7979½(C14549), 7991(M). WAYNE CO. OAF 1386b(C14537), 12223(M).

Unconfirmed reports: CHEBOYGAN CO. F. C. Gates and J. H. Ehlers (1925). OTTAWA CO. MSC file (1950). ST. CLAIR CO. O. A. Farwell (1918).

13. Panicum tennesseense Ashe, Elisha Mitchell Sci. Soc. Jour. 15: 52. 1898.

Panicum lindheimeri var. septentrionale Fern. Rhodora 23: 227. 1921.

Panicum lindheimeri var. tennesseense (Ashe) Farwell, Amer. Midl. Nat. 11: 45. 1928.

Panicum lanuginosum var. fasciculatum (Torr.) Fern. Rhodora 36: 77. pro parte. 1934.

Panicum lanuginosum var. septentrionale (Fern.) Fern. Rhodora 36: 77. 1934.

Open moist ground and edge of woods. Map no. 27.

Specimens examined: ALCONA CO. B&D 2169(S14676). ALPENA CO. B&D 2078(S14512), 2094(S14513). BERRIEN CO. HTD 1367(S14687), 1440(S14686); EJH 86(M). CHARLEVOIX CO. Beaver Is. MCR(C952). CHEBOYGAN CO. JHE 456(M), 962(M), 1489(M), 1526(M), 1527(M), 1555(M), 1824(M); HHI 2891(C16369); MP(M). EMMET CO. JHE 1735(M); RM 10797(C12832); THM 1625 (S124382); CFW(S14692). GRAND TRAVERSE CO. CWB 8405(S), 8576(S). INGHAM CO. W&L(S14475). IOSCO CO. CFW(S120140). KALAMAZOO CO. LAK(W). KENT CO. CWB 2934(S). LIVINGSTON CO. JHE 5046(M). MACKINAC CO. D&F 10392(A, S123758), Bois Blanc Is. MTB(C953, C954, C955, C956, C957), Round Is. MTB (C951). MECOSTA CO. RRD 4962(C14099). OAKLAND CO. C&S (C12649). ST. CLAIR CO. OAF 8058(C14416, M). TUSCOLA CO. CKD(M). VAN BUREN CO. GWP 1710(S). WASHTENAW CO. CB (C949, M); OAF 5237 (C14417, M), 5847a(C14517, C16328, M); FJH 6839(S14685). WAYNE CO. OAF 8972(C14415).

14. Panicum albermarlense Ashe, Elisha Mitchell Sci. Soc. Jour. 16: 84. 1900.

Panicum meridionale var. albermarlense (Ashe) Fern. Rhodora 36: 76. 1934.

Low sandy woods or open ground. Map no. 28.

Specimen examined: PRESQUE ISLE CO. FJH 7016(M).

Unconfirmed reports: CASS CO. O. A. Farwell (1918). KALAMAZOO CO. C. R. Hanes (1942), C. R. and F. N. Hanes (1947).

15. Panicum implicatum Scribn. U. S. Div. Agrost. Bul. 11: 43, f. 2. 1898; et in Britt. and Br. Illus. Fl. 3: 498, f. 267a. 1898.

Panicum lanuginosum var. implicatum (Scribn.) Fern. Rhodora 36: 77. 1934.

In a list of Division of Agrostology publications, Scribner (1901b) indicates that the date of publication of U. S. Div. Agrost. Bul. 11 is July 20, 1898. Although such an exact date is not available for volume 3 of Britton and Brown (1898), the preface is dated June 20, 1898. It is probably safe to assume that the latter publication was not printed and distributed before July 20 of that year. The place of first publication for this species is, then, in the Agrostology Bulletin cited above and as listed in Supplement 2 of the Index Kewensis.

Wet meadows, bogs, sandy soil; in cedar and hemlock swamps. Map no. 29.

Specimens examined: ALLEGAN CO. AJP(M). ARENAC CO. CFW(S14668). BERRIEN CO. HTD 1357(S14682). CASS CO. HSP 14(S14688). CHEBOYGAN CO. JHE 3578(M), 5588(M), 5617(M), 5618(M), 6183(M); HHI 2848(C16370). CLINTON CO. GWP 429(S). EMMET CO. JHE 3695(M). HOUGHTON CO. OAF 10268(C13982), 11771(C13981), 12837(C13980). INGHAM CO. MC 729(S); HTD (S14681); GWP 201(S), 418(S). JACKSON CO. C&C(S14711). KALAMAZOO CO. LHH 1809(M). KENT CO. CWB 5505(C12144). KEWEENAW CO. OAF 597a(C13999), 643a(C14512, C16314), 5976 (C14513, C16315), s.n.(S120132); FJH 8188(M). LAKE CO. CWB 4804(C12132, C12133). LENAWEE CO. JTB 73(S), 99(S). LUCE CO. RM 9524(M). MACOMB CO. OAF 5885(M), 5894(C14387). MIDLAND CO. RRD 5878(C14096). MISSAUKEE CO. HTD 711 (S14689). MONROE CO. MEM 5067(S). MUSKEGON CO. CWB 3188 (C12134). OAKLAND CO. CB(W); OAF 2860(C14421), 5270a C14423, M), 5894(M). OCEANA CO. CWB 6573(C12343). OTTAWA CO. CWB 6070(C12128). PRESQUE ISLE CO. RM 9241(M), 9254 (M), 9628(M). ST. CLAIR CO. CKD(M-2 sheets, S). VAN BUREN CO. CHK(M). WASHTENAW CO. CB(M); OAF 5275(C14389, M), 5281(C14388, M). WAYNE CO. OAF 1610½(C14511, C16324), 4514c (C14422, M), 12203(M), 12217½(M), s.n.(M).

16. Panicum meridionale Ashe, Elisha Mitchell Sci. Soc. Jour. 15: 59. 1898.

Panicum lindheimeri var. implicatum subvar. meridionale (Ashe) Farwell, Amer. Midl. Nat. 11: 45. 1928.

Panicum lanuginosum var. implicatum subvar. meridionale (Ashe) Farwell, Mich. Acad. Sci. Pap. 26(1): 5. 1941.

Sandy or sterile woods and clearings. Map no. 30.

Specimens examined: ARENAC CO. CFW 355(S14561). BAY CO. CFW(S14709, S14710). BERRIEN CO. CB(C933). CALHOUN CO. WJB(S14669). CHIPPEWA CO. Drummond Is. RM 9121(M). HOUGHTON CO. OAF 12046(C13990). HURON CO. CKD(M). JACKSON CO. C&C(S14711); OAF 5854(M); GWP 752(S). KALAMAZOO CO. HTD(S124000); LHH 1771(M); LAK(W-2 sheets). KENT CO. CWB 5549(C12125, S124002). KEWEENAW CO. OAF 642p.p.(C13997). LAKE CO. CWB 6687(C12122), 6869(S124003). LIVINGSTON CO. DML(S123198). MIDLAND CO. RRD 5888(C14100). MONROE CO. OAF 6993(C13992, M). MUSKEGON CO. CWB 5867(S), 6954 (C12389), 6768(C12126), 6812(C12123); WJB(S14708). OAKLAND CO. MTB(C932, C934, C950); OAF 3831(C13994), 5028(C14551), 5616a(C13993). OTTAWA CO. CWB 5078(S), 6333(C12124). ST. CLAIR CO. OAF 3788½(C13996). WASHTENAW CO. OAF 5845 (C13991); LKL 963(M); BAW(S14583).

Unconfirmed reports: CASS CO. O. A. Farwell (1918). CHEBOYGAN CO. F. C. Gates and J. H. Ehlers (1925). CRAWFORD CO. A. DeLisle (1951). EMMET CO. F. C. Gates and J. H. Ehlers (1925).

17. Panicum subvillosum Ashe, Elisha Mitchell Sci. Soc. Jour. 16: 86. 1900.

Dry woods and sandy ground. Map no. 31.

Specimens examined: ALPENA CO. B&D 1868(S14511). ARENAC CO. CFW 335(S14703). BRANCH CO. D&H M93(S). CHEBOYGAN CO. THM 400(S124013). HOUGHTON CO. OAF 9777(C14419). INGHAM CO. W&H(S14543). IOSCO CO. CFW(S120139). JACKSON CO. THM 1645(S124387), 1647(S12488). KALKASKA CO. WJB (S14537). KEWEENAW CO. OAF 642(C14414, S14538), 1214 (C14418, S14670); FJH 8083(M). LAKE CO. CWB 7324(S120205). LIVINGSTON CO. OAF 5847(M); THM 1594(S124373). MACKINAC CO. THM 1618(S124381). MARQUETTE CO. MTB(S9179); AD(M). MECOSTA CO. GWP 1091(S). MIDLAND CO. RRD 4922(C14097). MONTCALM CO. CAD(C10512, M). OAKLAND CO. CB(M); OAF 5510 (M), 5881(M). ONTONAGON CO. HTD(S14691). ROSCOMMON CO. DiA 129(H, S). SCHOOLCRAFT CO. CKD(M). ST. CLAIR CO. CKD (M); OAF 3210½(C14413), 5496(M), 8059(C14514). VAN BUREN CO. LHH 1792(M). WASHTENAW CO. OAF 5847(C14420). WAYNE CO. OAF 4512b(M), 9073(M); CFW(N).

Unconfirmed reports: CHIPPEWA CO. C. K. Dodge (1921c). MACOMB CO. O. A. Farwell (1927).

18. Panicum huachucae Ashe, Elisha Mitchell Sci. Soc. Jour. 15: 51. 1898.

Panicum dichotomum var. fasciculatum Torr. Fl. North & Mid. U. S. 146. 1824.

Panicum nitidum var. pilosum Torr. Fl. North & Mid. U. S. 146. 1824.

Panicum dichotomum f. fasciculatum Wats. & Coult. in A. Gray. Man. ed. 6. 633. 1890.

Panicum huachucae var. fasciculatum (Torr.) Hubb. Rhodora 14: 171. 1912.

Panicum lindheimeri var. fasciculatum subvar. pilosum (Torr.) Farwell, Amer. Midl. Nat. 11: 45. 1928.

Panicum lanuginosum var. fasciculatum (Torr.) Fern. Rhodora 36: 77. 1934.

Panicum lanuginosum var. fasciculatum subvar. pilosum (Torr.) Farwell, Mich. Acad. Sci. Pap. 26: 5. 1941.

Prairies and open ground. Map no. 32.

Specimens examined: ALLEGAN CO. CWB 3044(C12129, C12131); AJP 3(S14684). BAY CO. GWB(S); RRD 5494(C14095). BERRIEN CO. CKD 188(M); EJH 81(M). CASS CO. HSP 14(S14592), 952(S14534). CHEBOYGAN CO. JHE 546(M), 1528(M), 2077(M), 6183(M); CMR 7002(S). DELTA CO. COG 8108(M). EMMET CO. JHE 2641(M), 2642(M). GENESEE CO. DCl 3385(S14556). GOGEBIC CO. B&D 3395(M). INGHAM CO. GHH(S14541); CFW(S14526, S14527, S61537). JACKSON CO. OAF 5841(M); GWP 1434(S). KALAMAZOO CO. LAK(W). KENT CO. CWB 56(S122238), 2933 (C12127), 6110(S). KEWEENAW CO. OAF 597o(C14386), 12516 (C13769, S14555). LIVINGSTON CO. DML(S123201, S123202, S123303). MACKINAC CO. Mackinac Is. CWB 6687(C11078). MACOMB CO. DCo(S14547); OAF 5888(C14009); ERL(S14551). MANISTEE CO. OAF 5208(M). MARQUETTE CO. CKD(M). MENOMINEE CO. COG 2677(M), 2887(M), 2947(M). MISSAUKEE CO. B&D (S124007). MONROE CO. CB(M); OAF 6240(C13988, M); RRD 6215(C14094). MONTCALM CO. CFW(S14510, S14556). MUSKEGON

CO. CDM(S14675). NEWAYGO CO. CWB 5411(C12130); RM 9835(M). OAKLAND CO. CB(C926, M); MTB(C924, C925, C927, C958); OAF 3985(C14516, C16329), 5582(M), 5616a(M), 5855(M). OSCODA CO. DAP(S14552). SCHOOLCRAFT CO. JHE 135(M), 4275(M). ST. CLAIR CO. CKD(M, S14564); OAF 2828(C13989), 4971(C14014, M), 5496(C14013), 8057(C13987). ST. JOSEPH CO. CFW(S14544). WASHTENAW CO. CB(M, W); JD(M); COE 1698(M); E&E 5204(M); OAF 5841(C13984); FJH 6860(M), 6960(S14683). WAYNE CO. CB (C923, M); OAF 643b(C13979, S14536), 1382(C13977, C13978), 4512b(C13976, M), 4515a(M), 4527a(C13986, M), 12217½(C9648, C9650, C9651, C9652, C9653, C9654, C9655, C9656, C9660), s.n. (C9670, C9672).

Unconfirmed report: HILLSDALE CO. MSC file (1950).

19. Panicum villosissimum Nash, Torr. Bot. Club Bul. 23: 49. 1896.

Dry sandy or sterile soil; open woods and hillsides. Map no. 33.

Specimens examined: ALLEGAN CO. EAB(S124008). MISSAUKEE CO. B&D(S124009). MONTCALM CO. GWP 463(S). MONROE CO. CFW(S14540, S14665). MUSKEGON CO. CDM(S14528). VAN BUREN CO. LAK(W).

Unconfirmed reports: EMMET CO. F. C. Gates and J. H. Ehlers(1925). KALAMAZOO CO. C. R. and F. N. Hanes (1947).

20. Panicum pseudopubescens Nash, Torr. Bot. Club Bul. 26: 577. 1899.

Panicum villosissimum var. pseudopubescens (Nash) Fern. Rhodora 36: 79. 1934.

Panicum euchlamydeum Shinners, Amer. Midl. Nat. 32: 170. 1944.

Panicum commonsianum var. euchlamydeum (Shinners) Pohl, Amer. Midl. Nat. 38: 507. 1947.

Sandy open woods. Map no. 34.

Specimens examined: GRAND TRAVERSE CO. CFW(S14705). MARQUETTE CO. LHS(C12145). MUSKEGON CO. WJB(S14704). NEWAYGO CO. THM 1600(S124374), 1612(S124377). OCEANA CO. CWB 4726(C15549). WAYNE CO. OAF 9073(C14541).

Unconfirmed report: SAGINAW CO. O. A. Farwell (1918).

21. Panicum sphaerocarpon Ell. Bot. S. C. and Ga. 1: 125. 1816.

Panicum microcarpon var. sphaerocarpon (Ell.) Vasey, U. S. D. A. Spec. Rep. 63: 12. 1883.

The name Panicum microcarpon var. sphaerocarpon has been credited by various Michigan authors to Beal, who published the combination in his "Grasses of North America" (1896); the Vasey combination, however, is obviously earlier.

Sandy soil. Map no. 35.

Specimens examined: BERRIEN CO. HTD 1277(S14514), 1769(S14599; EJH 89(M). JACKSON CO. SHC(S14662); C&C(M, S14608); GHH(S14525, S14652); THM 1639(S124383), 1641

(S124385); GWP 1350(S). MACOMB CO. DCo(S61523). MUSKEGON CO. CDM(S14650, S14651). NEWAYGO CO. HTD 897(S14598). OAKLAND CO. CB(C946, W); OAF 2127a(C14408), 5584(C14399). VAN BUREN CO. HSP 161(S14653), 900(S14607). WASHTENAW CO. THM 1666(S124397). WAYNE CO. OAF 1388(C14522, C16323, S14656), 12228(M), 12253½(M).

Unconfirmed reports: BAY CO. W. J. Beal (1904). CASS CO. O. A. Farwell (1918). KALAMAZOO CO. C. R. and F. N. Hanes (1947). ST. CLAIR CO. W. J. Beal (1904).

22. Panicum ashei Pears. Elisha Mitchell Sci. Soc. Jour. 15: 35. 1898.

Panicum umbrosum LeC. ex Torr. in Eaton, Man. Bot. 342. 1818; not of Retz. (1786).

Panicum commutatum var. ashei (Pears.) Fern. Rhodora 36: 83. 1934.

Dry, rocky woods. Map no. 36.

Specimens examined: OTTAWA CO. CWB 1349(S). WAYNE CO. OAF 5396½(C14430).

Unconfirmed reports: BERRIEN CO. A. DeLisle (1951). KALAMAZOO CO. C. R. and F. N. Hanes (1947). MUSKEGON CO. O. A. Farwell (1918).

23. Panicum commutatum Schult. Mantissa 2: 242. 1824.

Panicum nervosum Muhl. ex Ell. Bot. S. C. and Ga. 1: 122. 1816; not of Lam. (1797).

Woods and copses. Map no. 37.

Specimens examined: ALLEGAN CO. GWP 1687(S). INGHAM CO. CFW(S14671). KALAMAZOO CO. LAK(W). KENT CO. S&S (S14571). LAPEER CO. THM 1676(S124401).

Unconfirmed reports: ST. CLAIR CO. W. J. Beal (1904). WAYNE CO. O. A. Farwell (1901, 1918).

24. Panicum clandestinum L. Sp. Pl. 58. 1753.

Moist sandy ground. Map no. 38.

Specimens examined: ALLEGAN CO. CWB 4565(C11078). BAY CO. GWB(S). BERRIEN CO. CB(C905, M, S14590); HTD 1297 (S14492). CASS CO. WJB(S14672); FCG 1319(M); HSP 148 (S14464). GOGEBIC CO. B&D 2732(M, S14491). HILLSDALE CO. GWP 854(S). INGHAM CO. GWP 412(S); CFW(N); W&H(S14572). KALAMAZOO CO. LAK(W-2 sheets). KENT CO. EJC(M). MACKINAC CO. Round Is. MTB(C908). MUSKEGON CO. CDM(S14493, S14505). OAKLAND CO. MTB(C906, C909, C910, C911, C14524); OAF 3814 (C14524, C16321). OTTAWA CO. CWB 1564(C123471). SHIAWASSEE CO. DCl 3023(S61511). ST. CLAIR CO. CKD(M-3 sheets); OAF 3889(C14440), 4011(C14445), 7251(M). VAN BUREN CO. LHH 1794 (M); GWP 1711(S). WAYNE CO. OAF 9167(C14444, M).

Unconfirmed reports: CLINTON CO. W. J. Beal (1904), C. F. Wheeler and E. F. Smith (1881). EATON CO. H. L. Clark (1902). GENESEE CO. W. J. Beal (1904), C. F. Wheeler and

E. F. Smith (1881). MACOMB CO. W. J. Beal (1904), C. F. Wheeler and E. F. Smith (1881). ST. JOSEPH CO. F. P. Daniels (1904b). WASHTENAW CO. B. A. Walpole (1924).

25. Panicum latifolium L. Sp. Pl. 58. 1753.

Panicum macrocarpon LeC. ex Torr. in Eaton, Man. Bot. ed. 2. 341. 1818.

Rocky and sandy woods. Map no. 39.

Specimens examined: ALLEGAN CO. CWB 3045(C11081, C12141). BAY CO. GWB(S). BARRY CO. GWP 1644(S). CALHOUN CO. WJB(S14623). CASS CO. GWP 1577(S); HSP 172(S14603). CHEBOYGAN CO. JHE 2220(M). GENESEE CO. DC(M). GRATIOT CO. CAD(C10478, M, S14624). HURON CO. CKD(M). INGHAM CO. WJB (S14516, S61529); MC(S); GWP 550(S), 1326(S); W&H(S14619). JACKSON CO. GWP 730(S), 1327(S), 1412(S), 1463(S); MS(M). KALAMAZOO CO. LHH 1761(M); MS(M). KENT CO. CWB 428 (S122479), 3316(C12142); EJC(S14618); GDS(M). LAKE CO. RM 9807(M). LENAWEE CO. JTB 71(S). LIVINGSTON CO. JHE 1900 (M); DML(S123193). MACOMB CO. DCo(S61525). MECOSTA CO. GWP 1034(S). MUSKEGON CO. WJB(S14622). NEWAYGO CO. EAB 1016(S14620), 1047(S14517). OAKLAND CO. CB(M, W); MTB (C924); EWE 1615(M); OAF 3821(C14003), 4256(C14002, M), 5584b(C14000, M); JMS 117(M). OSCODA CO. DAP 21(S14616). ROSCOMMON CO. EAB 394(S14518); B&D 333(S14621). ST. CLAIR CO. CKD(M-3 sheets). ST. JOSEPH CO. GWP 1533(S), 2483(S). VAN BUREN CO. LHP(M). WASHTENAW CO. JD(M); COE 2283(M);

E&E(M); FJH 6870(M, S14617); CDL(M); AJP 133(M); BAS(S14585); ARW 3267(M); MHW(M); MS(M). WAYNE CO. A(S14625); CB(C928); OAF 1378(C14004, S93731), 1920(C14528, C16319), 4532b (C14001, M), 6161(M), 12220(M), s.n.(M).

Unconfirmed reports: BERRIEN CO. A. DeLisle (1951). EMMET CO. F. C. Gates and J. H. Ehlers (1925).

26. Panicum boscii Poir. in Lam. Encycl. Sup. 4: 282. 1816.

Panicum latifolium var. molle Vasey ex Ward, Fl. Washington 135. 1881.

Panicum porterianum Nash, Torr. Bot. Club Bul. 22: 420. 1895.

Panicum boscii var. molle (Vasey) Hitchc. and Chase, Rhodora 10: 64. 1908.

Woods. Map no. 40.

Specimen examined: JACKSON CO. GWP 689(S).

Unconfirmed reports: BERRIEN CO. A. DeLisle (1951). KENT CO. E. J. Cole (1901). OAKLAND CO. O. A. Farwell (1918). ST. CLAIR CO. C. K. Dodge (1900). O. A. Farwell (1918). TUSCOLA CO. C. K. Dodge (1921d). WASHTENAW CO. B. A. Walpole (1924). WAYNE CO. O. A. Farwell (1918).

27. Panicum deamii Hitchc. and Chase in Deam, Ind. Dept. Conserv. Pub. 82: 284. 1929.

Panicum wilcoxianum of Fern. (1950), but not of Vasey (1889).

Sand dunes and sandy woodlands. Map no. 41.

Specimen examined: OCEANA CO. CWB 4784(S).

28. Panicum commonsianum Ashe, Elisha Mitchell Sci. Soc. Jour. 15: 55. 1898.

Sand dunes and sandy woods. Map no. 42.

Specimens examined: KENT CO. CWB 4395(S). NEWAYGO CO. D&H M274(S).

29. Panicum addisonii Nash, Torr. Bot. Club Bul. 25: 83. 1898.

Panicum commonsianum var. addisonii (Nash) Fern. Rhodora 37: 391. 1935.

Open, sandy ground. Map no. 43.

Specimens examined: LIVINGSTON CO. IJC(M); DML (S123199).

30. Panicum tsugetorum Nash, Torr. Bot. Club Bul. 25: 86. 1898.

Panicum columbianum of Fern. (1950), but not of Scribn. (1897).

Sandy woods. Map no. 44.

Specimens examined: ALPENA CO. B&D 2091(S14967). ARENAC CO. CKD(M-2 sheets). BAY CO. GWB(S-2 sheets); RRD 4913(C14087); CFW(S14519, S14520, S14698, S14700). BERRIEN CO. CFW(S14677). CHEBOYGAN CO. JHE 2065(M), 4672(M), 5388(M); FCG 12386(A), 13052(A); HHI 2847(C16367); THM 371 (S124019). DICKINSON CO. CFW(S14556). EMMET CO. JHE 2110

(M); LHH 685(M); THM 719(S124342). HURON CO. CAD(S14701); CKD(M). KALAMAZOO CO. G&V 94(S124004); LHH 1754(M), 1770 (M). KENT CO. CWB 2888(C12143), 4592(C11084). LAPEER CO. THM 1674(S124400). MECOSTA CO. RRD 5001(C14088). MONTCALM CO. CFW(S14509). MUSKEGON CO. CDM(S14528, S14694). NEWAYGO CO. CFW(S14508). OAKLAND CO. CB(M); OAF 5510(C13985), 5582 (C14006), 5583(C14515, C16316); THM 1679(S124403), 1680 (S124404). ROSCOMMON CO. EAB(S). SCHOOLCRAFT CO. JHE 4268(M). ST. CLAIR CO. CKD 131(S14699), s.n.(M-5 sheets, S14696). WASHTENAW CO. THM 1656(S124393). WAYNE CO. OAF 1674b(M), 8972(C9702).

31. Panicum columbianum Scrin. U. S. Div. Agrost. 7: 78, f. 60. 1897.

Sandy woods and open ground. Map no. 45.

Specimens examined: DELTA CO. F&P 3080(M). HURON CO. CAD(M). KALAMAZOO CO. LHH 1786(M). ONTONAGON CO. HTD (S14690). WASHTENAW CO. AJP 392(M). WAYNE CO. OAF 1218½ (M).

Unconfirmed report: ST. CLAIR CO. C. K. Dodge (1900).

32. Panicum microcarpon Muhl. ex Ell. Bot. S. C. and Ga. 1: 127. 1816.

Wet woods and swampy places. Map no 46.

Specimens examined: JACKSON CO. THM 1644(S124386).

WAYNE CO. OAF 5400½(C14395).

Unconfirmed reports: OAKLAND CO. M. T. Bingham (1945). VAN BUREN CO. W. J. Beal (1908).

33. Panicum dichotomum L. Sp. Pl. 58. 1753.

Panicum dichotomum f. commune Wats. & Coult. in A. Gray, Man. ed. 6. 633. 1890.

Panicum dichotomum f. gracile Wats. & Coult. in A. Gray, Man. ed. 6. 633. 1890.

Dry sterile woods. Map no. 47.

Specimens examined: CALHOUN CO. WJB(S14565). CASS CO. FCG 1391(M); GWP 1584(S). EATON CO. CB(M). INGHAM CO. WJB(S14667); CFW(N). JACKSON CO. GHH(S14481); GWP 744(S); MS(M). KALAMAZOO CO. LHH 1762(M); LAK(W). KENT CO. AJP (M). KEWEENAW CO. OAF(S14506). MACOMB CO. DCo 63(S14476). MONROE CO. CFW(S14539, S14557). MUSKEGON CO. CDM(S14560, S14562, S14563). OAKLAND CO. MTB(C916, C918); OAF 2107 (C14434), 4999(C14433, M), 5583(C14438), 9428(C14431, M). OTTAWA CO. CWB 1934(S122473), 1574(S122475), 1594(C12140). ST. CLAIR CO. CKD(M-2 sheets, S14559). ST. JOSEPH CO. GWP 1524(S), 1547(S), 2484(S). VAN BUREN CO. HSP 166(S13163), s.n.(S14673). WASHTENAW CO. OAF 5236(C14439); VMS(M); ?(M). WAYNE CO. CB(C917); OAF 643(S14507), 4275(M), 4533a (M), 5396(C14424).

Unconfirmed reports: BERRIEN CO. A. DeLisle (1951),

O. A. Farwell (1918). HURON CO. H. T. Darlington (1900), Charity Is. C. K. Dodge (1911). MANISTEE CO. F. P. Daniels (1904a).

34. Panicum barbulatum Michx. Fl. Bor. Amer. 1: 49. 1803.

Panicum dichotomum var. barbulatum (Michx.) Wood, Class-book ed. 3. 786. 1861

Sterile or rocky woods. Map no. 48.

Specimens examined: EATON CO. OAF 6559(C14432, M). VAN BUREN CO. FCG 1451(M).

Unconfirmed reports: INGHAM CO. O. A. Farwell (1918). ST. CLAIR CO. O. A. Farwell (1918). WAYNE CO. O. A. Farwell(1921).

35. Panicum boreale Nash, Torr. Bot. Club Bul. 22: 421. 1895.

Panicum boreale var. michiganense Farwell, Rhodora 42: 306. 1940.

Moist open ground or woods. Map no. 49.

Specimens examined: CHARLEVOIX CO. EAB(S124005). CHEBOYGAN CO. JHE 962(S14581). GRAND TRAVERSE CO. CFW (S14680). GRATIOT CO. CAD(M-2 sheets). INGHAM CO. CFW (S14716, S14717). KEWEENAW CO. OAF 643(C14428), 11355 (C14427), s.n.(S61528); FJH 8053(M); FEW 3586(S14712). MACKINAC CO. WGD 10393(A). MENOMINEE CO. COG 2837(M). MIDLAND CO. RRD 4926a(C14092). MUSKEGON CO. WJB(S14531);

CDM(S14715). NEWAYGO CO. CWB 5371(C12135). OAKLAND CO. CB(C922); OAF 5050(C14426, M). SCHOOLCRAFT CO. F&P 3079(M). ST. CLAIR CO. CKD(M).

Unconfirmed reports: BAY CO. C. K. Dodge (1921a). GOGEBIC CO. H. T. Darlington (1921). KALAMAZOO CO. C. R. and F. N. Hanes (1947). KENT CO. W. J. Beal (1904), E. J. Cole (1901), C. F. Wheeler and E. F. Smith (1881).

36. Panicum lucidum Ashe, Elisha Mitchell Sci. Soc. Jour. 15: 47. 1898.

Wet woods and sphagnum swamps. Map no. 50.

Specimens examined: ST. CLAIR CO. CKD(M-3 sheets).

37. Panicum miliaceum L. Sp. Pl. 58. 1753.

Broom-corn Millet. Waste places; introduced or escaped from cultivation. Map no. 51.

Specimens examined: CHEBOYGAN CO. JHE 5343(M). GRATIOT CO. CAD(M, S14661). GOGEBIC CO. HTD(S14604). JACKSON CO. GWP 1244(S). KENT CO. HCS(S14530). KEWEENAW CO. OAF 1414a(C14008). MACKINAC CO. Bois Blanc Is. MTB (C936). OAKLAND CO. CB(C935); OAF 7588(C14007, M). WASHTENAW CO. BAW(S14584), WAYNE CO. OAF 1414(S14384, S14605).

Unconfirmed reports: CALHOUN CO. MSC file (1950). EATON CO. MSC file (1950). ST. CLAIR CO. C. K. Dodge (1921a).

38. Panicum flexile (Gatt.) Scribn. in Kearney, Torr. Bot. Club Bul. 20: 476. 1893.

Panicum capillare var. flexile Gatt. Tenn. Fl. 94. 1887.

Sandy, mostly damp, soil; meadows and open woods. Map no. 52.

Specimens examined: ALGER CO. OAF 7215(M). CHARLEVOIX CO. Beaver Is. MCR 891(C920). EMMET CO. D&M 10377 (A, S123757). INGHAM CO. CFW(S14503, S61516). JACKSON CO. CFW(M). KENT CO. EJC(M, S14628). LAPEER CO. CKD(M). LIVINGSTON CO. JHE 4718(M). MENOMINEE CO. COG 2961(M). OAKLAND CO. OAF 893(C13768), 7215(C14435); GHH(N). WASHTENAW CO. FJH 6427(M), 6996(S14533), 9291(D219144, M), s.n. (A, M); LKL 1557(M). WAYNE CO. OAF 893a(C13767), 12185(M).

Unconfirmed reports: KALAMAZOO CO. C. R. and F. N. Hanes (1947). ST. CLAIR CO. W. J. Beal (1904), C. K. Dodge (1900), C. F. Wheeler and E. F. Smith (1881).

39. Panicum capillare L. Sp. Pl. 58. 1753.

Panicum capillare var. occidentale Rydb. U. S. Nat. Herb. Contr. 3: 186. 1895.

Witch-grass. Open ground and waste places; a weed in cultivated ground. Map no. 53.

Specimens examined: BAY CO. GWB(S). BERRIEN CO. CB(M, S12954). CHARLEVOIX CO. Beaver Is. MCR(C902).

CHEBOYGAN CO. JHE 1220(M), 1629(M), 5697(M); THM 865 (S124015); MP 85(M). EMMET CO. JHE 199(M). GOGEBIC CO. B&D 2598(M, S14578). HOUGHTON CO. OAF 10526(C14447); FJH 1529(M). INGHAM CO. WJB 17(S14497), s.n.(N, S14575); MC 710(S); FAL(S); THM 865(S124015); GWP 318(S). IRON CO. E&E 1220(S14580). KALAMAZOO CO. LAK(W). KALKASKA CO. LR 61(H, S). KENT CO. CWB 4150(C12138, C15554); GDS(M). KEWEENAW CO. WGD 10422(A); OAF 16(S14577), 514½(C14443), 536(C14528, C16317). LAKE CO. THM 1627(S124419). LAPEER CO. THM 1671 (S124339). LEELANAU CO. CWB 6323(C11083, C12139). LENAWEE CO. JTB 54(S). LIVINGSTON CO. DML(S123191). MACKINAC CO. WGD 10385A(A), 10385B(A), 10385C(A); THM 1618(S124380), Bois Blanc Is. MTB(C903). MACOMB CO. DCo(S14496); ERL (S14504). MARQUETTE CO. MTB(C9176). MENOMINEE CO. COG 2502(M), 2598(M). MISSAUKEE CO. JCE(S). MONROE CO. MEM 5149(S). MUSKEGON CO. CWB 5843(C12137). OAKLAND CO. CB(W); MTB(C900, C901, C904). SCHOOLCRAFT CO. WGD 10408(A, S123761), 10467(A, S123760), 10468(A). ST. CLAIR CO. CKD(M). VAN BUREN CO. HSP 559(S14591). WASHTENAW CO. FCo(M); FJH 9148 (M); AJP 134(M); THM 1661(S124395). WAYNE CO. OAF 536a (C14446), 5600(M); PAH 240(S), 254(S).

Unconfirmed reports: ANTRIM CO. MSC file (1950). CALHOUN CO. MSC file (1950). CHIPPEWA CO. C. K. Dodge (1921c). CLINTON CO. MSC file (1950). GENESEE CO. MSC file (1950). HILLSDALE CO. MSC file (1950). HURON CO.

H. T. Darlington (1900), Charity Is. C. K. Dodge (1911). MACKINAC CO. Mackinac Is. C. K. Dodge (1913). MIDLAND CO. MSC file (1950). ST. JOSEPH CO. F. P. Daniels (1904b). TUSCOLA CO. C. K. Dodge (1921d). Also seen, but not collected by the author in SHIAWASSEE CO. in the winter of 1951.

40. Panicum philadelphicum Bernh. ex Trin. Gram Pan. 216. 1826.

Dry open or sandy ground. Map no. 54.

Specimens examined: IONIA CO. CFW(M). MONTCALM CO. CFW(S61512). WAYNE CO. OAF 3214b(C14548).

Unconfirmed reports: OAKLAND CO. MSC file (1950). KALAMAZOO CO. C. R. and F. N. Hanes (1947).

41. Panicum dichotomiflorum Michx. Fl. Bor. Amer. 1: 48. 1803.

Panicum proliferum var. geniculatum Wood, Amer. Bot. & Flor. 2: 392. 1871.

Panicum proliferum of Michigan authors, but not of Lam. (1797).

Panicum dichotomiflorum var. geniculatum (Wood) Fern. Rhodora 38: 387. 1936.

Fall Panicum. Moist ground, along streams; a weed in waste places and cultivated soil. Map no. 55.

Specimens examined: HOUGHTON CO. OAF 12247(C14441). INGHAM CO. THM 972(S124422); GWP(S). KALAMAZOO CO. LAK(W) LIVINGSTON CO. DML(S123200). MONROE CO. MEM 5669(S).

OAKLAND CO. OAF 6416(C14442). ST. CLAIR CO. CKD 726(C915), s.n.(M). ST. JOSEPH CO. FPD(S14627). WASHTENAW CO. WGD 10358(A). WAYNE CO. CB(C914, M, W); OAF 4812(C14437), 11697 (C14436, D219415); PAH 242(S).

Unconfirmed report: BERRIEN CO. A. DeLisle (1951).

42. Panicum virgatum L. Sp. Pl. 59. 1753.

Panicum virgatum var. cubense Griseb. Cat. Pl. Cub. 233. 1866.

Switch-grass. Prairies, open ground and open woods. Map no. 56.

Specimens examined: ALLEGAN CO. LHB 1821(M); GWP 1156 (S). ARENAC CO. CFW 351(S14637). BAY CO. GWB(S). BERRIEN CO. CB(M); HTD 1447(S14477); CKD(M); GWP 1713(S). BRANCH CO. D&H M97(S). CASS CO. D&H M125(S); GWP 1568(S). CHEBOYGAN CO. MTB(C961, C963); JHE 1276(M), 2200(M), 3071(M); E&E 1276(S14579). DICKINSON CO. CFW(S14641). HILLSDALE CO. D&H M254(S). HOUGHTON CO. OAF 11118(C14518). INGHAM CO. D&H M182(S); W&H(S14572); GWP 401(S). JACKSON CO. GHH 15 (S14640). KALAMAZOO CO. D&H M138(S), M230(S); MS(M). KENT CO. CWB 6787(C12103); EJC(S14524); S&S(S14523, S14575). LAPEER CO. OAF 6687(M). LENAWEE CO. CB(C900, W). LIVINGSTON CO. OAF 1928(C14520, C16326); DML(S123192). MONROE CO. OAF 5300(M); CMR 7304(S). MUSKEGON CO. CDM(S14638). OAKLAND CO. OAF 3809(C14409). OTTAWA CO. CWB 6203(C12100). SHIAWASSEE CO. GWP 2633(S). ST. CLAIR CO. CKD 247(S14597),

s.n.(M, S13497); OAF 2139½(C14410), 3055(C14519, C16327). VAN BUREN CO. DAP(S14639); HSP 371(S14576). WASHTENAW CO. CB(M); OAF 6323(C14412, M), 6324(M), 6340(M), 6803(M), 6803½ (C14411), 8021(M); FCG(M); FJH 9139(M); LKL 1084(M); BAW(M). WAYNE CO. OAF 8949(M).

Unconfirmed reports: ANTRIM CO. MSC file (1950). CLARE CO. MSC file (1950). GENESEE CO. W. J. Beal (1904). GRAND TRAVERSE CO. MSC file (1950). HURON CO. Charity Is. H. T. Darlington (1900), C. K. Dodge (1911). SAGINAW CO. MSC file (1950). ST. JOSEPH CO. W. J. Beal (1904), F. P. Daniels (1904b), MSC file (1950). WEXFORD CO. MSC file (1950). Also seen, but not collected, by the author in WEXFORD CO.

43. Panicum agrostoides Spreng. Pl. Pugill. 2: 4. 1815.

Wet meadows and shores. Map no. 57.

Specimens examined: ALLEGAN CO. CWB 8109(C11981). BERRIEN CO. HTD 1560(S14500), 9629(S14631). INGHAM CO. GWP 407(S). MACOMB CO. DCo(S61513). OTTAWA CO. CWB 5079 (C12153, S).

Excluded Species

Panicum amarum Ell. Reported for St. Joseph Co. in the MSC file (1950). No specimens were seen and it is of doubtful occurrence in Michigan; it is an Atlantic coast species.

Panicum anceps Michx. Reported for Tuscola Co. in the MSC file (1950). No specimens were seen. It may possibly occur in Michigan since it is known from the states adjoining on the south, or this report may be based on a misidentification of a specimen of P. agrostoides.

Panicum annulum Ashe. Reported for Michigan by Hitchcock and Chase (1951), but no specimens have been seen.

Panicum calliphyllum Ashe. Reported for Kalamazoo Co. by C. R. Hanes (1939) and C. R. and F. N. Hanes (1947), and without definite locality by C. W. Bazuin (1947). No specimens were seen, but it may well occur in the state since it is reported also by Hitchcock and Chase (1951).

Panicum columbianum Scribn. Reported for Michigan by Hitchcock and Chase (1951), but no specimens have been seen.

Panicum condensum Nash. Reported for Berrien Co. in the MSC file (1950). No specimens were seen and it is of doubtful occurrence inasmuch as it is an Atlantic and Gulf coast species.

Panicum gattingeri Nash. According to the range as given by Fernald (1950), this species would be expected in Michigan, but no specimens have been seen. It is not reported for the state by Hitchcock and Chase (1951).

Panicum lanuginosum Ell. Reported for Van Buren Co. by W. J. Beal (1908) and for Wayne Co. by O. A. Farwell (1901). No specimens were seen and it is not likely to occur since the species has a more southern and eastern distribution.

Panicum laxiflorum Lam. Reported by W. J. Beal (1908) on the basis of a report, without specimen, from H. S. Pepoon. No specimens were seen and, since this is a species of the southeastern states, it probably does not occur here.

Panicum nitidum Lam. The several reports for this southeastern coastal species probably are based on misidentifications of specimens of P. dichotomum, P. lindheimeri or P. tsugetorum.

Panicum polyanthes Schult. Reported for Macomb Co. by W. J. Beal (1904) and O. A. Farwell (1901), and also for Oakland Co. by Farwell (1901). The Oakland Co. specimen to which Farwell refers is a specimen of P. sphaerocarpon. The species has a more southern range.

Panicum proliferum Lam. This is an Old World species to which P. dichotomiflorum has been referred by various authors.

Panicum ravenelii Scribn. & Merr. The report for Washtenaw Co. by B. A. Walpole (1924) was based on a misidentification of a specimen of P. leibergii.

Panicum scoparioides Ashe. Reported for Michigan by Hitchcock and Chase (1951), but no specimens have been seen.

Panicum scoparium Lam. This species has a more southern distribution and no Michigan specimens were seen. Reports by several authors, under the synonymous name P. pubescens Lam., are based on misidentifications of specimens of P. huachucae and P. implicatum.

Panicum tuckermanii Fern. Reported for Michigan by Hitchcock and Chase (1951), but no specimens have been seen.

Panicum verrucosum Muhl. Reported for Michigan by C. W. Bazuin (1947) and by Hitchcock and Chase (1951), but no specimens have been seen.

Panicum xalapensis H.B.K. Reported for Michigan by Hitchcock and Chase (1951), but no specimens have been seen.

Panicum yadkinense Ashe. Reported for St. Clair Co., under the synonymous name P. maculatum, by W. J. Beal (1904) and C. K. Dodge (1900). No specimens have been seen, but it may well occur in the state since it is also reported for Michigan by Hitchcock and Chase (1951).

TRIBE ANDROPOGONEAE

Key to the Michigan Genera

1. Racemes of several to many joints, solitary, digitate, or aggregate in panicles ..... 9. Andropogon

1. Racemes reduced to one or a few joints, these mostly peduncled in a subsimple or a compound panicle

   2. Pedicellate spikelets staminate ..... 10. Sorghum

   2. Pedicellate spikelets absent, the pedicels only present ..... 11. Sorghastrum

9. ANDROPOGON L. Sp. Pl. 1045. 1753.

A genus of about 150 species in the tropics of both hemispheres, a few of which extend into the temperate regions. Three of the latter species are found in Michigan.

Key to the Michigan Species

1. Racemes solitary on each peduncle ... 1. A. scoparius

1. Racemes 2 to numerous on each peduncle

   2. Pedicellate spikelet staminate; inflorescence of digitate spicate racemes ..... 2. A. gerardii

   2. Pedicellate spikelet reduced to 1 or 2 glumes; inflorescence paniculate ..... 3. A. virginicus

1. Andropogon scoparius Michx. Fl. Bor. Amer. 1: 57. 1803.

   Schizachyrium scoparium (Michx.) Nash in Small, Fl. Southeast. U. S. 59. 1903.

Andropogon praematurus Fern. Rhodora 42: 413, pl. 626. ff. 1--3. 1940.

Little Bluestem. Prairies, open woods, dry hills and fields. Map no. 58.

Specimens examined: ALGER CO. CKD 400(C659), s.n.(M); JHE 4423(M). BARRY CO. GWP 1121(S). BERRIEN CO. GLA(M); HTD 1411(S15103). CALHOUN CO. WJB(S15287). CHEBOYGAN CO. WGD 10373(A), 10374(A); JHE 1185(M, S15269), 1238(M); E&E 1238(S12567). CLINTON CO. GWP 425(S). CRAWFORD CO. JHE 4423(M). EMMET CO. MTB(C661); JHE 2159(M); THM 813(S124304). GOGEBIC CO. B&D 2774(M, S15292). GRAND TRAVERSE CO. CRB 3060(A); CWB 8789(S). INGHAM CO. WJB(S61543); D&H M194(S); GWP 416(S). IOSCO CO. GAL 4204(A). JACKSON CO. C&C (S15286); THM 1636(S124361); GWP 796(S). KALKASKA CO. LR 67(H, S124722). KENT CO. CWB 5191(C12011); FC1(W). LAKE CO. CG(M); RM 9805(M). LAPEER CO. OAF 6687(M); THM 1675 (S124362). LENAWEE CO. WJB 5(S15290), s.n.(S123039); CB (M, W). LIVINGSTON CO. D&H M198(S); DML(S123216). MACKINAC CO. WGD 10394(A), 10399(A); JHE 1835(M); COE 771(M); THM 1623(S124363). Bois Blanc Is. MTB(C663). Round Is. MTB(C662). MACOMB CO. DCo(S15294). MANISTEE CO. FPD (S15286, S15289); OAF 3045a(M), 3055½(M), MECOSTA CO. GWP 1059(S), 1074(S). MENOMINEE CO. COG 2888(M). NEWAYGO CO. D&H M272(S). OAKLAND CO. WGD 10361(A); OAF 5587c(M), 5610(M), 5610½(M). OTSEGO CO. RM 9670(M). PRESQUE ISLE

CO. JHE 5448(M), 7097(M); RM 11069(C12725, M). ROSCOMMON CO. DiA 176(H, S124720). ST. CLAIR CO. CKD(M). ST. JOSEPH CO. D&H M114(S). VAN BUREN CO. HSP 362(S15295). WASHTENAW CO. ECA(M); MHC(M); AJP 145(M), s.n.(M-2 sheets); GBS(M).

Unconfirmed reports: CHIPPEWA CO. C.K. Dodge(1921c). HURON CO. Charity Is. C. K. Dodge (1911). KALAMAZOO CO. C. R. and F. N. Hanes (1947), MSC file (1950). MARQUETTE CO. C. K. Dodge (1918). MONTMORENCY CO. C. K. Dodge (1921a). OGEMAW CO. C. K. Dodge (1921a). OSCODA CO. C. K. Dodge (1921a). OTTAWA CO. C. K. Dodge (1921a). WAYNE CO. MSC file (1950).

2. Andropogon gerardii Vitm. Summa Pl. 6: 16. 1792.

Andropogon provincialis Lam. Encycl. 1: 376. 1785; not of Retz. (1783).

Andropogon furcatus Muhl. in Willd. Sp. Pl. 4: 919. 1806.

Big Bluestem. Dry soil, prairies and open woods. Map no. 59.

Specimens examined: ALLEGAN CO. CHK(M). BARRY CO. GWP 1122(S). BAY CO. GWB(S). BERRIEN CO. HTD 1410 (S15271); D&H M151(S). CALHOUN CO. WJB(S15283). CASS CO. D&H M120(S). CHEBOYGAN CO. JHE 1275(M), 5639(M); E&E 1275 (S15268). CLINTON CO. DMB(S); GWP 257(S). CRAWFORD CO. EAB(S123041); JHE 5941(M). HILLSDALE CO. D&H M246(S). HOUGHTON CO. CDR 2661(A, M). HURON CO. ELM A227(M).

INGHAM CO. WJB(S15264, S61542); D&H M180(S), M183(S); WAM 88(S); GWP 396(S). IOSCO CO. GAL 4202(A). JACKSON CO. D&H M226(S); K&K(M); THM 1632(S124365); GWP 723(S), 797(S). KALAMAZOO CO. D&H M43(S), M137(S); ?(S). KENT CO. CWB 1886(S121830), 5925(D219412); W&H(S15276). KEWEENAW CO. WGD 10456(A). LAKE CO. CD(M); RM 9805(M). LAPEER CO. THM 1677(S124364). LENAWEE CO. WJB 6(S15272); CB(C651, W); JTB 3(S). LIVINGSTON CO. D&H M197(S); JHE 4721(M); DML(S123214, S123215). MACOMB CO. DCo 65(S15284), 66(S61539). MECOSTA CO. EAB 824(S15275); GWP 1057(S), 1081(S). MENOMINEE CO. COG 3861(M), 3581(M). MUSKEGON CO. CWB 4197(C10260); CDM (S123040). NEWAYGO CO. EAB 1037(S15274); D&H M273(S); RM 9824(M). OAKLAND CO. CB(C650); MTB(C652, C653, C654, C655. C656); C&S(C14467); MTH(C18727). PRESQUE ISLE CO. JHE 5449 (M), 7098(M); RM 11022(M), 11070(C12724, M); THM 770(S124338). ROSCOMMON CO. DiA 120(H, S124717). ST. CLAIR CO. CKD(M, S15265, S15281). SHIAWASSEE CO. WHL(S). VAN BUREN CO. HSP 350(S15270). WASHTENAW CO. ECA(M-2 sheets); JHE 1843 (M); COE 844(M); OAF 1185(M); FJH 6971(S15282); K&K(M); AJP 146(M), s.n.(M-2 sheets); BAW(M).

Unconfirmed reports: CHIPPEWA CO. C. K. Dodge (1921c). EMMET CO. F. C. Gates & J. H. Ehlers (1925). GOGEBIC CO. H. T. Darlington (1921). HURON CO. Charity Is. H. T. Darlington (1900), C. K. Dodge (1911). MANISTEE CO. F. P. Daniels (1904a), MSC file (1950). MARQUETTE CO. C. K.

Dodge (1918). MIDLAND CO. MSC file (1950). MISSAUKEE CO. MSC file (1950). MONROE CO. MSC file (1950). MONTMORENCY CO. C. K. Dodge (1921a). OGEMAW CO. C. K. Dodge (1921a). OSCODA CO. C. K. Dodge (1921a). ST. JOSEPH CO. F. P. Daniels (1904b). TUSCOLA CO. C. K. Dodge (1921d).

3. Andropogon virginicus L. Sp. Pl. 1046. 1753.

Broomsedge. Open ground, old fields, open woods, sterile hills and sandy soil. Not common in Michigan. Map no. 60.

Specimens examined: CASS CO. FCG 1511(M). OTTAWA CO. CWB 5083(C12012). 5182(C10855). VAN BUREN CO. HSP 536 (S15296).

Excluded Species

Andropogon glomeratus (Walt.) B.S.P. Reported for Kalamazoo Col by C. R. and F. N. Hanes (1947) under the synonymous name Andropogon virginicus var. abbreviatus Fern. & Grisc. No specimens of this species have been seen. It is doubtful if it occurs in Michigan since it has a much more southern distribution.

Andropogon hallii Hack. Reported for Van Buren Co. by A. DeLisle (1951) under the synonymous name Andropogon chrysocomus Nash. No specimens have been seen for this species and it is of doubtful occurrence in Michigan since it has a more western distribution.

10. SORGHUM Moench. Meth. 207. 1794.

A genus of about thirty species of the tropics, some of which are widely distributed in cultivation. Two species are found in Michigan.

Key to the Michigan Species

1. Perennial, with long, creeping rootstocks; spikelets disarticulating from the pedicel at maturity ..... 1. S. halepense

1. Annual; spikelets not disarticulating from the pedicel at maturity ..... 2. S. vulgare

1. Sorghum halepense (L.) Pers. Syn. Pl. 1: 101. 1805.

Holcus halepense L. Sp. Pl. 1047. 1753.

Andropogon halepensis (L.) Brot. Fl. Lusitan. 1: 89. 1804.

Johnson Grass. Open ground, fields and waste places. Not common in Michigan. Map no. 61.

Specimens examined: BERRIEN CO. HTD 1372(S10106). INGHAM CO. THM 956(S124421). SHIAWASSEE CO. RRD 5448 (C14226). WAYNE CO. OAF 1416a(C13774), 8828(C13773).

Unconfirmed reports: EATON CO. MSC file (1950). KALAMAZOO CO. C. R. and F. N. Hanes (1947). TUSCOLA CO. MSC file (1950).

2. Sorghum vulgare (L.) Pers. Syn. Pl. 1: 101. 1805.

Holcus sorghum L. Sp. Pl. 1047. 1753.

Holcus saccharatus L. Sp. Pl. 1047. 1753.

Holcus durra Forsk. Fl. Aegypt. Arab. 174. 1775.

Sorghum sorghum (L.) Karst. Deut. Fl. 367, f. 189. 1880.

Sorghum vulgare var. saccharatum (L.) Boerl. Ann. Jard. Bot. Buitenzorg 8: 69. 1890.

Holcus durra var. aegypticus (Koern.) Farwell, Mich. Acad. Sci. Rep. 20: 163. 1918.

Holcus saccharatus var. technicus (Koern.) Farwell, Mich. Acad. Sci. Rep. 20: 163. 1918.

Sorghum vulgare var. technicus (Koern.) Jav. Magyar. Fl. 1: 63. 1924.

Sorghum vulgare var. durra (Forsk.) Hubb. and Rehd. Harvard Mus. Bot. Leaflets 1: 10. 1932.

Sorghum. An occasional waif in Michigan. Map no. 62.

Specimens examined: INGHAM CO. GWP 395(S). WAYNE CO. OAF 2504(C13772).

11. SORGHASTRUM Nash in Britton, Man. 71. 1901.

A genus of six species in tropical Africa and three species in the United States east of the Rocky Mountains. One species in found in Michigan.

1. Sorghastrum nutans (L.) Nash in Small, Fl. Southeast U. S. 66. 1903.

Andropogon nutans L. Sp. Pl. 1045. 1753.

Andropogon avenaceus Michx. Fl. Bor.-Amer. 1: 58. 1803.

Sorghum nutans (L.) A. Gray, Man. 617. 1848.

Chrysopogon avenaceus (Michx.) Benth. Linn. Soc. Jour. Bot. 19: 73. 1881.

Sorghastrum avenaceum (Michx.) Nash in Britton, Man. 71. 1901.

Indian grass. Prairies, open woods and dry slopes. Map no. 63.

Specimens examined: ALLEGAN CO. GWP 1160(S). BERRIEN CO. GLA(M); HTD 1509(S15298); GWP 1787(S); ?(M). BRANCH CO. D&H M261(S). CALHOUN CO. WJB(S15302). CASS CO. MS (M-2 sheets). CHEBOYGAN CO. MTB(C1069); WGD 10375(A); JHE 1251(M, S15297), 2212(M). HURON CO. CAD(S15729). INGHAM CO. WJB(S61641); W&H(S15301); ?(S15722). JACKSON CO. D&H M237(S); THM 1633(S124366). KENT CO. CWB 20(S122237), 2163 (C11158, S122478), 2193(C12015); S&S(S15299). LAPEER CO. OAF 6690(C13196, M). LIVINGSTON CO. DML(S123217). MENOMINEE CO. COG 2836(M). MONTMORENCY CO. RM 11065(C12672). NEWAYGO CO. CWB 2079(C11157, S122477); D&H M301(S); RM 9832 (C11736). OAKLAND CO. MTB(C1071); C&S(C12932); OAF 1575 (C13829), 3218(C13195); GWP 1941(S). VAN BUREN CO. HSP 349 (S15304); MS(M). WASHTENAW CO. ECA(M-2 sheets); CB(C1070, W); GBS(M). WAYNE CO. OAF 1575a(C13328).

Unconfirmed reports: HURON CO. Charity Is. C. K. Dodge (1911). KALAMAZOO CO. C. R. and F. N. Hanes (1947). MARQUETTE CO. A. Dachnowski (1907). ST. JOSEPH CO. F. P. Daniels (1904b). TUSCOLA CO. C. K. Dodge (1921d).

TRIBE TRIPSACEAE

In much of the literature this tribe is referred to as the Maydeae, a name which is not in accordance with the current rules of botanical nomenclature.

Key to the Michigan Genera

1. Staminate and pistillate spikelets in separate portions of the same inflorescence, the pistillate below the staminate ..... 12. Tripsacum

1. Staminate and pistillate spikelets in separate inflorescences, the former in a terminal panicle, the latter in the axils of the leaves ..... 13. Zea

12. TRIPSACUM L. Syst. ed. 10. 1261. 1759.

A genus of seven species, distributed from northern South America through the West Indies and Central America to central and eastern United States. One species occurs locally in Michigan.

1. Tripsacum dactyloides (L.) L. Syst. ed. 10. 1261. 1759.
Coix dactyloides L. Sp. Pl. 972. 1753.

Eastern Gamagrass. Swales, banks of streams and other moist places. Map no. 64.

Specimens examined: MACOMB CO. OAF 6297(M). WASHTENAW CO. BAW(C1089, C14225).

13. ZEA L. Sp. Pl. 971. 1753.

1. Zea mays L. Sp. Pl. 971. 1753.

This common cultigen, the only species accepted in the genus, is found occasionally as a waif in Michigan. Although it is not a persistent part of the flora of the state, it is included here for the convenience of those who might encounter it in the field.

SUMMARY

This floristic study of the Panicoideae of Michigan is the first to be made since 1904, when W. J. Beal's "Michigan Flora" was published.

It involved the study of all Michigan specimens of this subfamily in the herbaria of Michigan State College, Cranbrook Institute of Science, the Division of Botany and Plant Pathology of the Canadian Department of Agriculture, Houghton Lake Wildlife Experiment Station, Michigan State Normal College, University of Michigan, University of Notre Dame, and Western Michigan College.

Eleven genera, including 63 species, were found to occur definitely in Michigan. Keys to the identification of the genera and species are included in this report. A brief note regarding the habitat is given for each species. The counties in which the specimens were collected are listed, along with information regarding the collectors, collector's number, present location of each specimen, and, where available, the herbarium numbers of the specimens. The nomenclature employed is essentially in accord with that of Hitchcock and Chase, "Manual of the Grasses of the United States" (1951). A list of synonyms used by Michigan workers is included for each species where names other than the currently accepted one were used by them.

A few notes on the types of habitats are included in the beginning of the report. Maps showing distribution have been prepared for each species. An analysis of distribution patterns has been made. As a result of this analysis, the species have been divided into six groups. These are: species of statewide distribution; species of the southern half of the lower peninsula with scattered distribution in the upper peninsula; species of the southern half of the lower peninsula; species of restricted distribution or of rare occurrence; introduced weeds or waifs. These groups are individually discussed.

A summary, by counties, of the known distribution of the Panicoideae within Michigan is also included.

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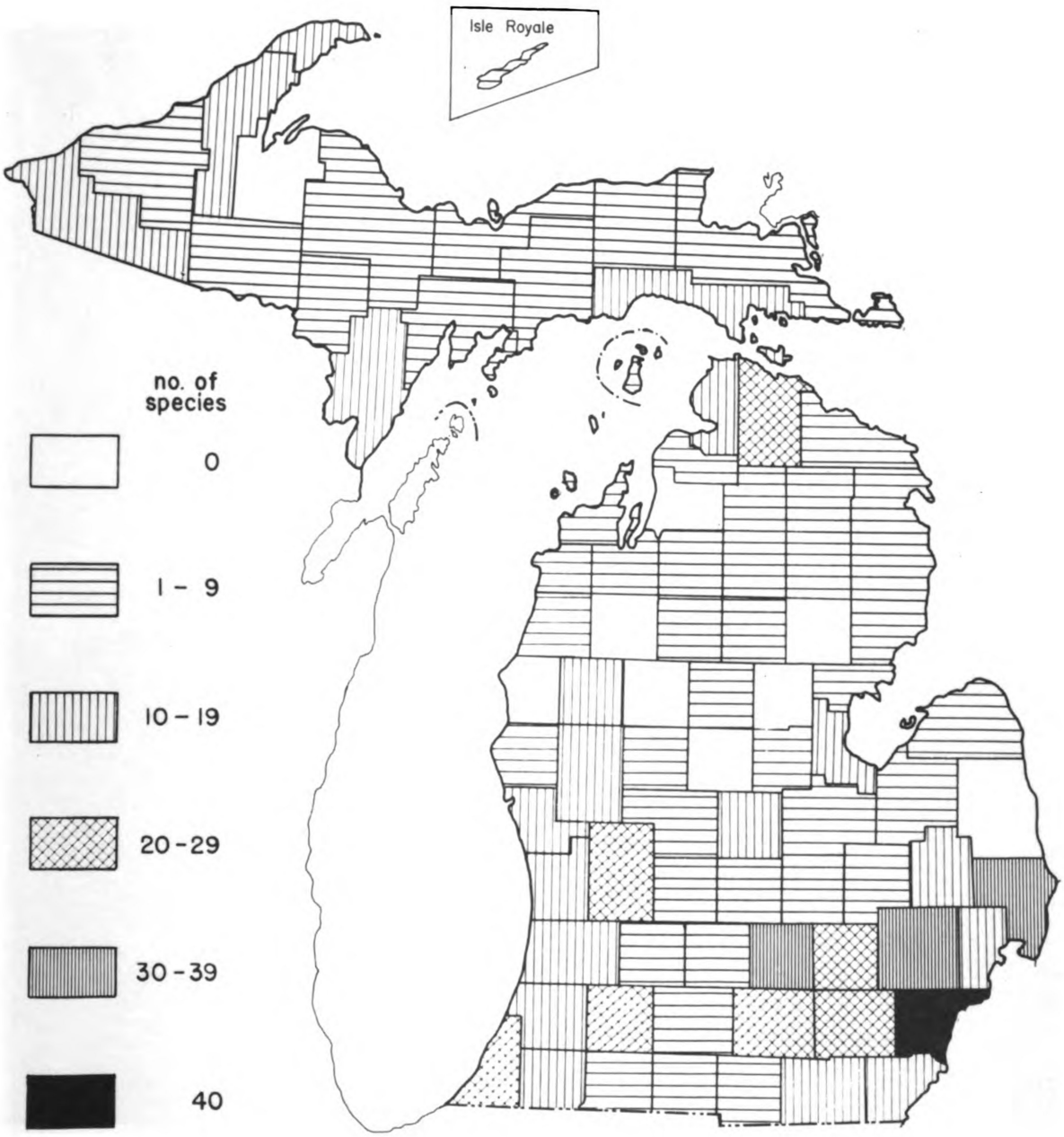
APPENDIX: DISTRIBUTION MAPS

Summary of Distribution by Counties (Map 1)

Individual Species Distributions (Maps 2--64)

Map 1. Summary of Distribution by Counties



1

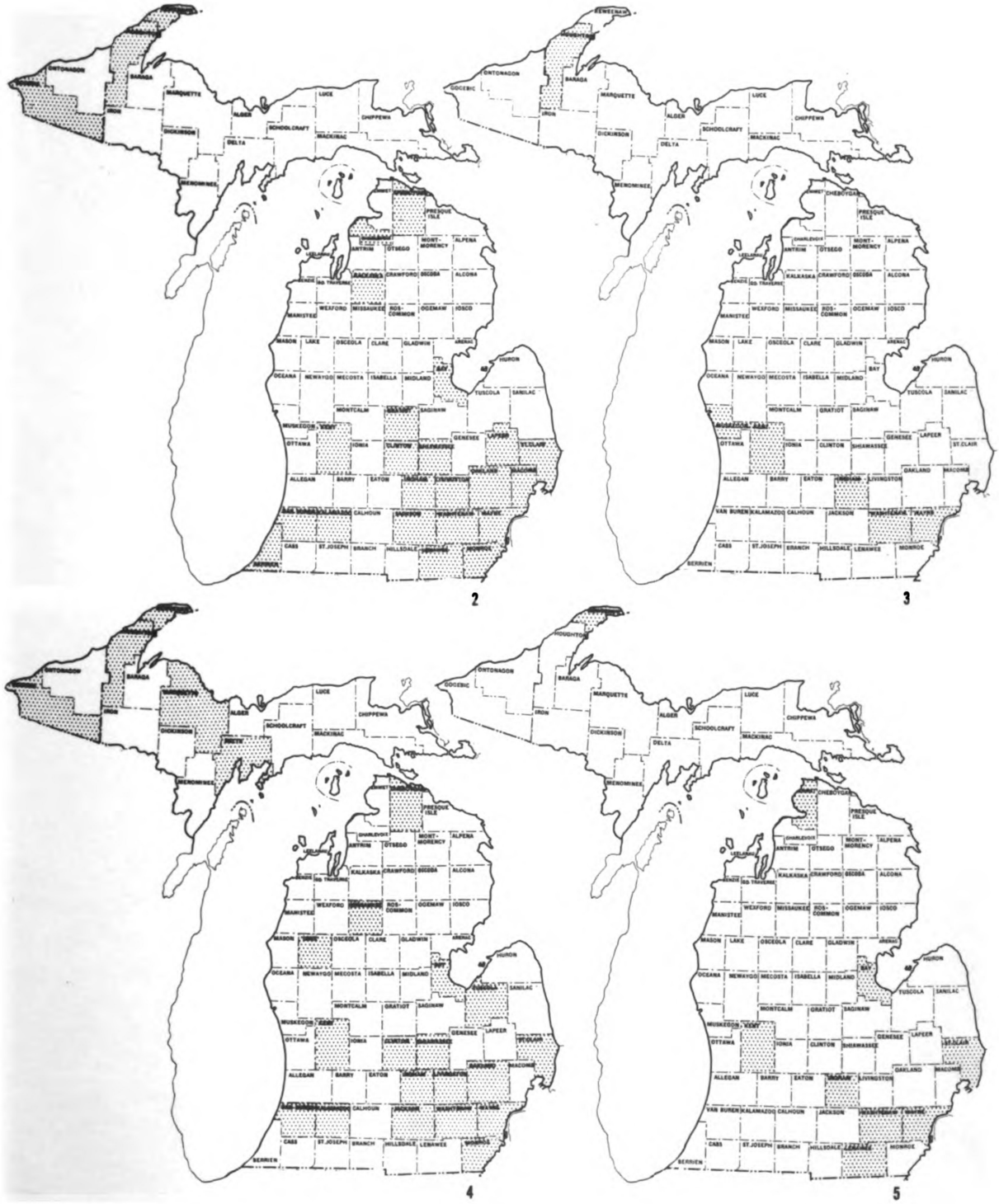
Individual Species Distributions:

Map 2. *Setaria lutescens* (Weig.) Hubb.

Map 3. *Setaria verticillata* (L.) Beauv.

Map 4. *Setaria viridis* (L.) Beauv.

Map 5. *Setaria italica* (L.) Beauv.


2
3
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Individual Species Distributions:

Map 6. *Cenchrus pauciflorus* Benth.

Map 7. *Echinochloa colonum* (L.) Link.

Map 8. *Echinochloa crusgalli* (L.) Beauv.

Map 9. *Echinochloa walteri* (Pursh) Heller

6
7
8
9

Individual Species Distributions:

Map 10. Digitaria filiformis (L.) Koel.

Map 11. Digitaria ischaemum (Schreb.) Schreb.

Map 12. Digitaria sanguinalis (L.) Scop.

Map 13. Leptoloma cognatum (Schult.) Chase

KEWEENAW
HOUGHTON
ONTONAGON
GOGEBIC
BARAGA
MARQUETTE
IRON
DICKINSON
ALGER
LUCE
CHIPPEWA
SCHOOLCRAFT
MACKINAC
DELTA
MENOMINEE
CHEBOYGAN
PRESQUE ISLE
CHARLEVOIX
EMMET
ANTRIM
OTSEGO
MONTMORENCY
ALPENA
LEELANAU
BENZIE
KALKASKA
CRAWFORD
OSCODA
ALCONA
GRAND TRAVERSE
WEXFORD
MISSAUKEE
ROSCOMMON
OGEMAW
IOSCO
MANISTEE
MASON
LAKE
OSCEOLA
CLARE
GLADWIN
ARENAC
BAY
HURON
OCEANA
NEWAYGO
MECOSTA
ISABELLA
MIDLAND
TUSCOLA
SANILAC
MONTCALM
GRATIOT
SAGINAW
MUSKEGON
KENT
OTTAWA
IONIA
CLINTON
SHIAWASSEE
GENESEE
LAPEER
ST.CLAIR
ALLEGAN
BARRY
EATON
INGHAM
LIVINGSTON
OAKLAND
MACOMB
VAN BUREN
KALAMAZOO
CALHOUN
JACKSON
WASHTENAW
WAYNE
CASS
ST.JOSEPH
BRANCH
HILLSDALE
LENAWEE
MONROE
BERRIEN

10

KEWEENAW
HOUGHTON
ONTONAGON
GOGEBIC
BARAGA
MARQUETTE
IRON
DICKINSON
ALGER
LUCE
CHIPPEWA
SCHOOLCRAFT
MACKINAC
DELTA
MENOMINEE
CHEBOYGAN
PRESQUE ISLE
CHARLEVOIX
EMMET
ANTRIM
OTSEGO
MONTMORENCY
ALPENA
LEELANAU
BENZIE
KALKASKA
CRAWFORD
OSCODA
ALCONA
GRAND TRAVERSE
WEXFORD
MISSAUKEE
ROSCOMMON
OGEMAW
IOSCO
MANISTEE
MASON
LAKE
OSCEOLA
CLARE
GLADWIN
ARENAC
BAY
HURON
OCEANA
NEWAYGO
MECOSTA
ISABELLA
MIDLAND
TUSCOLA
SANILAC
MONTCALM
GRATIOT
SAGINAW
MUSKEGON
KENT
OTTAWA
IONIA
CLINTON
SHIAWASSEE
GENESEE
LAPEER
ST.CLAIR
ALLEGAN
BARRY
EATON
INGHAM
LIVINGSTON
OAKLAND
MACOMB
VAN BUREN
KALAMAZOO
CALHOUN
JACKSON
WASHTENAW
WAYNE
CASS
ST.JOSEPH
BRANCH
HILLSDALE
LENAWEE
MONROE
BERRIEN

11

KEWEENAW
HOUGHTON
ONTONAGON
GOGEBIC
BARAGA
MARQUETTE
IRON
DICKINSON
ALGER
LUCE
CHIPPEWA
SCHOOLCRAFT
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ANTRIM
OTSEGO
MONTMORENCY
ALPENA
LEELANAU
BENZIE
KALKASKA
CRAWFORD
OSCODA
ALCONA
GRAND TRAVERSE
WEXFORD
MISSAUKEE
ROSCOMMON
OGEMAW
IOSCO
MANISTEE
MASON
LAKE
OSCEOLA
CLARE
GLADWIN
ARENAC
BAY
HURON
OCEANA
NEWAYGO
MECOSTA
ISABELLA
MIDLAND
TUSCOLA
SANILAC
MONTCALM
GRATIOT
SAGINAW
MUSKEGON
KENT
OTTAWA
IONIA
CLINTON
SHIAWASSEE
GENESEE
LAPEER
ST.CLAIR
ALLEGAN
BARRY
EATON
INGHAM
LIVINGSTON
OAKLAND
MACOMB
VAN BUREN
KALAMAZOO
CALHOUN
JACKSON
WASHTENAW
WAYNE
CASS
ST.JOSEPH
BRANCH
HILLSDALE
LENAWEE
MONROE
BERRIEN

12

KEWEENAW
HOUGHTON
ONTONAGON
GOGEBIC
BARAGA
MARQUETTE
IRON
DICKINSON
ALGER
LUCE
CHIPPEWA
SCHOOLCRAFT
MACKINAC
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MENOMINEE
CHEBOYGAN
PRESQUE ISLE
CHARLEVOIX
EMMET
ANTRIM
OTSEGO
MONTMORENCY
ALPENA
LEELANAU
BENZIE
KALKASKA
CRAWFORD
OSCODA
ALCONA
GRAND TRAVERSE
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Individual Species Distributions:

Map 14. Paspalum pubescens Muhl.

Map 15. Panicum depauperatum Muhl.

Map 16. Panicum perlongum Nash

Map 17. Panicum linearifolium Scribn.

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Individual Species Distributions:

Map 18. *Panicum werneri* Scribn.

Map 19. *Panicum bicknellii* Nash

Map 20. *Panicum leibergii* (Vasey) Scribn.

Map 21. *Panicum xanthophysum* A. Gray

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Individual Species Distributions:

Map 22. *Panicum oligosanthes* Schult.

Map 23. *Panicum scribnerianum* Nash

Map 24. *Panicum spretum* Schult.

Map 25. *Panicum lindheimeri* Nash

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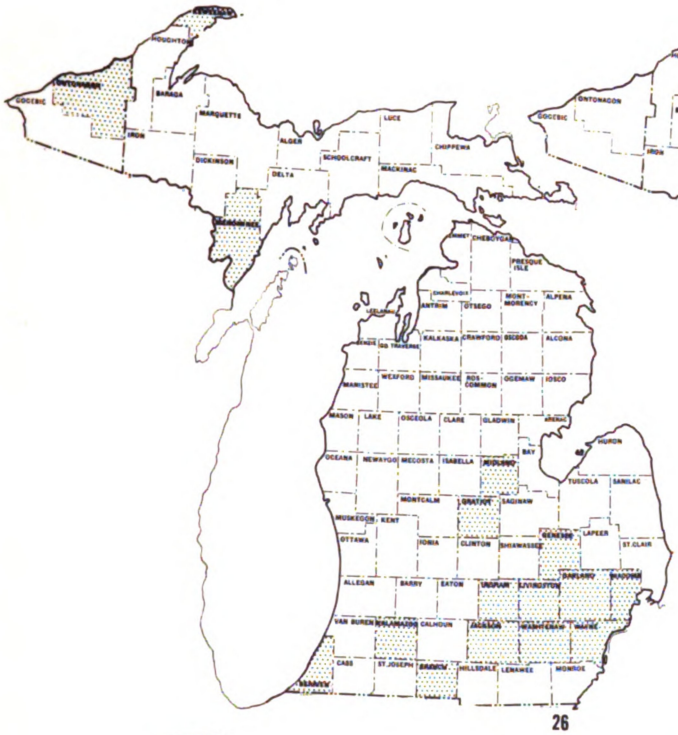
Individual Species Distributions:

Map 26. Panicum praecocius Hitch. & Chase

Map 27. Panicum tennesseense Ashe

Map 28. Panicum albemarlense Ashe

Map 29. Panicum implicatum Scribn.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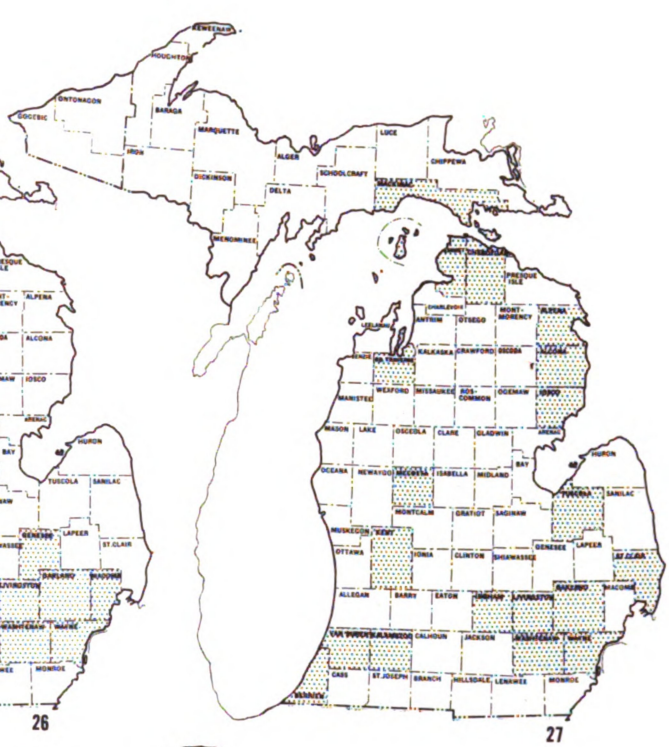
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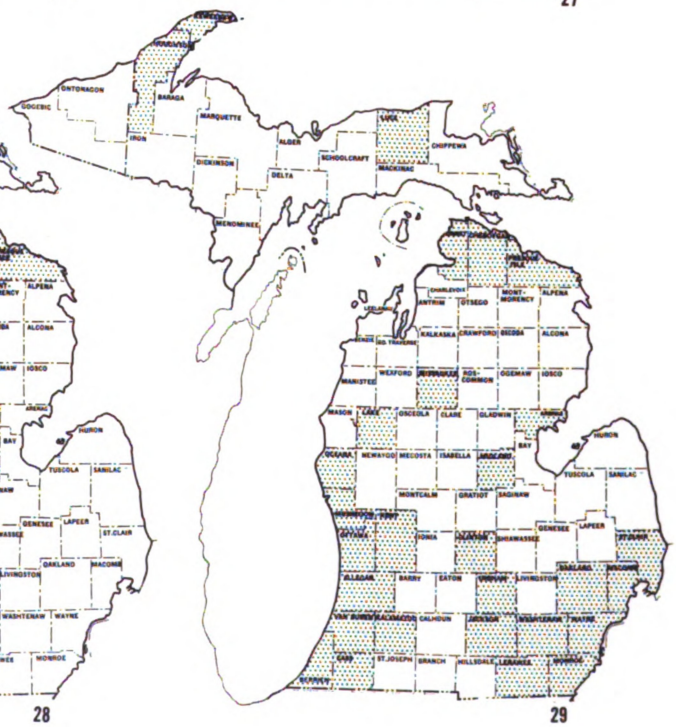
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Individual Species Distributions:

Map 30. *Panicum meridionale* Ashe

Map 31. *Panicum subvillosum* Ashe

Map 32. *Panicum huachucae* Ashe

Map 33. *Panicum villosissimum* Nash

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Individual Species Distributions:

Map 34. *Panicum pseudopubescens* Nash

Map 35. *Panicum sphaerocarpon* Ell.

Map 36. *Panicum ashei* Pears.

Map 37. *Panicum commutatum* Schult.

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Individual Species Distributions:

Map 38. *Panicum clandestinum* L.

Map 39. *Panicum latifolium* L.

Map 40. *Panicum boscii* Poir.

Map 41. *Panicum deamii* Hitchc. & Chase

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Individual Species Distributions:

Map 42. *Panicum commonsianum* Ashe

Map 43. *Panicum addisonii* Nash

Map 44. *Panicum tsugetorum* Nash

Map 45. *Panicum columbianum* Scribn.

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CANADA

Individual Species Distributions:

Map 46. *Panicum microcarpon* Muhl.

Map 47. *Panicum dichotomum* L.

Map 48. *Panicum barbulatum* Michx.

Map 49. *Panicum boreale* Nash

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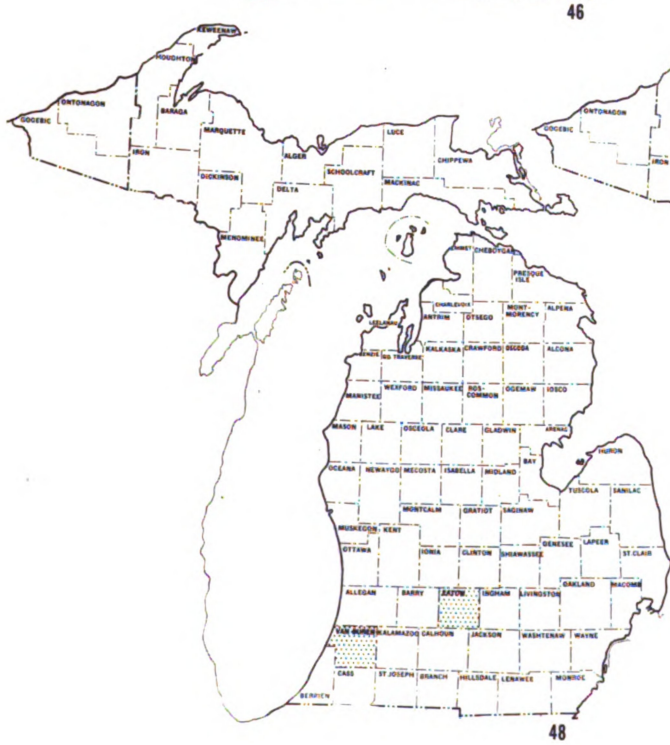
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Individual Species Distributions:

Map 50. *Panicum lucidum* Ashe

Map 51. *Panicum miliaceum* L.

Map 52. *Panicum flexile* (Gatt.) Scribn.

Map 53. *Panicum capillare* L.

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Individual Species Distributions:

Map 54. Panicum philadelphicum Bernh.

Map 55. Panicum dichotomiflorum Michx.

Map 56. Panicum virgatum L.

Map 57. Panicum agrostoides Spreng.

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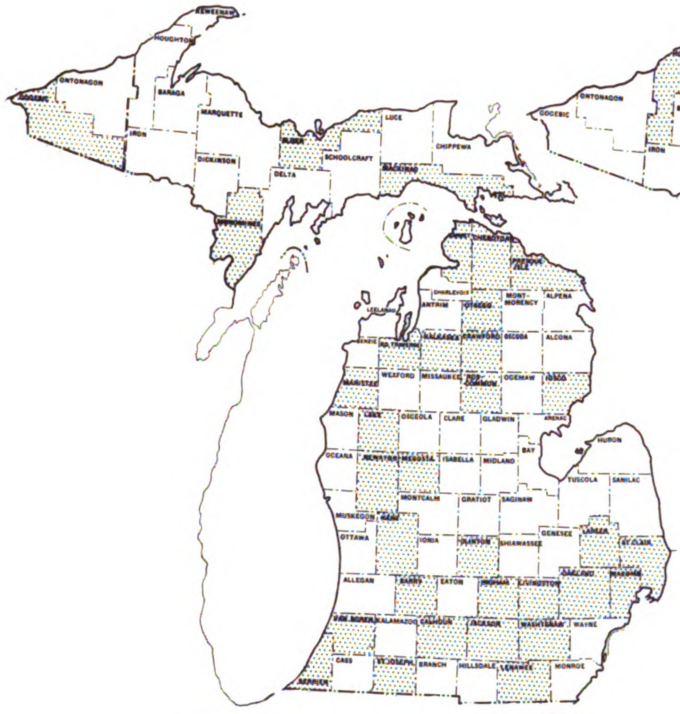
Individual Species Distributions:

Map 58. *Andropogon scoparius* Michx.

Map 59. *Andropogon gerardii* Vitm.

Map 60. *Andropogon virginicus* L.

Map 61. *Sorghum halepense* (L.) Pers.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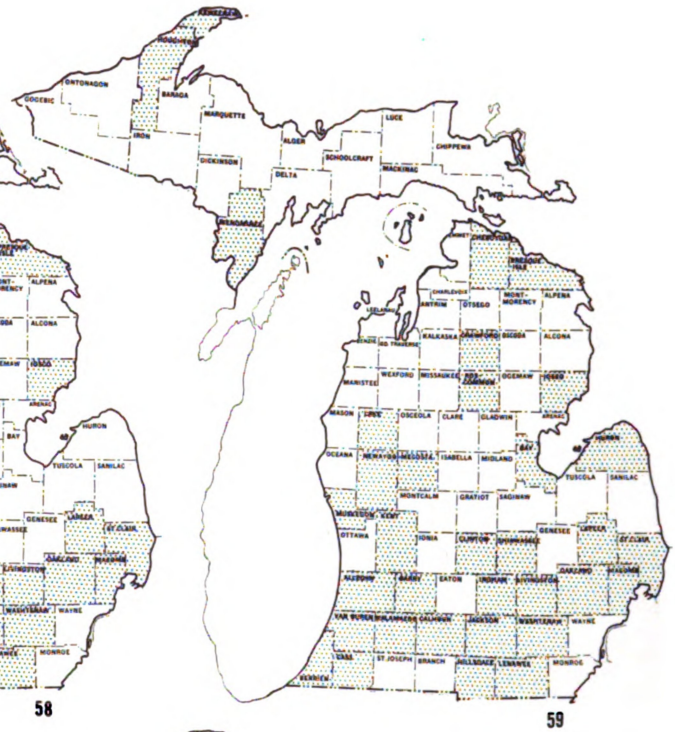
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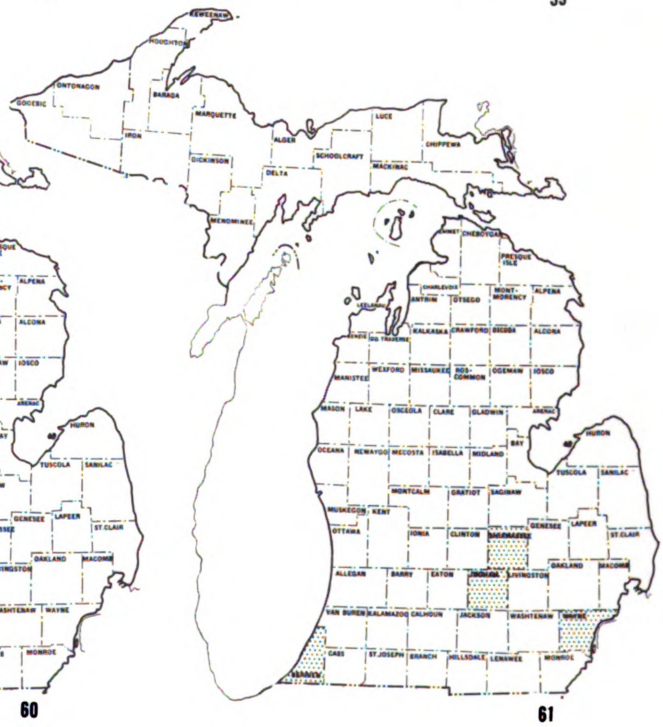
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Individual Species Distributions:

Map 62. Sorghum vulgare (L.) Pers.

Map 63. Sorghastrum nutans (L.) Nash

Map 64. Tripsacum dactyloides (L.) L.

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