



GRAMINOIDS

**- A GUIDE TO SOME COMMON GRASSES, SEDGES
AND RUSHES OF THE NORTHEASTERN USA.**

BY MARTIN C. MICHENER

Published as an interactive PDF document by
MIST Software Associates, Inc. Hollis, NH

All material Copyrighted, 2004, Martin C. Michener
All rights reserved.

Please note that this short sampling from the original book is critically impaired in several very important ways - no page numbers mean anything in this example, and none of the click-links, that are [blue and underlined](#), will work when you click them. Why? Because the whole rest of the book, that contains all but a handful of those actual link **locations**, has been disconnected from the part you are reading. So please understand that even the part we are providing (free, yet still copyrighted) does not work as promised, for understandable reasons.

Now, if all you want to do is to read . . . well, **welcome!**

Graminoids - Contents

Foreword, The Advantages of the PDF capabilities	4
Preface, the book's purpose and format	5
I. Introduction to New England Graminoids	13
II. Learning graminoids from photographs, the drawbacks	18
III. Learning to use a graminoid key - the companion: Magee & Ahles	26
IV. Ecological approach to graminoid identification	34

[V. Species Accounts: Grasses, *Poaceae*](#)

Agrostis gigantea - Redtop, Black Bent	51
Agrostis scabra - Rough Bent	52
Ammophila breviligulata - Dune Grass, American Beach Grass	53
Brachyelytrum aristosum (or erectum)-Long-awned Wood Grass, Shorthusk ..	54
Bromus inermis - Smooth Brome	55
Calamagrostis canadensis - Bluejoint Grass	56
Cenchrus longispinus - Innocent Weed	57
Dactylis glomerata - Orchard Grass	58
Dichanthelium (or Panicum) clandestinum - Deer-tongue Rosette Grass	59
Digitaria sanguinalis - Hairy Crab Grass	60
Echinochloa crus-galli - Barnyard Grass	61
Elymus (or Agropyron) repens - Creeping Wild Rye, Quack Grass	62
Eragrostis spectabilis - Petticoat Climber	63
Glyceria canadensis - Rattlesnake Manna Grass	64
Leersia oryzoides - Rice Cut Grass	65
Panicum virgatum - Wand Panic Grass	66
Phalaris arundinacea - Reed Canary Grass	67
Phleum pratense - Common Timothy	68
Phragmites australis - Common Reed	69
Poa pratensis - Kentucky Blue Grass	70
Schizachyrium (or Andropogon) scoparium - Little False Bluestem	71
Setaria viridis - Green Bristle Grass	73
Spartina alterniflora - Saltwater Cord Grass	74
Spartina patens - Salt-meadow Cord Grass	75
Spartina pectinata - Freshwater Cord Grass	76
Tridens flavus - Tall Redtop	77
Zea mays - Corn	78

[VI. Species Accounts: Rushes, *Juncaceae*](#)

Juncus acuminatus - Knotty-leaf Rush	79
Juncus effusus - Soft Rush, Lamp Rush	80
Juncus tenuis - Path Rush, Lesser Poverty Rush	81

VII. Species Accounts: Sedges, Cyperaceae

Bulbostylis capillaris - Dense-tuft Hair Sedge 82

Carex comosa - Bearded Sedge 83

Carex crinita - Fringed Sedge 84

Carex intumescens - Greater Bladder Sedge 85

Carex lurida - Sallow Sedge 86

Carex scoparia - Pointed Broom Sedge 87

Carex stricta - Tussock Sedge 88

Carex vestita - Velvet Sedge 89

Cyperus esculentus - Chufa, Edible Flat Sedge 90

Cyperus lupulinus (or *filiculmis*)- Great Plains Flat Sedge 91

Dulichium arundinaceum - Three-way Sedge 92

Eriophorum vaginatum var. *spissum* - Tussock Cotton Grass 93

Eriophorum virginicum - Tawny Cotton-grass 94

Rhynchospora alba - White Beak-sedge or Beak-rush 95

Schoenoplectus tabernaemontani (was *Scirpus validus*- Great Bulrush)
Soft-stem Club-Rush 96

Scirpus atrovirens - Dark Green Bulrush 97

Scirpus cyperinus - Cotton-grass Bulrush 98

VIII. References

Bibliography 99

Web Pages about Graminoids 100

IX. Appendices

A. Pronunciation Guide 102

B. Glossary 103



Lamp Rush, *Juncus effusus*, flowers with mature capsules, close-up.

Foreword - The Advantages of PDF capabilities

A paper-based reference book has its own attractive features, but it cannot give the cross-referencing, links and other services unique to computers which are incorporated into this Graminoids PDF¹ book. The PDF table of [Contents](#) is linked to each chapter and to each species account. Just like the world wide web, you click on a blue hyperlink to go to wherever you want to go. If you want to UNDO the click, to go back, press **Alt** [←] to jump back to whatever was your previous view. Thus my twentyfive-page illustrated [Glossary](#) of botanical terms is presented not only at the end as in paper books but as a link to that term's definition every time a term first appears on a page.

Please try it out right now to practice; here I give you a link to the [Glossary](#) on page 103 at the back of the book. You click that link, then remember to use the **Alt** [←] combination to come right back to this page and to continue with this paragraph.

This may not seem like much of a great thing, until you begin using the plant keys and learning the technical terms. Suppose you see a technical descriptive sentence like:

"[Inflorescence](#) an [umbelliform panicle](#) of [subglobose](#) heads, each radiating many very small fuzzy reddish-brown [spikelets](#)."

You will now appreciate that every linked term is just one click and one Alt-[←] away from knowing the meaning and continuing to read the sentence without major interruption. In a paper book, most beginners would have to make four or five look-ups in the Glossary, while holding the sentence in their minds and original page with their thumb. Hyperlinks are also used to jump to a [remote diagram](#), **so practice that Alt. [←]**

There are also many (external) links to internet space, that look similar, but when you hover your cursor over them, a URL appears in the tiny window, beginning with *http://* . . . If you are connected to the internet, feel free to use these hyperlinks. If not, they won't work. They will open up your browser in another window, so you do not need to use the Alt-back key trick to resume reading - just click on the Acrobat window. Here [is an example of an external link to our publishing home page](#), if you want to test it out at this time.

Perhaps the most exciting aspect of a PDF book format to me is that color photos do not require any more expense than crude line diagrams - there is no paper wasted or added expense of color separation, ink or photo plates - basically: doing "it right" has never been financially or environmentally so attractive. There is one last feature I have added - a clickable button that takes you back to the

[{TABLE OF CONTENTS}](#).

¹ PDF: Portable Document Format

Preface

The first purpose of this book is to provide a useful pictorial introduction to some of the common grasses, rushes and sedges² of the Northeast. I know there are already many other fine visual-approach books available; you may have tried some and had some successes. But books like this often lack completeness -- sure, you may have learned the common species after due study, but how do you learn the less common ones, and how ultimately can one handle identifications of an entire flora? The second purpose is to delineate what the steps are to advanced identifications, and perhaps why is it so hard for many of us to take them:

One: get a 10x or 15x hand lens and keep it with you so you can see the small parts;

Two: buy and carry a book that covers ALL the species in your home range;

Three: learn to reliably use its keys; perhaps the best way is from a short course or workshop on graminoid identification; *take and keep notes as you go*;

Four: save labeled examples for reference of grasses and sedges you have identified.

In this PDF book, I will help you progress to an understanding of the graminoid morphology - through annotated photos to visualize each group's anatomical parts and to learn the names of especially diagnostic structures - and thus to become a more advanced user of technical keys. I will also introduce you to some grass ecology.

I wish all plants were as simple to describe visually as are most birds. But graminoid plants have not evolved reliably distinctive appearances. They do not "care", evolutionarily speaking, what they look like, as their breeding success does not depend much on their appearance. With showy "flowers", animal vision is critically involved in the plant's breeding success every season, so showy distinct colors and patterns which have evolved over time for attracting bees often provide excellent clues for you and me to easily identify each to species.

Of course, all graminoids are flowering plants, and as you read you shall see photographs of their intricate and often lovely flowers. But make no mistake: these groups are probably neglected by most naturalists in the same spirit that fly identification (Diptera) is neglected by beginning entomologists in favor of becoming familiar with the showy butterflies and dragonflies - the keys are technical, you need a hand lens WITH YOU to see the characters, and the glossary is way in the back of the book.

Without formal training in field botanical identification, a naturalist will find the initial use of grass keys to be very difficult. Nonetheless, good keys are distillations of a vast field-mark logic into a very dense, highly useful structure, and as such deserve more of our attention. The rare botanist who is capable of the complex mental acrobatics

² grasslike plants collectively are called **Graminoids**.

necessary to produce a reliable field key is a rarity, indeed. Beginners, like you and me, can barely speak their [language](#), so that is one of the first goals of this book - to help you to learn the lingo.

In considering my qualifications to write this book, I claim two favorable circumstances: that I AM a beginner as a grass botanist, and that I always have one of those eccentric rarities, Dennis Magee, upon whom I impose whenever I need help. This great fortune of mine allows me to attempt this book, on the theory that if I can understand it, and explain how I understand it to you, then you will understand it. In turn, I can recommend using HIS book as a basis for your developing education as a budding New England graminoid botanist.

But using any plant key has its trying moments, and if you are reading this, you likely know them as I do. Great patience is required. As each couplet is read and the plant examined, you must make choices. But you know the feeling of doubtful decision following on earlier doubtful decision. As you progress, you find you are less and less sure of some of the earlier choices, and your doubt deepens until you hit THAT ONE COUPLET.

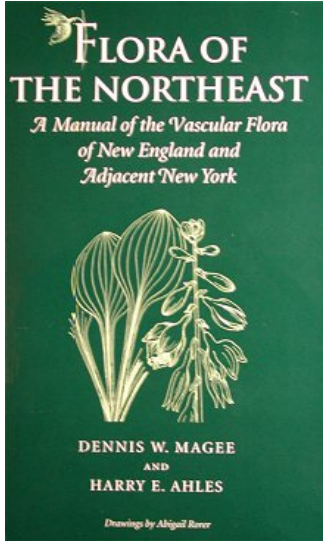
You know the one. It might say: "**Pappus sordid**" and you say to yourself: "Sure, ok, right!" The opposing couplet is only slightly more helpful: "**Pappus immaculate**." So you find the glossary in the back, and it says³: "**Pappus - the modified calyx-limb in Compositae, etc., forming a crown of very various character at the summit of the achene.**" And you mumble to yourself: "I have no clue . . ." and you just give up. This is what I have always called Key Frustration (or KF). Those possessed of a hardy mind and well caught up on their sleep may indeed fight their way back to the beginning, take several deep breaths and try again with success. Failing those qualities, I call Magee. This is my good fortune, and it is a good fortune to all that he has now finished his late mentor's book and University of Massachusetts Press has published it; we will use it.

I have also taught classroom and field botany, and I have learned some excellent tricks from colleagues and students that we used (before we had the Internet or cell phones) for when Magee was away from his office. This book is a compilation of those ideas and tricks, a remedy for this key frustration, but it will require attention and work on your own part as we go along.

Book Format - I have laid out this book so you can gradually progress from the pictorial "look-like" means of identification, to one based on diagnostic key characters; to progress from the easy to the more formal, by planned steps. But, of course, using the connected links, you may read it in whatever order suits your immediate needs. I try to give examples of how to use each of several methods of plant identification, then, by

³ Gray's Manual of Botany, p.1579. Couplet translation: "Thistle-down gray", vs. "thistle-down white."

alternating these methods with familiar plant species, you become more sure of what you are seeing and of the name of each new structure, and thus to gradually make more informed decisions using the plant keys. If you follow the narrative, using your own fresh plant material to observe, you will learn to be able to use all the methods and perhaps some more of your own devising.



The essential companion text is:

[Dennis W. Magee](#) & Harry E. Ahles: **Flora of the North-east**, U. Mass Press, **1999**.

If you do not own this U. Mass. book, click above to buy online, or borrow a copy for the duration of these examples. The keys are technical, and they are the best I have used. Each key contains many hours or days of study of fresh and museum plant materials. Becoming more technical is one of your main aims, as you read and follow the examples. For this progress to happen, you will need to minimize each of the problems that beset beginners at this dark art, which I shall dwell upon later in this section.

You may already have bought the book, or have a favorite store (like Garden in the Woods, at New England Wild Flower Society) where you plan to buy it. In any case, if you are to progress in this undertaking, you must have a copy in hand.

Let's list and then try to eliminate some of the problems that often crop up which make grass and sedge identification difficult:

Seeing the tiny parts well - you need a hand lens, ten power will do nicely. I own several, now scattered among packs, automobiles and coat pockets; one is even beside me at my computer. I [herewith provide](#) you [with](#) some external [links](#) which [purport](#) to sell [such lenses](#). I did use a twenty power for a while, but the part of each plant I saw through it was just TOO SMALL, and so I now seldom use it. You will need good light from the side as you hold the lens (and a way to hold the plant material steady). At twilight and on overcast days a flashlight-lens combination works well, but is more bulky to carry. One trick I found is this: Take a short piece of transparent tape and touch it to the flower head of a dry grass or sedge; it will help hold tiny parts very still, yet have them remain visible to your hand lens. I carry tape with me in the field for this purpose. Many of the photos in this book were made using tape to hold



the sub-millimeter objects that fall out of a grass head. Now you are ready to answer an anatomical couplet without too much [KF](#).



Having a consistent taxonomy - when I first started to study grasses, I used a book of drawings by Lauren Brown and a technical resource - Gray's Manual of Botany. But the names of the grasses didn't always match, and it has now gotten much worse. Not just the use of English names, usually called "common names", but also the scientific names as well have been changed. In college, I was always taught the reason we use the Latinized binomial names is for consistency. As Skip Lazell writes in [This Broken Archipelago](#):

"A lot of people deride the scientific habit of naming things, claiming that '*scientists* think that giving something a name explains it,' and that 'taxonomists are just biological stamp collectors.' Calling something by a name is the first step toward understanding it. If you can get others to agree on your name for it, then at least it can be identified. If we can't identify it, we can never hope to explain or understand it."

The authority currently recognized for all plant taxonomy in the USA is Dr. John T. Kartesz, of North Carolina. He and Dr. Christopher Meacham produce a PC software product they call ["The Synthesis"](#). It lists about 30,000 species of plants and their synonymy (other names given to a species by other authors) and we anticipate soon a version with plant species and attributes linked to photos, as well.

The simplest example a scientific name change is the Common Reed, [Phragmites australis](#). When I first learned it the name was *Phragmites communis*, as it appeared on page 131 of Gray's Manual. But do not think this invasive wetland grass has evolved into a *new species*; an earlier published valid name has been uncovered and validated, and the rule is: we must use the FIRST, the oldest, name, because it has precedence over all later names. Also, perhaps new studies may show relationships between species of grass to be different from what was first believed, and as new species are created (split) or two species are found to really be just one (lumped) the names of course must follow the findings as they are published and accepted. The effect of these rules is that older books need to be revised often to reflect the currently valid taxonomy, and Dr. Kartesz is the authority recognized by, for example, The Nature Conservancy and the U. S. Government on which we rely for the most valid nomenclature. For this reason, I also suggest you obtain and use a copy of Drs. Kartesz' and Meacham's latest software, if feasible for you.

But, I am here to tell you, that the latest Synthesis disagrees with Magee & Ahles on the proper names of several of our common graminoids. To prepare you for these discrepancies, here is what I have done about it. I do use both sets of names in referring to a grass, and I put the name in **boldface for the latest Kartesz-approved version**. Probably the one that makes older naturalists most perturbed was taking the Great Bulrush, *Scirpus validus*, a common pond-edge sedge, and assigning it the name

Schoenoplectus tabernaemontani, **Soft-stem Club-Rush**. We have some sad humor over that one.

Pronouncing the Latinized names - there is some difference from one institution to another, and from one office of a museum to another office, over the proper pronunciation of plant scientific names - because the number of learned people using them daily is quite small and in isolated pockets around the globe, (but we all can say *Schoenoplectus tabernaemontani*). I provide the beginner with some guidelines in [Appendix A](#), if you are interested, and I have placed links to sound files, so you can hear on your computer how at least one botanist pronounces each of them. Please, **DO NOT** worry too much about pronunciation, and please **DO** use these names and **NOT** the English ones - there is no successful standardization among real botanists, who all use the scientific names in daily chatter as well as in print. Unlike many of my colleagues and English professors, and like the birders I came from, I do capitalize English common names, to set them off visually in print from the rest of the written context. This habit is based fully on Strunk & White's principle: "The reader is in trouble more than half the time." If my capitalizing common names offends you, I am sorry.

Plant Press - If you want to keep a more permanent record of your finds, you need a plant press - two boards, with blotters and newspapers in between, and some way to press and hold them together while the plants dry thoroughly (in a very dry place). Each time you find or identify a grass you can place it in between blotters, and preserve its form, albeit squashed. The longer stems can be folded artistically to keep them within the bounds of the press. To see just how lovely such specimens can be, I highly recommend a look at Erika Sonder's samples on her Portable Herbarium [web site](#). I also make use of tall, empty glass vases, and just keep the stems dry and the vase on the table.



You can find a number of other ways to store dried grasses and sedges without flattening them out with a press. I often informally save specimens in a large heavy glass vase. Of course this is not a proper way to store specimens of any scientific value or for longer than a few months, but it has the aesthetic advantage of allowing your family and guests to enjoy the wonderful subtle shapes and curves so typical of many native grasses. When you are first assembling an informal collection, you should label each grass or sedge with a small paper note, enclosed in clear mending tape that also encircles the stem. Develop skills at keeping field notes and describing each source location



ecologically. Each label should have **date, place, town, state, country, collector name, and species to which you have identified it.**

Please note that biologists make a very clear distinction between the uses of two important words: The only person who **classifies** a plant or animal is the taxonomic expert who publishes the species description, along with that of its closest relatives - genus, species, family, etc. For most species, this happens exactly once. The rest of us, then, following this classification, **identify** specimens as to (or **determine**) the correct species. Please

adopt this usage if you expect to be taken seriously by other field biologists.

Keeping records - You are likely to pluck samples from wherever you find them, and bring them home to look at in more detail. Please note, however, that legally any landowner OWNS the plants on their land, (but does NOT OWN the wildlife - animals), so collect plant materials discreetly or with explicit permission, and do not collect in parks and preserves. Mostly, collecting upland grasses in quantities of less than a hay-bale will likely go unchallenged, but you should know and respect your neighbors. Wetland plants can be a sticky matter, depending. If in doubt, ask the land owner before you begin plucking and pulling. Roadsides are usually fairly safe. If you recoil at the idea of killing these objects of your study, or you plan to explore a nature preserve, then certainly "take nothing but pictures" -- nowadays digital cameras, using nothing but recycled electrons, are the way I preserve most of my botanical experiences -- all the photos in this study having been taken with a Nikon 990 CoolPix. You may further extend your green ethics to the use of "AA" Nickel-Metal Hydride batteries, and recharge them every day or two.

In trying to obtain plant material that looks like the illustrations in this book, it may become obvious to you that your grass or sedge sample belongs to a species covered in my Species Accounts, but it is of a very different growth form. This may be because it is a hybrid, or a different growth form due to environmental site conditions, or because my photos were taken in late summer whereas your sample was collected at a different season. These variations in form are exactly why it is important to learn to rely on the characters in Magee's keys - they are carefully chosen to invariably give the proper species identity over the ranges of time and space covered by his book.

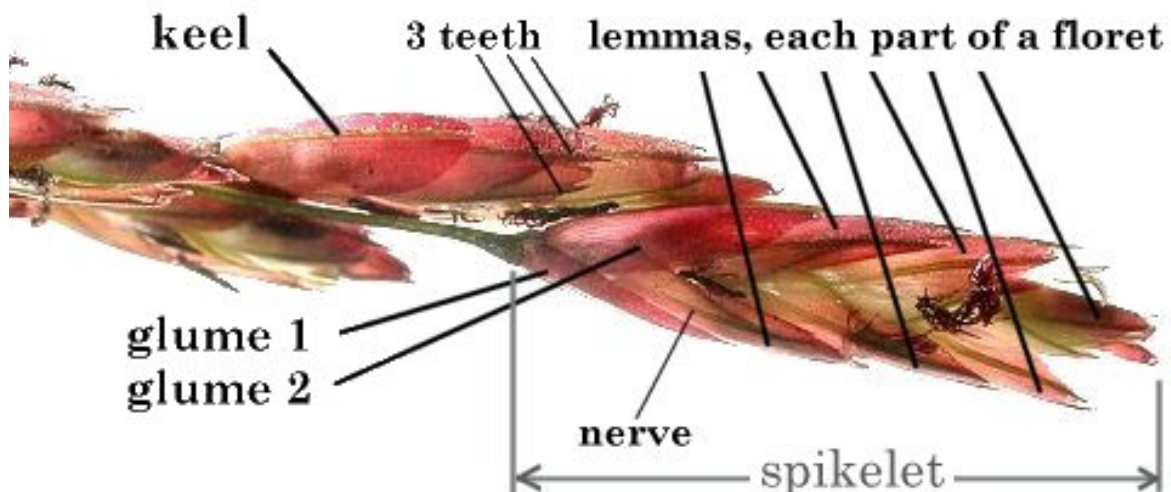
I. Introduction to New England Graminoids

Graminoids cover the earth. They comprise our most important domestic crops, the lawns and much of the open spaces, both planned and natural. What are their most important talents, needs and problems, and how can we begin to make sense of the many kinds?

I assume you have eliminated most of the difficulties listed, and are willing and ready to find grassy subjects in nature to begin your study. Here, I will first distinguish between the three graminoid groups, in nomenclature, in morphology and in appearance. I will try to begin with things about grasses you can easily see, then move on to structures that take a strong light and some intense lens-peering. First, the technical differences among the three plant families; these are always challenging to visualize, but necessary to review for technical identifications:

Poaceae (Po-ay'-see-ee), the grasses; ranging from bamboo and corn down to the very tiniest grass. Generally, and there are many exceptions, grasses have either round (technically [terete](#)) or flat ([compressed](#)) stems, whereas "sedges have edges", that is, many of the species have stems with triangular cross-sections, they are [trigonous](#).

This family is technically defined beginning with the basic flowering unit, the [spikelet](#), borne on its stalk, the pedicel. The photo below shows two full spikelets, and a bit more of two others, of the magnificent autumn grass [Tall Redtop, *Tridens flavus*](#); here the pedicel is green. Poaceae typically have two scales below each spikelet, called [glumes](#) (here reddish, keeled). Then, for each [floret](#) within the spikelet (there are six in each spikelet below), there are two more scales at each floret base: the larger, (visible here, also reddish, nerved and keeled) the [lemma](#) and the (smaller) [palea](#) (which is sometimes absent, here not visible, inside). Held between the lemma and palea you will find on dissection the female ([pistil](#), [style](#) and [stigma](#), here fuzzy, dark), and the male ([stamens](#) with their pollen-bearing [anthers](#)). - *continued in actual book.*



II. Learning graminoids from photographs, (who needs all that terminology?)

Wouldn't you like to just LOOK at a plant and then look up and immediately SEE to which species it belongs? That way, we could avoid all these new terms. You could look down a page of small photos and click below the one that looks like the graminoid you found in your grandma's swale? Well, this is the chapter for you! That click-reference is exactly what PDF Readers allow me to create, and for you to use. Now, if only your luck holds -- if the damp sedge happens to be one of the 47 species chosen, instead of one of the other possible 94% of the species in our area . . . If only there WERE only 47 species of graminoids to pick from, then you would be done with it. No need for keys, no need for indecision, no [KF](#), no real need for you to apply your curiosity any further at all.

I will assume that you are now looking closely at some fertile material, in flower or in fruit, and I will organize the photo collection along the same lines that bird "plates" are rendered, with similar-appearing species grouped together. We have already agreed upon the major family differences, so I will start with those, rush through the rushes to get the easiest species out of the way first, then on to the one-scaled sedges, and lastly to all the two-scaled grasses.

Photo key to common Graminoids:

The flower / fruit has six similar scales ([tepals](#)) subtending it, making it a member of the *Juncaceae*: *Juncus*, (if not, go on ahead to the next page) - *continued in the actual book.*



Juncus acuminatus
Knotty-leaf Rush



Juncus effusus
Lamp Rush



Juncus tenuis
Lesser Poverty Rush

II. Learning to use a graminoid key

As long as we approach a technical key stepwise as a tool we will retain charge of our decisions. At the least, we can make the identity of a specimen more certain; at the best we can gain confidence and progressively use it to identify unfamiliar species. We begin with the Magee & Ahles rush key in a process I call "running it through backwards", starting with the conclusion, and working back to the parent group decisions. When we are sure of our answers from known plant material, we will gain skill and confidence instead of [KF](#); just as you would try out any new tool in a familiar situation, rather than first tackling the unknown -- try out your flashlight on your driveway at night before taking it camping or into a deep cave. By running the familiar through a plant key together, we should solidify a number of critical steps:

1. We understand the morphological terms correctly;
2. Our use of units of measurement and of the verbal key context is correct, and
3. The plant we had supposed is species X is "for real", not a sister species, but indeed the one for which we started out hoping to identify correctly.

This is really no more remarkable than the wisdom of a teenager practicing dance steps first with his mom. Once we can reliably use a key to reinforce our identification of several related species, we can extend our confidence to more and more NEW plant material, and ultimately to the exciting flora at large.

A critical aspect of this process is your becoming familiar with Magee's key language -- for this I have made every effort to help with [underlined click links to the glossary](#). In my case this familiarity has happened quite easily - Magee really talks out loud just like his keys, so I have gotten to hear these terms a lot since 1973. But this might mean you need to familiarize yourself with them, until you can really talk the talk. It may help to read the key lines out loud. Then as you approach new key couplets with a new plant we hope you will find yourself deciding more quickly, taking the right choices, -- walking the walk.

The first actual keying will be for the green and not-so-green rushes, *Juncus*, and we will just use the [Species Account](#) characters, as provided. This exercise is quite elementary, since it involves looking at photographs and listed features, no plants, no hand lens and no decisions. Here is my simplified key (It really is Magee's key from p. 319, simplified to cover just four species, instead of all his 30) . . . - ***continued in the actual book.***



IV. Ecological approach to graminoid identification

"While much valuable work has been done along true ecological lines, a certain amount of discredit appears to have been thrown upon the term by the fragmentary and superficial work presented under this title by certain writers. The hasty division of a flora into various societies and associations is a case in point. . . .The establishment of such associations upon a few days' study seems utterly unwarranted, and when, as is usually the case, the same author proposes a different lot of 'associations' for every area he studies, the utility of the whole method is called into question. Furthermore, some writers on 'ecology' are so careless in the systematic side of their work that their papers abound in misidentifications which, of course, render them practically worthless. **Witmer Stone 1911, *Plants of Southern New Jersey*. p. 70."**

Each plant species has a range of habitats over which it may successfully flourish, often described by a range of dimensions: wetness, salt, nutrients, soil compaction, or sunlight budget. These ranges of tolerance circumscribe success for many of our common species. Each species account here provides as well as can be delineated the known tolerance range of such variables. Anyone who has planted lawn grass, only to have it repeatedly replaced by crab grass in short order may know something about the brutal realities of species limits.

I will start off by describing the most limiting habitats, the salt marshes and beach dunes, and the graminoid species typically found throughout New England in these chemically punishing environs. I will then move on to very dry, droughty, and very wet no-salt settings, and provide some species expectations to be found at these limits. The generally adapted species, like the ubiquitous crab grass, will certainly remain successful in all but the saltiest, the wettest and the driest. Nutrient level extremes, particularly those of nitrate and phosphate availabilities, permit certain species to thrive where others cannot venture. Please try to think about each habitat not as fixed places with given objects, but as an ecologist does so, as the momentary result of dynamic complex processes of change, some competing, some outweighing the others. The sub-headings are:

[The Story of Salt Marshes](#)

[The Story of Sand Dunes](#)

[Other Bare Sand Plains](#)

[Graminoids of Acid Peat Bogs](#)

[Other Freshwater Wetland Graminoids](#)

[Widely adapted Graminoids](#)

Landscapers and horticulturists often understand better than botanists how to maintain plants in semi-favorable conditions - you weed to maintain adequate light, you water to avoid drought and you fertilize slowly to promote steady growth. Naturalists tend to misunderstand . . . - ***continued in actual book.***

Calamagrostis canadensis - Bluejoint Grass

Description: Native, perennial, culms erect, forms mats and tussocks. Panicle sometimes open, sometimes closed.

Older synonyms: Foin Bleu.

Wetland category (NWI): FACW+, Present ca. 91% in wetlands.

Habitat: Perennially flooded wet meadows, bogs and sandy discharge shores.

Magee & Ahles: p. 225 Gray's Manual: p. 157 Hitchcock: p. 323 B&B: p. 209.



Festucoideae; the key **species** characters are:

Open dense stands in sunny wet meadows, forms mats (cespitose); Long flat leaves.

Panicle varies from open to dense cylindrical, with time of year.

Awns delicate.

Callus hairs (from inside glumes) numerous and sub-equal in length, about as long as lemma.

Glumes longer than lemma.

One floret per spikelet.



Juncus effusus - Soft Rush, Lamp Rush

Description: Native, perennial, culms arched, in dense tussocks to 2 m; heads appear to grow from the side of the single culm; few to no leaf blades.

Older synonyms:

Wetland category (NWI): FACW+, Present ca. 91% in wetlands.

Habitat: Fresh marshes, meadows, ditches & wet margins of ponds.

Magee & Ahles: p. 321;

Gray's Manual: p. 406

B&B: p. 467.



The key **species** characters are:

Tall, in wet tussocks.

Appearing as a single tapering culm, with brown flowers branching laterally, from the side near the top. The part of this "stem" above the inflorescence is really a vertically elongated involucral bract.

Flowers are solitary, lance-shaped tepals have ribs and nerves, but no stripes.



Carex scoparia - Pointed Broom Sedge

Description: Native, perennial, slender cespitose erect culms to 1.0 m. (no separate staminate spike); spikes ovoid, similar;

Older synonyms:

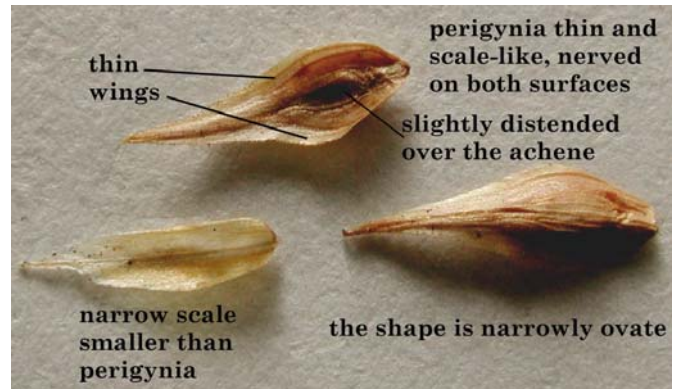
Wetland category (NWI): FACW, Present ca. 82% in wetlands.

Habitat: Dry to wet woods, meadows, swales, roadsides, sandy waste places.

Magee & Ahles: p. 249

Gray's Manual: p. 322

B&B: p. 380.



The key **species** characters are:

Found most often in dry to slightly moist waste areas, roadsides.

Dense mat or tuft, leaves firm, culms erect to arching.

Compact terminal clusters of 3-12 shiny, lustrous, brown ovoid similar spikes.

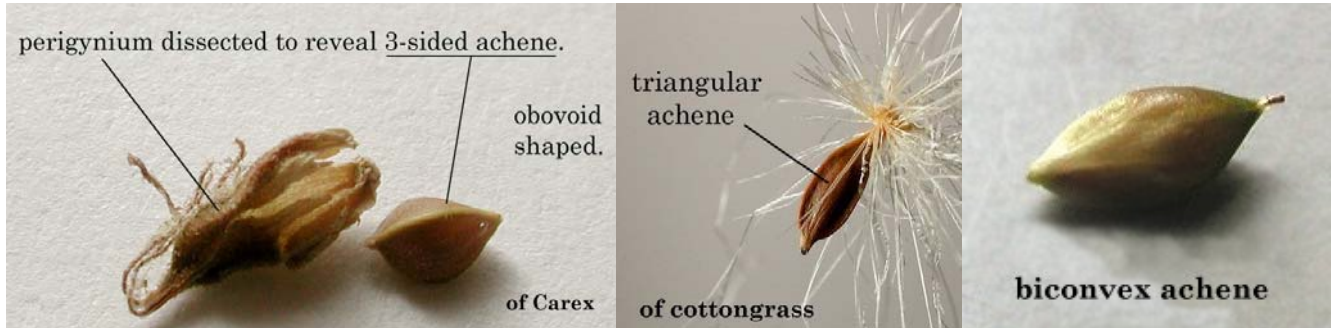
Spikes 5-16 mm long, with pistillate scales brown with paler margins, **shorter and narrower than perigynia, exposing the tips and margins.**

Perigynia 4-7 mm long, 1-2 mm wide; biconvex, thin, only slightly larger than achene.

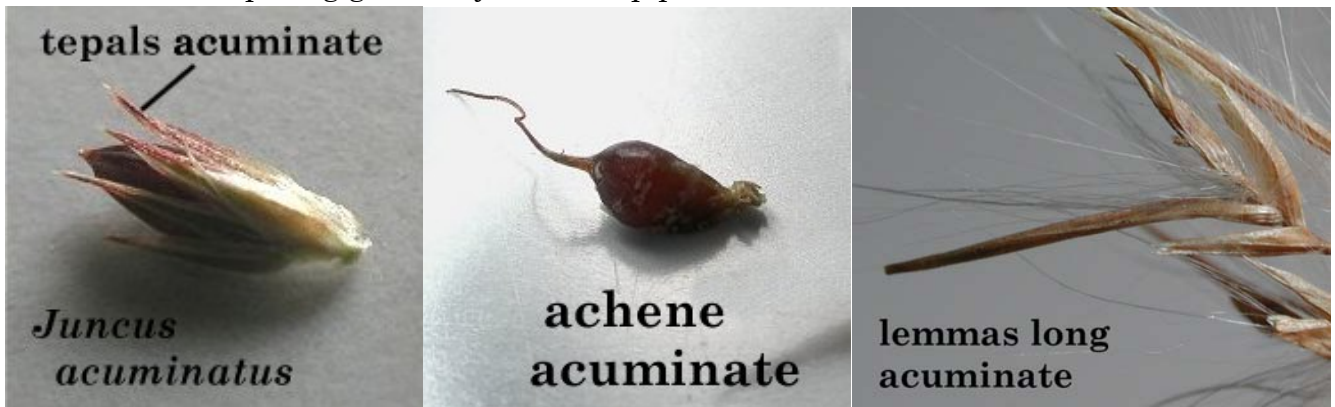
Magee Group 5: Multiple spikes, achenes narrowly ovate to lenticular, 2 stigmas, some spikes gynecandrous (pistillate above, staminate below), perigynia with winged margins.

B. Glossary

Achene - the small hard fruit of a sedge; 1-locular, 1-seeded.



Acuminate - tapering gradually to a sharp point.



Acute - broader, more abrupt point than acuminate.

