

Species Review
Graminoid Taxa of the Oak Ridge Reservation Herbarium
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In July 2009 Water Resources, LLC was provided funding to conduct a review of selected graminoid taxa housed at the Oak Ridge Reservation Herbarium (ORRH). Such a review was deemed necessary in order to bring the herbarium up to date in terms of taxonomic nomenclature and, in small part, because of concerns about potential misidentifications by past investigators.

Plant groups targeted for review included all members of the *Cyperaceae* (Sedge Family), *Juncaceae* (Rush Family), and selected “problem” genera within the *Poaceae* (Grass Family) including *Panicum* and *Dichanthelium*. In all, more than 425 specimens representing 147 taxa were reviewed and annotated.¹ The review resulted in a significant number of changes to the 1998 version of the [ORR Vascular FLORA list](#). The general types of changes made can be summarized as follows:

1. *Species Re-alignment* (15 occurrences): This took place when a taxon was initially misidentified at either the species or sub-specific level. As a consequence of this, a re-alignment resulted in an addition or deletion from the flora list, or both. An example of the former occurred when a single specimen of rough flatsedge (*Cyperus retrofractus*) was determined instead to be many-flowered flatsedge (*Cyperus lancastrimensis*). Since no other specimens of *C. retrofractus* were found at ORRH, this species should be dropped from the FLORA list. In an example of the latter, a single specimen of reflexed sedge (*Carex retroflexa*) was identified during the review to be Texas sedge (*Carex texensis*). Thus, *C. retroflexa* should be dropped from the list, and *C. texensis* should be added.
2. *Taxonomic Enhancement* (2 occurrences): An enhancement occurred when a specimen, formerly identified only to the species level, was identified to variety or subspecies. This was done when it was believed that more than one subspecific entity was likely present on the ORR. An example of this occurred when a specimen of slender spikerush (*Eleocharis tenuis*) was determined to belong to the variety *pseudoptera*. (Specimens of the variety *tenuis* are also known to be present.)
3. *Nomenclature Change* (22 occurrences): Such changes were made to bring the ORRH collections in line with current scientific nomenclature. Most notable changes at the generic level involved transferring species from the genus *Panicum* to *Dichanthelium* and a number of others from *Scirpus* to *Schoenoplectus* and *Bolboschoenus*.

All changes are documented in the enclosed table. Nomenclature follows that which is presented in the *Fifth Checklist of Tennessee Vascular Plants* (Edward W. Chester, B. Eugene Wofford, Dwayne Estes, and Claude Bailey. 2009. Botanical Research Institute of Texas Press. Fort Worth, TX).

¹ At the end of the review process, Water Resources personnel became aware of a number of mounted graminoid specimens acquired from Area 0800 of the ORR that were housed separately from the main collection. Because of time constraints and budget limitations, these specimens were not reviewed.

Species Review
Graminoid Taxa of the Oak Ridge Reservation Herbarium

Cyperaceae (Sedge Family)

GENUS	SPECIES	VARIETY	SYNONYM	COMMENTS ^{1,2}
<i>Bolboschoenus</i>	<i>fluviatilis</i>		<i>Scirpus fluviatilis</i> , <i>Schoenoplectus fluviatilis</i>	Specimens confirmed
<i>Bulbostylis</i>	<i>capillaris</i>			Specimen confirmed
<i>Carex</i>	<i>abscondita</i>			Specimen resides at TENN. Not seen. Additional collections were obtained by Durr in 2009 and will be added to ORRH.
<i>Carex</i>	<i>albicans</i>	<i>emmonsii</i>	<i>C. emmonsii</i>	Specimen identified as <i>C. albicans</i> var. <i>emmonsii</i> is referable to var. <i>albicans</i>.
<i>Carex</i>	<i>albicans</i>	<i>albicans</i>	<i>C. artitecta</i>	Specimen confirmed. Additional collections were obtained by Durr in 2009 and will be added to ORRH.
<i>Carex</i>	<i>albolutescens</i>			Specimen confirmed
<i>Carex</i>	<i>albursina</i>		<i>C. laxiflora</i> var. <i>latifolia</i>	Specimen not seen. Collections were obtained by Durr in 2009 and will be added to ORRH.
<i>Carex</i>	<i>amphibola</i>			Specimen confirmed. See comments under <i>C. planispicata</i> .
<i>Carex</i>	<i>atlantica</i>	<i>ssp. atlantica</i>	<i>C. incomperta</i>	Specimen identified as <i>C. atlantica</i> ssp. <i>atlantica</i> is referable to ssp. <i>capillacea</i>.
<i>Carex</i>	<i>atlantica</i>	<i>ssp. capillacea</i>	<i>C. howei</i>	Specimen not seen. Collections were obtained by Durr in 2009 and will be added to ORRH.
<i>Carex</i>	<i>baileyi</i>			Specimen resides at TENN. Not seen. A 1990 collection of <i>C. lurida</i> made from Bearden Creek embayment by Cunningham & Pounds appears to be <i>C. baileyi</i> .
<i>Carex</i>	<i>blanda</i>		<i>C. laxiflora</i> var. <i>blanda</i>	Specimens confirmed
<i>Carex</i>	<i>bromoides</i>	<i>ssp. bromoides</i>		Specimen confirmed. Additional collections were obtained by Durr in 2009 and will be added to ORRH.
<i>Carex</i>	<i>bushii</i>			A pressed, unmounted specimen purportedly of this species was examined and determined to be <i>C. caroliniana</i>.
<i>Carex</i>	<i>caroliniana</i>			Specimens confirmed
<i>Carex</i>	<i>cephalophora</i>			Specimens confirmed

GENUS	SPECIES	VARIETY	SYNONYM	COMMENTS ^{1,2}
<i>Carex</i>	<i>cherokeensis</i>			Specimens confirmed
<i>Carex</i>	<i>complanata</i>		<i>C. hirsutella</i>	All specimens are referable to <i>C. hirsutella</i>.
<i>Carex</i>	<i>conjuncta</i>			Specimen confirmed
<i>Carex</i>	<i>crinita</i>	(<i>brevicrinis</i>)		All specimens were annotated to var. <i>brevicrinis</i> .
<i>Carex</i>	<i>crus-corvi</i>			Specimen not seen.
<i>Carex</i>	<i>debilis</i>			Specimens confirmed
<i>Carex</i>	<i>digitalis</i>			Specimens confirmed
<i>Carex</i>	<i>eburnea</i>			Specimen confirmed
<i>Carex</i>	<i>echinata</i>		<i>C. muricata</i> var. <i>angustata</i>	A pressed, unmounted specimen was examined and could not be determined to species.
<i>Carex</i>	<i>festucacea</i>			Specimens confirmed
<i>Carex</i>	<i>frankii</i>			Specimens confirmed
<i>Carex</i>	<i>gracillima</i>			A pressed, unmounted specimen was confirmed. Additional collections were obtained by Durr in 2009 and will be added to ORRH.
<i>Carex</i>	<i>granularis</i>			Specimens confirmed
<i>Carex</i>	<i>gravida</i>			Tentative identification based on 2 poor specimens.
<i>Carex</i>	<i>grayi</i>			Specimens confirmed
<i>Carex</i>	<i>grisea</i>			Tentative identification based on a single over-mature specimen.
<i>Carex</i>	<i>hirsutella</i>		<i>C. complanata</i> var. <i>hirsuta</i>	Specimens confirmed. See comments under <i>C. complanata</i> .
<i>Carex</i>	<i>intumescens</i>			Specimens confirmed
<i>Carex</i>	<i>jamesii</i>			Specimen confirmed. Additional collections were obtained by Durr in 2009 and will be added to ORRH.
<i>Carex</i>	<i>laevivaginata</i>		<i>C. stipata</i> var. <i>laevivaginata</i>	Specimen confirmed
<i>Carex</i>	<i>laxiflora</i>			Specimens confirmed
<i>Carex</i>	<i>leptalea</i>			Specimens confirmed
<i>Carex</i>	<i>louisianica</i>			Specimens confirmed
<i>Carex</i>	<i>lupulina</i>			Specimens confirmed
<i>Carex</i>	<i>lurida</i>			Specimens confirmed
<i>Carex</i>	<i>meadii</i>			Specimen confirmed
<i>Carex</i>	<i>muehlenbergii</i>	<i>muehlenbergii</i>		Specimen confirmed

GENUS	SPECIES	VARIETY	SYNONYM	COMMENTS ^{1,2}
<i>Carex</i>	<i>nigromarginata</i>			Specimen not seen
<i>Carex</i>	<i>normalis</i>			Specimen confirmed
<i>Carex</i>	<i>oligocarpa</i>			One specimen identified as <i>C. oligocarpa</i> appears to be <i>C. laxiflora</i>, while another is referable to <i>C. digitalis</i>.
<i>Carex</i>	<i>oxylepis</i>	<i>oxylepis</i>		Specimens confirmed
<i>Carex</i>	<i>pensylvanica</i>			Specimens confirmed
<i>Carex</i>	<i>planispicata</i>		<i>C. amphibola</i> var. <i>rigida</i>	A single specimen, previously determined to be <i>C. amphibola</i>, was annotated to this newly described species. Additional collections were obtained by Durr in 2009 and will be added to ORRH.
<i>Carex</i>	<i>platyphylla</i>			Specimen confirmed
<i>Carex</i>	<i>prasina</i>			Specimens confirmed
<i>Carex</i>	<i>projecta</i>			Specimens confirmed
<i>Carex</i>	<i>purpurifera</i>		<i>C. laxiflora</i> var. <i>purpurifera</i>	Specimen confirmed
<i>Carex</i>	<i>retroflexa</i>			The single specimen previously identified as <i>C. retroflexa</i> is referable to <i>C. texensis</i>.
<i>Carex</i>	<i>rosea</i>		not <i>C. radiata</i> !	Specimens confirmed
<i>Carex</i>	<i>scoparia</i>			Specimen confirmed
<i>Carex</i>	<i>shortiana</i>			Specimens confirmed
<i>Carex</i>	<i>squarrosa</i>			Specimens confirmed
<i>Carex</i>	<i>stipata</i>	<i>stipata</i>		Specimens confirmed
<i>Carex</i>	<i>striatula</i>			Specimens confirmed
<i>Carex</i>	<i>styloflexa</i>			Specimen confirmed. Additional collections were obtained by Durr in 2009 and will be added to ORRH.
<i>Carex</i>	<i>swanii</i>		<i>C. virescens</i> var. <i>swanii</i>	Specimen confirmed
<i>Carex</i>	<i>texensis</i>		<i>C. rosea</i> var. <i>texensis</i>	Specimen confirmed. See comments under <i>C. retroflexa</i> .
<i>Carex</i>	<i>tribuloides</i>			Specimens confirmed
<i>Carex</i>	<i>venusta</i>	<i>minor</i>		Specimens confirmed
<i>Carex</i>	<i>virescens</i>			Specimen confirmed
<i>Carex</i>	<i>vulpinoidea</i>			Specimens confirmed
<i>Carex</i>	<i>willdenowii</i>			Specimens confirmed

GENUS	SPECIES	VARIETY	SYNONYM	COMMENTS ^{1,2}
<i>Cyperus</i>	<i>acuminatus</i>			Specimen confirmed
<i>Cyperus</i>	<i>croceus</i>			Specimen confirmed
<i>Cyperus</i>	<i>echinatus</i>		<i>C. ovularis</i>	Specimens confirmed
<i>Cyperus</i>	<i>esculentus</i>			Specimens confirmed
<i>Cyperus</i>	<i>ferruginescens</i>			Specimen resides at TENN. Not seen.
<i>Cyperus</i>	<i>flavescens</i>	<i>poaeformis?</i>		Specimens reside at TENN, US, and DU. Not seen. One ORRH specimen from 1990 (not shown on the flora list) is immature and not clearly discernible.
<i>Cyperus</i>	<i>lancastriensis</i>			Specimens confirmed
<i>Cyperus</i>	<i>odoratus</i>			Specimen confirmed
<i>Cyperus</i>	<i>pseudovegetus</i>			Specimen confirmed
<i>Cyperus</i>	<i>retrofractus</i>			A single specimen, identified as <i>C. retrofractus</i>, was determined to be <i>C. lancastriensis</i>.
<i>Cyperus</i>	<i>strigosus</i>			Specimens confirmed
<i>Eleocharis</i>	<i>acicularis</i>			Identification could not be confirmed.
<i>Eleocharis</i>	<i>erythropoda</i>		<i>E. calva</i>	Specimen confirmed
<i>Eleocharis</i>	<i>obtusa</i>			Specimens confirmed
<i>Eleocharis</i>	<i>palustris</i>			Specimen confirmed
<i>Eleocharis</i>	<i>parvula</i>			Specimen confirmed
<i>Eleocharis</i>	<i>quadrangulata</i>			Specimens confirmed
<i>Eleocharis</i>	<i>tenuis</i>	<i>tenuis</i>		Specimens confirmed
<i>Eleocharis</i>	<i>tenuis</i>	(<i>pseudoptera</i>)		One specimen of <i>E. tenuis</i> belongs to the var. <i>pseudoptera</i> .
<i>Fimbristylis</i>	<i>autumnalis</i>			Specimen confirmed
<i>Kyllinga</i>	<i>gracillima</i>		<i>K. brevifolioides</i> , <i>Cyperus brevifolioides</i>	Identification could not be confirmed. More definitive material was obtained by Durr in 2009 and will be added to ORRH.
<i>Kyllinga</i>	<i>pumila</i>		<i>Cyperus tenuifolius</i>	Poor specimen. Identification could not be confirmed.
<i>Rhynchospora</i>	<i>capitellata</i>			Specimen confirmed
<i>Rhynchospora</i>	<i>colorata</i>		<i>Dichromena colorata</i>	Specimens confirmed
<i>Rhynchospora</i>	<i>globularis</i>			All specimens are referable to <i>R. recognita</i>.
<i>Rhynchospora</i>	<i>recognita</i>		<i>C. globularis</i> var. <i>recognita</i>	Specimens confirmed. See comments under <i>R. globularis</i> .

GENUS	SPECIES	VARIETY	SYNONYM	COMMENTS ^{1,2}
<i>Schoenoplectus</i>	<i>pungens</i>		<i>Scirpus americanus</i>	Specimens confirmed
<i>Schoenoplectus</i>	<i>purshianus</i>		<i>Scirpus purshianus</i>	Specimens confirmed
<i>Schoenoplectus</i>	<i>tabernaemontanii</i>		<i>Scirpus validus</i> , <i>Scirpus tabernaemontanii</i>	Specimens confirmed
<i>Scirpus</i>	<i>atrovirens</i>			Specimens confirmed. Several specimens were referable to <i>S. georgianus</i>.
<i>Scirpus</i>	<i>cyperinus</i>			Specimens confirmed
<i>Scirpus</i>	<i>georgianus</i>		<i>S. atrovirens</i> var. <i>georgianus</i>	Specimens confirmed. See comments under <i>S. atrovirens</i> .
<i>Scirpus</i>	<i>pendulus</i>			Specimens confirmed
<i>Scirpus</i>	<i>polyphyllus</i>			Specimens confirmed
<i>Scleria</i>	<i>oligantha</i>			Specimens confirmed
<i>Scleria</i>	<i>pauciflora</i>	<i>pauciflora</i>		Specimen confirmed
<i>Scleria</i>	<i>triglomerata</i>			Specimen confirmed

¹ Bold type indicates either a direct change to the 1998 version of the ORR vascular plant list or clarification of the status of a listed species.

² TENN = University of Tennessee-Knoxville Herbarium, US = Smithsonian Institution Herbarium, DU = Duke University Herbarium

Species Review
Graminoid Taxa of the Oak Ridge Reservation Herbarium

***Juncaceae* (Rush Family)**

GENUS	SPECIES	VARIETY	SYNONYM	COMMENTS^{1,2}
<i>Juncus</i>	<i>acuminatus</i>			Specimens confirmed
<i>Juncus</i>	<i>anthelatus</i>		<i>J. tenuis</i> var. <i>anthelatus</i>	Specimens confirmed. See comments under <i>J. tenuis</i> .
<i>Juncus</i>	<i>biflorus</i>			Specimens confirmed
<i>Juncus</i>	<i>brachycarpus</i>			Specimens confirmed
<i>Juncus</i>	<i>brachycephalus</i>			Specimens confirmed
<i>Juncus</i>	<i>coriaceus</i>			Specimens confirmed
<i>Juncus</i>	<i>debilis</i>			Specimens confirmed
<i>Juncus</i>	<i>dudleyi</i>			Specimens confirmed
<i>Juncus</i>	<i>effusus</i>	<i>solutus</i>		Specimens confirmed
<i>Juncus</i>	<i>interior</i>			Specimen confirmed
<i>Juncus</i>	<i>marginatus</i>			Specimens confirmed
<i>Juncus</i>	<i>scirpoides</i>			Specimens confirmed
<i>Juncus</i>	<i>secundus</i>			Specimen confirmed
<i>Juncus</i>	<i>tenuis</i>			Specimens confirmed. Several specimens were referable to <i>J. anthelatus</i>.
<i>Luzula</i>	<i>acuminata</i>			Specimens reside at TENN and US. Not seen.
<i>Luzula</i>	<i>bulbosa</i>			Specimen confirmed
<i>Luzula</i>	<i>echinata</i>			Specimen confirmed
<i>Luzula</i>	<i>multiflora</i>			Specimen not seen.

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Species Review
Graminoid Taxa of the Oak Ridge Reservation Herbarium

Poaceae (Grass Family)
Genus *Dichantherium*, Genus *Panicum*

GENUS	SPECIES	VARIETY	SYNONYM	COMMENTS ^{1,2}
<i>Dichantherium</i>	<i>aciculare</i>	ssp. <i>angustifolium</i>	<i>Panicum angustifolium</i>	Specimen confirmed
<i>Dichantherium</i>	<i>acuminatum</i>	ssp. <i>acuminatum</i>	<i>Panicum lanuginosum</i>	Specimen confirmed
<i>Dichantherium</i>	<i>acuminatum</i>	ssp. <i>fasciculatum</i>	<i>Panicum lanuginosum</i> var. <i>fasciculatum</i>	Specimens confirmed
<i>Dichantherium</i>	<i>acuminatum</i>	ssp. <i>leucothrix</i>	<i>Panicum acuminatum</i> var. <i>leucothrix</i>	Specimen confirmed. Listed by TDEC as a Species of Special Concern.
<i>Dichantherium</i>	<i>acuminatum</i>	ssp. <i>lindheimeri</i>	<i>D. lindheimeri</i> , <i>Panicum lanuginosum</i> var. <i>lindheimeri</i> , <i>Panicum acuminatum</i> var. <i>lindheimeri</i>	Specimen confirmed
<i>Dichantherium</i>	<i>acuminatum</i>	ssp. <i>longiligulatum</i>	<i>Panicum acuminatum</i> var. <i>longiligulatum</i> , <i>Panicum longiligulatum</i>	Specimen confirmed
<i>Dichantherium</i>	<i>boscii</i>		<i>Panicum boscii</i>	Specimens confirmed
<i>Dichantherium</i>	<i>clandestinum</i>		<i>Panicum clandestinum</i>	Specimens confirmed
<i>Dichantherium</i>	<i>commutatum</i>	ssp. <i>ashei</i>	<i>Panicum commutatum</i> var. <i>ashei</i>	Specimens confirmed
<i>Dichantherium</i>	<i>commutatum</i>	ssp. <i>commutatum</i>	<i>Panicum commutatum</i>	Specimens confirmed
<i>Dichantherium</i>	<i>depauperatum</i>		<i>Panicum depauperatum</i>	Specimens confirmed
<i>Dichantherium</i>	<i>dichotomum</i>	ssp. <i>dichotomum</i>	<i>Panicum dichotomum</i>	Specimens confirmed
<i>Dichantherium</i>	<i>dichotomum</i>	ssp. <i>microcarpon</i>	<i>Panicum dichotomum</i> var. <i>ramulosum</i> , <i>Panicum microcarpon</i>	Specimen confirmed
<i>Dichantherium</i>	<i>laxiflorum</i>		<i>Panicum laxiflorum</i>	Specimens confirmed
<i>Dichantherium</i>	<i>ovale</i>	ssp. <i>villosissimum</i>	<i>Dichantherium villosissimum</i> , <i>Panicum ovale</i> var. <i>villosum</i> , <i>Panicum villosissimum</i>	Specimen confirmed
<i>Dichantherium</i>	<i>polyanthes</i>		<i>Dichantherium sphaerocarpon</i> var. <i>isophyllum</i> , <i>Panicum polyanthes</i>	Specimens confirmed
<i>Dichantherium</i>	<i>scoparium</i>		<i>Panicum scoparium</i>	Specimens reside at TENN. Not seen.
<i>Dichantherium</i>	<i>sphaerocarpon</i>		<i>Panicum sphaerocarpon</i>	Specimens confirmed
<i>Panicum</i>	<i>anceps</i>			Specimens confirmed
<i>Panicum</i>	<i>capillare</i>			Specimens confirmed
<i>Panicum</i>	<i>flexile</i>			Specimen confirmed
<i>Panicum</i>	<i>dichotomiflorum</i>			Specimens confirmed
<i>Panicum</i>	<i>rigidulum</i>	ssp. <i>elongatum</i>	<i>Panicum agrostoides</i> var. <i>elongatum</i>	Specimens confirmed

GENUS	SPECIES	VARIETY	SYNONYM	COMMENTS^{1,2}
<i>Panicum</i>	<i>virgatum</i>			Specimens not seen.

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² TDEC = Tennessee Department of Environment and Conservation, TENN = University of Tennessee-Knoxville Herbarium

Recommendations for Future Work by Water Resources and others at ORRH:

These recommendations are presented in no particular order.

Graminoids-

- Review graminoids from Area 0800 that were not assessed in the current effort.
- Mount, label, and enter into the ORR Herbarium collection and data base the voucher specimens that were collected during the 2009 field efforts.
- Confirm the identity of the ORR specimens residing at the University of Tennessee Herbarium.
- Permanently mount the good quality, un-mounted specimens that are currently in the collection to protect them from damage.
- Review entire ORRH graminoid collection and annotate.
- Identify existing herbarium specimens that are of poor quality, are over-mature/under-mature, or that are missing important diagnostic features. Re-collect, mount, and provide augmented label data with GPS locational information. Discard poor material after it is replaced. (This would be a multi-year effort.)

General-

- Review entire ORRH woody species collection and annotate.
- Update ORRH checklist. Modernize nomenclature and assign collection numbers so that individual specimens can be tracked. (This too would be a multi-year effort and should be headed by a competent botanist.)