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DELTA Intkey Tutorial

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GENERAL INFORMATION

INTRODUCTION

This tutorial was created as a basic guide to Intkey identification and introduction to some of the features available through the toolbars. The guide uses data from the **DELTA Sample Data** set provided by L. Watson and M. J. Dallwitz. This sample data set is available when downloading Intkey from the web (see below). The tutorial is constructed so the user can be shown as many features of Intkey as possible.

ABOUT INTERACTIVE KEYS

Interactive keys differ from printed, dichotomous keys in that there is no predetermined path that the user must follow to effect identification. Interactive keys allow the flexibility of viewing characters in different orders and of selecting them in a sequence that suits the information available to the user. The characters can be presented in the 'natural' order, i.e. grouped together by feature, e.g. all leaf characters together, or by 'best' order, in which characters with the best power to separate the taxa in the group are presented first. Both these arrangements are interchangeable within the identification process and changing from one mode to another does not affect the previous choices.

ABOUT THE SAMPLE DATA

The data on grass genera were collected in DELTA format by L. Watson of the Australian National University. They are an extract from the full data set, which contains descriptions of about 800 genera in terms of more than 500 characters (Watson and Dallwitz 1981; Watson, Dallwitz and Johnston 1986; Watson and Dallwitz 1992). The extract was chosen to illustrate the use of the DELTA programs, and is not intended to be a biologically meaningful subset. The DELTA system is provided free-of-charge.

DOWNLOADING DELTA INTKEY

As of 2013, the DELTA Intkey program (and others) have been rewritten in Java. For instructions on how to install DELTA Intkey, please visit <u>http://florabase.dec.wa.gov.au/help/keys/</u>.

CITATION

L. Watson and M. J. Dallwitz (1998 onwards). DELTA Sample Data: Descriptions, Illustrations, Identification, and Information Retrieval. Version: 21st September 2000.

THE INTKEY SCREEN

This screen is the first screen you will see as you begin your identification. It is divided into 4 panes – two for characters (left side) and two for taxa (right side).

Each set of panes has its own set of toolbar icons placed on the top of the upper panes:

Character toolbar	Taxon toolbar
INTYEY - DELTA Samula Data	
INTIGET: DELLA Sample Data	
	↓ <u>№</u>
est Characters (66) 🖉 🚽 💽 🛹 🚫 🗛 🖡	Remaining Taxa (14) 👔 🚫 🥥 🐴
pper glume [[or the single glume] of female-fertile spikelets, mid-zone nerve number] emale-fertile [lemmas (number of nerves traversing mid-region) daxial jigue (form: avoid seedings) emale-fertile [spikelets [location of disarticulation positions] te incomplete [male or sterile] florets [notification in spikelet] tamens (number per female-fertile floret [not applicable to male spikelets or male florets]) emale-fertile [spikelets [location of disarticulation and spikelet] tamens (number per female-fertile floret [not applicable to male spikelet] emale-fertile [spikelets [not applicable], excluding any awns] ilum [form] umber of female-fertile florets [per female-fertile spikelet] emale-fertile [spikelets [not applicable] tor large genera] lumes [of female-fertile spikelets, whether rearinate [i.e., one-keeled at least to the middle on the back] lumes [of female-fertile spikelets, whether rearkedly unequal in the intact spikelet; regardless of any differences in form] dicules [of lemale-fertile spikelets, whether rearkedly unequal in the intact spikelet; regardless of any differences in form] dicules [of lemale-fertile spikelets, whether transted by a female-fertile [floret, or 'prolonged'] tigmas [colour, in chasmogamous spikelet] emale-fertile [nersence] emale-fertile spikelets, whether reminated by a female-fertile floret, relative size] lants [whether runcoronate or awned] was [of female-fertile florets, textual spikelets, or dioecious] atalts [whether two ones [or free]] vary [of female-fertile florets, whether applicables, or dioecious] atalts [whether fusced of looses [or free]] was [of female-fertile florets, whether applicables, or hairy] emale-fertile [lemmas, [shape: data incomplete] ericarp [whether fusced to lorets [or the lemale-fertile spikelets, when present, number [intended mainly for panicoids]] was [of female-fertile florets, whether applicables, when present, number [intended mainly for panicoids]] was [of female-fertile lemmas, whether staight or geneculate when dry] atal bades [whether pr	Agrostis Andropogon Anisopogon Bambusa Chloris Cynodon Echinochloa Eleusine Festuca Oryza Panicum Phragmites Poa Zea
sed Characters [U]	Elminated Taxa (U)
ارا بایانانده بایا 🕅 🔍 🔜 🔜 🗠 اینیا که این میباری از این 🖂 در این میباری از این ا	

There are four panes - the two on the left displaying lists of characters and the two on the right containing lists of taxa

- best characters (top left): •
 - the best characters to use are listed at the top
- used characters (bottom left): •
- the characters used so far in your identification the set of taxa which match the used character values
- remaining taxa (top right): •
- eliminated taxa (bottom right): the set of taxa which no longer match the characters used •

Initially only the top two panes contain information.

The character list can be displayed in two ways - 'best' order or 'natural' order. This view shows the character list in 'best' order (see next page for explanation).

Stay on this screen and use it to follow the Intkey icon explanations on the next page.

INTKEY ICONS

The Intkey icons are found under the menu bar and within the character and taxon toolbars, along the top of the uppermost panes. Holding the mouse over the icons reveals their function.



	Introduction and references – this enables you to read extra information on the data set and view the author's reference file.
N?	Help button – to find out more information about any button in the set, press 'help' then the button for which you need an explanation.

S	Restart Identification – if you want to re-start your identification click this button.
Ш	Best order – displays the characters in the top-left pane in order of their merit for separating the remaining taxa in the identification. This icon is greyed out on the screen because the characters ARE in 'best' order.
	Natural order – displays the characters in the top-left pane in the order in which the author placed them in the character list. Warning. Unless you are familiar enough with the data to know that certain character values exhibited by your specimen will eliminate a good proportion of the taxa at the current stage of the identification, you should consider using the 'Best' order.
2	Set error tolerance – A taxon will remain under consideration until the number of differences between it and the specimen is greater than the error tolerance. You should increase the current value by 1 if you are aware that you have made a mistake in an identification (because the illustration or description of the remaining taxon does not correspond to your specimen) but you do not know what the mistake is.
0	Use a subset of the characters. This button allows you to choose a set of characters to be used in subsequent operations. THIS IS A VERY USEFUL INTKEY TOOL
#	Search – enables you to find text in characters or in taxon names.

i	Information about taxa – allows you to display any information about the selected taxon eg descriptions, images
Ø	Differences between taxa – displays the differences between selected taxa. Two or more taxa must be selected in either or both of the 'Taxa' panes before pressing the button.
0	Use a subset of the taxa – allows you to choose a subset of the taxa, rather than the whole set. The subsets are defined by the author
A	Search – enables you to find text in characters or in taxon names

THE INFORMATION BOX

NTKEY : DELTA Sample Data	_ /8 ×
File Window Help	
	<u>N</u> ?
Best Characters (66) 🖉 🚍 🚺 🌍 📈 🔘 🗛	Remaining Taxa (14) 👔 🚫 🔵 🐴
upper glume [[or the single glume] of female-fertile spikelets, mid-zone nerve number] [female-fertile] lemmas [number of nerves traversing mid-region] [female-fertile] spikelets [location of disarticulation positions] the incomplete [male or strille] florets [gosition in spikelet] stamens [number per female-fertile floret [not applicable to male spikelets or male florets]] [female-fertile] spikelets [location of disarticulation positions] hilum [form] [number of] female-fertile florets [per female-fertile spikelet] [female-fertile] spikelets [plane of compression] inflorescence [chasmogamous: overall form] [female-fertile] lemmas [whether carinate [i.e., one-keeld at least to the middle on the back] glumes [of female-fertile spikelets, whether markedly unequal in the intact spikelet; regardless of any differences in form] lodicules [of female-fertile lemtas, whether terminated by a fer stigmas [colour, in chasmogamous spikelets] hairy callus [presence] plants [whether muconate or awmed] awms [of female-fertile lemmas, in present, number] plate [female-fertile] lemmas [whether areands, number] plate [female-fertile] lemmas [shape da spikelets, or dioect leat blades [shape: data incomplete] pericarp [whether funcets, whether apex glabrous or hairy] [female-fertile] lemmas, [shape da spex] herende-fertile lemmas, position of [main, median]) waves [of female-fertile lemmas, whether straight or geniculate leat blades [whether pseudopetiolate] waves [of male-fertile lemmas, whether straight or geniculate leat blades [whether pseudopetiolate] waves [of female-fertile] lemmas, whether straight or geniculate leat blades [whether pseudopetiolate] waves [of female-fertile] lemmas, whether straight or geniculate leat blades [whether pseudopetiolate] waves [of female-fertile] lemmas, whether straight or geniculate leat blades [whether pseudopetiolate] waves [of female-fertile] lemmas, whether straight or geniculate leat blades [whether pseudopetiolate] waves [of female-fertile] lemmas, wh	Agrostis Andropogon Anisopogon Bambusa CChoris Cchordon Echinochloa Eleusine Festuca Oryza Panicum Phragmites Poa Zea
Used Characters (U)	Eliminated Taxa (U)
🐮 Start 📔 🐼 🐨 🔣 🖫 😫 🕲 🙁 🙍 🔛 🔯 Inbox - Microsoft Outlook 🕒 INTKEY 📄 sample 🖉 delta_tutorial do	oc - Micro 🚺 INTKEY : DELTA S 🛛 « 🗐 📼 📶 🥘 🕅 2:35 PM

This screen shows the information dialogue box (in blue), which is accessed by clicking the book icon in the upper left corner (see arrow). Within this box are links to other information that the author has compiled for the data set.

HINT

Always check here first, as there may be special instructions from the author, which will help you to use a particular Intkey set

USING INTKEY

INTKEY : DELTA Sample Data			_ <i>8</i> ×
File Window Help			
			N?
Best Characters (66)	🗠 = = 🔍 ~ 🔾 🗛	Remaining Taxa (14)	🚺 🛇 🕒 🕅
upper glume [[or the single glume] of female-fertile spikelets, mid-zone nerve number] [[emale-fertile] lemmas (number of nerves traversing mid-region] [adaxia] ligule [form; avoid seedlings] [[temale-fertile] spikelets [location of disarticulation positions] the incomplete [male or strile] florets [position in spikelet] stamens (number per female-fertile floret [not applicable to male spikelets or male florets]] [female-fertile] spikelets [plane of compression] inflorescence [chasmogamous: overall form] [mature] culms (maximum height data unreliable for large genera) glumes [of female-fertile spikelets, lengths relative to proximal [adjacent] lemmas; refers to the logicale of female-fertile spikelets, whether markedly unequal in the intact spikelet regardless of locicules [of female-fertile lorets, texture] spikelets (whether secund] rachilla (of female-fertile spikelets, whether terminated by a fer stigmas (colour, in chasmogamous spikelets] hairy callus (presence] [female-fertile], relative size] plants (whether monocious, with bisexual spikelets, or dioeci plants (whether monocious, with bisexual spikelets, or dioeci plants (whether monocious, with bisexual spikelets, or dioeci plants (whether monocious, with bisexual spikelets, avons (of female-fertile lorets), terter strajet or spikelets, avons (of female-fertile lorets), terter strajet or spikelets, avons (of female-fertile	anger glume when glumes unequal) i any differences in form)	Agrostis Andropogon Hambusa Chloris Cynodon Echinochloa Eleusine Festuca Oryza Panicum Phragmites Poa Zea	
Used Characters (U)		Eliminated Laxa (U)	
🏄 Start 🔰 🥘 🔯 🔣 🕵 🔪 🖸 📓 💾 🎯 🔺 🔯 Inbox - Microsoft Outlook 🛛 🗁 INTKEY	🗀 sample 🛛 🕅 delta_tutorial.do	c - Micro A INTKEY : DELTA S	< 💽 📼 🏧 😺 🐧 2:35 PM

Examine the characters in the top left pane. In this screen the characters are sorted in the 'best' order i.e. the characters with the stronger discriminating power are listed first.

The first character is the best character to use (it is the most efficient character for eliminating the most taxa from your list), however, it is not necessary to start with this character; neither is it necessary to choose characters in the order in which they are presented.

Select the first character by clicking on it...

CHOOSING THE FIRST CHARACTER

INTKEY : DELTA Sample Data				_ <u>8</u> ×
File Window Help				
				▶?
Best Characters (66)		🖉 = 🔳 🕲 ~ 🔾 🗛	Remaining Ta×a (14)	00
upper glume (for the single glume) of fa (female-fertile) lemmas (number of ner (adaxial) ligule (form; avoid seedlings) (female-fertile) spikelets (location of dis the incomplete (male or storile) florets stamens (number per female-fertile flor (female-fertile) spikelets (approximate hilum (form)	male-fertile spikelets, mid-zone nerve number) ves traversing mid-region) sarticulation positions) [position in spikelet] et (not applicable to male spikelets or male florets]] length, excluding any awns]	<u>^</u>	Agrostis Andropogon Anisopogon Bambusa Chloris Cynodon Echinochloa Eleusine	
(female-fertile) spikelets (plane of com	male-tertile spikeletj pression)		Orvza	
inflorescence (chasmogamous: overall	form)		Panicum	
[mature] culms (maximum height: dat;]] alumes (of female-fertile spikelets, lei	Enter value or values		×	
(female-fertile) lemmas (whether carin	upper glume ((or the single glume) of female-fertile spikelets, n	id-zone nerve number)		
glumes (of female-fertile spikelets, wi lodicules (of female-fertile florets, text				
spikelets (whether secund)	3 nerved			
rachilla (of female-fertile spikelets, wf stigmas (colour, in chasmogamous st				
hairy callus (presence)				
awns (of female-fertile lemmas, if pres				
palea (female-fertile, relative size)				
plants (whether monoecious, with bis) leaf blades (shape: data incomplete)				
pericarp (whether fused or loose (or fr				
ovary (of female-fertile florets, whethe (female-fertile) lemmas (shape of ane)				
the proximal incomplete florets (of the				
awns (of female-fertile lemmas, positi awns (of female-fertile lemmas, wheth				
leaf blades (whether pseudopetiolate)				
Iculas (whether woods or herbaceous)				
Used Characters (Uj				
	OK Cancel	Notes Images		
-	f i i i i i i i i i i i i i i i i i i i			
ಶ Start 🖸 🥔 🖫 🞯 💿 🖸 🐨	🕱 🔋 🛛 🙍 Inbox - Micros 🖗 delta_tutorial 🛛 🕵 TextPad - [C 🕽 🗁 wa	jenera 📄 sample 🚺 🛝 INTKI	EY : We 🚺 INTKEY : 🖉 My View - Ma	« 😺 🕅 3:14 PM

On selecting this character, a character dialogue box appears. In Intkey there are two types of characters:

- numeric: requiring a real number or integer or a range of numbers
- multistate: requiring choice of one or more states

This character is a numeric character and requires an integer to be entered into the space – we entered ${\bf 3}$

Enter 3, and then click the OK button on the box...

RESULTS...

🝌 INTKEY : DELTA Sample Data			_ & ×
Ele <u>Window</u> Help			
			<u></u>
Best Characters (60) 🥢 📃	• • • • •	Remaining Taxa (8)	🚺 📀 🥌 🚯
The incomplete [male or sterile] florets [position in spikelet] [number of] female-fertile florets [per female-fertile spikelet] [female-fertile] spikelets [location of disarticulation positions] inforescence [chasmoganous; overall form] [female-fertile] lemmas [whether carinate [i.e., one-keeled at least to the middle on the back] stigmas [colour, in chasmoganous; operall form] [female-fertile] spikelets [approximate length, excluding any awns] spikelets [whether secund] hairy callus [presence] [female-fertile] spikelets [approximate length, excluding any awns] spikelets [whether secund] hairy callus [presence] [female-fertile] spikelets [plane of compression] [female-fertile] lemmas [number of nerves traversing mid-region] [female-fertile] lemmas [number] rachilla [of female-fertile forets, texture] leaf blades [shape: data incomplete] spikelet_bearing axes [whether disarticulating: note that spikelet-bearing axes may be greatly reduced] fruit [or grain surface pattern] pericarp [whether in regular 'long and-short' combinations, as exemplified in typical andropogonoids] glumes [of female-fertile] lemmas, in present, number] spikelets [whether in regular 'long and-short' combinations, as exemplified in typical andropogonoids] glumes [of female-fertile] lemmas, whether carinate [.e., one-keeled to middle or below]] awns [of female-fertile] lemmas, whether straight or geniculate when dry] the proximal incomplete forets [of the female-fertile spikelets, when present, numb	jlumes unequal) form)	Andropogon Chloris Cynodon Eleusine Festuca Panicum Phragmites Poa	
Used Characters (2)		Eliminated Taxa (6)	
glumes present upper glume 3 nerved		(1) Agrostis (1) Anisopogon (1) Bambusa (1) Echinochloa (1) Oryza (1) Zea	

In each of the panes, the lists have now changed:

Top left: the computer has recalculated the best characters to use to discriminate between the remaining taxa.

Bottom left: this shows the characters and values that have been used so far in the identification

Top right: shows a list of taxa which match the character values entered so far and therefore remain in the list to be identified

Bottom right: shows the list of taxa that don't match the data you have entered and have therefore been eliminated from the identification process

DEPENDENT CHARACTERS

The programme has scored a character you did not select – 'glumes present' – see red arrow.

Throughout Intkey data sets there will be a number of characters that must be answered before the character you have chosen can be considered. Sometimes, as in the above case, the computer will automatically assign the correct state needed for the program to continue. Or you will have to provide the answer: in that case the character dialogue box for the controlling character will be presented. e.g. when choosing a leaf character you may be asked to answer a character about the presence of leaves. Answer this and the character you selected will be presented for scoring.

Do not be scared if this happens

NOW, SELECT ANOTHER CHARACTER

INTKEY : DELTA Sample Data					_ (8) ×
Eile <u>Wi</u> ndow <u>H</u> elp					
					<u>.</u>
Best Characters (60)					Taxa [8] 🚺 🚫 🔘 👫
the incomplete [male or sterile] itorets [positio [number of [female-fertile] forets [per female-fer [female-fertile] spikelets [location of disarticul inflorescence [chasmogamous: overall form] (female-fertile] lemmas [whether carinate [i.e., stigmas [colour, in chasmogamous spikelets] [adaxial] lique [form; avoid seedlings] pales [female-fertile, relative size]	n in spikeletj irtile spikeletj ation positions) one-keeled at least to the	middle on the back)		Andropogo Chloris Cynodon Eleusine Festuca Panicum Phragmite: Pog	s
spikelets (whether secund)	Window				
protects (increased) female-tertilel spikelets (plane of compressin glumes (of female-fertile spikelets, lengths re female-fertile) lemmas (number of nerves tra female-fertile) lemmas (number of nerves tra trachilla (of female-fertile spikelets, whether tr locicules (of female-fertile spikelets, whether tr locicules (of female-fertile spikelets, whether tr soms (of female-fertile spikelets, whether tr spikelet-bearing axes (whether disarticulating pericarp (whether lused or loose (or free)) mature) cums (maximum height data unrelin- spikelets (whether in regular 'long-and-short' glumes (of female-fertile spikelets, whether c awns (of female-fertile spikelets, whether of aylumes (of female-fertile spikelets, whether of aylumes (of female-fertile spikelets, whether of awns (of female-fertile lemmas, position of (n enitelets (norunion: cended mathut in snike Used Characters [2] glumes 3 nerved	1. a single spike	Inflorescer	ce S. a fa lets or Centhes	Ise spike, with spike- to contracted axes	axa (6)
	1997	(201	iloa
	4. a single raceme		5. paniculate		
					_

Select the character "inflorescence (chasmogamous - overall form)"

Note that this character is NOT the first character on the list.

This character has 5 states. These states are presented as diagrams within the character dialogue box. Highlight the state(s) you choose (in this case, state 2), then click the OK button on the box or double-click the state description.

Note that on initial presentation of the character states, the first state looks as if it is already highlighted. It is not. To choose State 1, you must click on it.

CHOOSING MORE THAN ONE STATE

You can choose more than one state if you are unsure which is represented in your specimen. Just highlight as many as you need by clicking on the state name and then click the OK button. There is no need to hold down the shift or control keys for multiple selections. To un-select a state while in the dialogue box, just click it again.

CHANGING A CHARACTER STATE SELECTION

If, at any stage, you think you have made a mistake and want to correct it, click on the appropriate character in the 'Used Characters' (bottom-left) pane. The character dialogue box will be displayed with your original selection highlighted...



To change the previously entered information, click on the highlighted state. This un-selects it. Then click on the state(s) you do want and click OK. The example below shows a selection of states 1,4 & 5. Select these states and click OK.



CHANGING A CHARACTER STATE SELECTION (CON'T)

Now the original selection has been replaced with the new selection and the data recalculated.

				₩2	
Best Characters (57)		36. I	Remaining Taxa (5)		
		<u> </u>		<u>v v v m</u>	
the incomplete (male or sterile) noters (position in spikeley	-	- 1	Anaropogon Eastuss		
parca (icinaleterute, iciauve size) famale fattila) anilalate (facation of disationlation positions)			Penieum		
remare termine spiketers (location of orsaticulation positions)			Pancun Observites		
jauginas (colou), ni citasinoganious spikcieta) Inumber oft fomale fortile florete (nor female fertile enikelet)			Pos		
monible of female-fertile solvelets whether terminated by a female-fertile floret or 'prolonged')			1 00		
followed for female-fertile spikelets, lengths relative to proximal (adjacent) lemmas' refers to the longer glume when g	lumes unequal)				
adicules (of female-fertile florets, texture)	namee anequal)				
(female-fertile) spikelets (plane of compression)					
hilum (form)					
(adaxial) ligule (form; avoid seedlings)					
(female-fertile) lemmas (number of nerves traversing mid-region)					
hairy callus (presence)					
spikelet-bearing axes (whether disarticulating; note that spikelet-bearing axes may be greatly reduced)					
spikelets (whether in regular 'long-and-short' combinations, as exemplified in typical andropogonoids)					
[female-fertile] lemmas (whether carinate (i.e., one-keeled at least to the middle on the back)					
reat blades (shape: data incomplete)					
jawns (of female-leftile lemmas, if present, number)					
female-rerulej spikelets (approximate rerugu, excluding any awits)					
nemale-ternic) terminas (whether mucronate or awned) clumas (of female/attile collelate, whether markadly unaqual in the intert collelat; repardiace of any differences in ((orm)				
granies for remain remain spikeres, whence marked y and dat in the mark spikere, regardless of any uncreated in the fifther and the spikeres of any uncreated in the spikeres of the spikeres	ioning				
nomic of temple-fertile lemmas whether straight or geniculate when dry					
maturel culms (maximum height) data unreliable for (arge general)					
awns (of female-fertile lemmas, position of (main, median))					
the proximal incomplete florets (of the female-fertile spikelets, when present, number (intended mainly for panicoids))				
plants (whether monoecious, with bisexual spikelets, or dioecious)					
awns (main, median of the female-fertile lemmas, relative length)					
[glumes [of female-fertile spikelets, whether carinate [i.e., one-keeled to middle or below]]					
remaie-terrulej lemmas (presence of germination flap)					
stamens (number per remate-retaile noted (not applicable to male spikelets or male notets))					
real blaues (init-wittin, tata very incomplete) culms (whether woods or berbaseous)	[-			
Used Characters (3)		Ē	Eliminated Ta×a (9)		
alumes present		-1	(1) Agrostis		
upper glume 3 nerved		- 11	(1) Anisopogon		
Inflorescence a single spike; or a single raceme; or paniculate			(1) Bambusa		
			(1) Chloris		
			(1) Cynodon		
		- 11	(1) Eleusine		
			[1] Oryza		
			[1]∠ea (1) Estimation		
		- 11	[2] Echinochioa		
		- 11			
4					
		- 10			

Return the data to the original selection of 'inflorescence of spicate main branches', i.e. State 2

TO REMOVE A CHARACTER SELECTION COMPLETELY

Click on the character in 'Used Characters'. This returns the character dialogue box with the chosen state(s) highlighted: Click on the highlighted state(s) to de-select. **Then click OK**. This causes the character to be returned to the 'available characters' pane and any taxa that were eliminated by the character you have just cancelled, to be replaced.

THE SUBSET BUTTON 🚺

Most authors create a set of subsets of the character list. This allows you easy access to groups of characters without looking through the entire character list for them. This is very useful when working with large character sets such as the Western Australian Herbarium's WAGENERA Delta set. The picture below shows the list of subsets available for the Sample set. Choose the **'habit'** set.

🛕 INTKEY : DELTA Sample Data										_ 5 ×
File Window Help										
						•				<u>k?</u>
Best Characters (48)				ť	୬ = ■ ⊘ ~	0 A	Remainin	g Taxa (4)	() () () (A)
(female-fertile) spikelets (location of (female-fertile) lemmas (whether muc (number of) female-fertile florets (per hairy callus (presence) spikelet-bearing axes (whether disart glumes (of female-fertile spikelets, le the incomplete (male or sterile) floret (female-fertile) lemmas (whether cari (JUTLIDE-Clored observate hermost	isarticulation positi ronate or awned) female-fertile spikel iculating; note that s ngths relative to pro s (position in spikel ate (i.e., one-keeled	ons) et) pikelet-bearing a ximal (adjacent) et) I at least to the m	xes may be great lemmas; refers to iddle on the back)	y reduced) the longer glume	when glumes unec	jual)	Andropog Chloris Cynodon Eleusine	on		
INCLODE. Select character keywords										
all nomenclaure homenclaure billion cuins (form) ligules reproductive organization reproductive organization femotorile spikelets femotorile spikelets glumes ligores femotories fores fores fores fores										
	ОК	Cancel	Deselect All	List						
inflorescence (whether comprising a spikelets (whether secund) glumes (of female-fertile spikelets, w	complex of 'partial i nether awned) nether carinate (i.e.	nflorescences' an	nd intervening folia	ır organs (= leave	s, spathes, spathe	oles)) 💌				
Used Characters (3)							Eliminate	1 Ta×a (10)		
filunce present upper glume 3 nerved inflorescence of spicate main branch	28						 Bamb Echin Festu Forsu Panic Praga Praga Praga Praga Zea Agross Aniso 	usa ochioa ca jum mites tis pogon		
r 🍠 Start 🚎 🔯 🚾 😒 🗺 🐚 🗐	💾 🔞 👋 🔯 Inbo	x - Microsoft Outlook		🕞 sample	[@])	delta tutorial.	doc - Micro		ITA Sa 🔍 📾 📼	1 🕅 🕅 2:58 PM 1

The screen below shows that there are 2 characters available for this set, in the **'best'** view. Other characters may be available in the **'natural'** view. To change to 'natural' order, click on the 'natural' button, shown by the red arrow below. Now 4 characters are available for use. Go back to 'best' view

I.

by clicking the 'best' icon

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Best Characters (2)	<u> </u>	Remaining Taxa (4) 🚺 🚫 🔵 🐴
Imature) culma (maximum height: data unreliable for large genera) longevity of plants		Andropagan Coheris Eynadan Elevaine
Used Characters (3)		Eliminated Taxa (10)
glumes present upper glume 3 nerved Inflerescence of spicate main branches		11) Bambusa 11) Echinochoa 11) Echinochoa 11) Oryza 11) Panicum 11) Pinicum 11) Pinicum 11) Pinicum 11) Pinicum 11) Zea 12) Zea 12) Agrostis 12) Agrostis 12) Anisopegon
🎢 Start 🛛 🚙 🔞 🐨 🕿 🖏 🕲 🔄 💾 🚱 👋 🚺 Inbox - Microsoft Outlook 🔂 INTKEY	🔁 sample 🛛 🕅 delta tutorial c	Inc - Micro

CHARACTER NOTES

To help you interpret the character states, the author may have provided notes and images for various characters throughout the set, accessible when you select that character. If supplementary character information is available, the NOTES and IMAGES buttons in the character dialogue box will be active.

Select another character. In this case we have chosen 'longevity of plants'.

Exercise control Image: control Androgogina Character (2) Image: control Image: control Androgogina Image: control Image: control Image: control Image: control	NTKEY: DELTA Sample Data File Window Help	_ <u>-</u> 8 ×
Part Characters (2) Part C		M
Instance Joints (insolume highly data unreliable for large genera) ingreyiby of plants	Best Characters (2)	
Code: Note: The Use in the	(mature) culms (maximum height: data unreliable for large genera) longevity of plants	Andropogon Chloris Cynadan
	Select state or states	Eleusine
* branch (ar bitranicle without remains of old sheaths or colmo) * prenning (with multiple of an ermination to seed production and prening with multiple of the prening with multiple of the seed are obtained in the seed. * Bernall (oil now in grasser): a plat normally requiring two greats to complete this first, then flowering, futuing and perturbing in the second. * Perturbing with multiple of a second of the	longevity of plants	File Edit Window
Cilininated Taxa [10]	Innual (or biennial, without remains of old sheaths or culms) perennial (with remains of old sheaths and/or culms)	Annual': plants progressing from germination to seed production and pensiting, within that period. 'Biennial' (not known in grasses?)', a plant normally requiring two years to complete its life-cycle, growing vegetatively in the first, then flowering fruting and pensitism and the second. 'Peremial': a plant which persists and continues growth for several to many years. Detectable in herbaceous grasses by the shrivelled remnants of old sheaths and culms.
OK Cancel Notes Images 11 Bambusa 11 Festuca 11 Festuca 11 Festuca 11 Pranicum 11 Panaicum 11 Panaicum 11 Panaicum 12 Zea 21 Agrostis 22 Anisopogon		Eliminated Taxa (10)
1) Echinochloa 1) Frestuca 1) Oryza 1) Praguites 1) Paraguites 1) Para 1) Zea 2) Agrostis 2) Anisopogon	OK Cancel Notes Ima	(1) Bambusa
		1) Echinochloa 1) Echinochloa 1) Oryza 1) Panicum 1) Phraymites 1) Pragmites 1) Pra 1) Zea 2) Agrostis 2) Anisopogon

This character has two states and is presented in a normal blue character dialogue box. NB: Sometimes if there are more states than will fit into the space provided, a scroll bar is provided. In this case all states are visible.

If you are uncertain about definition of the states or require more information, click the NOTES button within the dialogue box. This displays a Notes window near the upper right corner of the character dialogue box.

Note that in this case the image button is greyed out, as no character image is available.

To continue, highlight 'annual', then click the OK button on the box.

FLIPPING BETWEEN SUBSETS

Remember you are still in the 'habit' subset. Choose the remaining character in this subset and type in '10' in the dialogue box:

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Best	Characters [1]				s = •	🐑 < 🔘 🐴	Remaining Taxa (3)	🚺 📀 🔿 👫
Best (mat	Characters [1] ure] culms (maximu height: data Enter value or range of value: [mature] culms (maximum heig 10 om high	a unreliable	for large genera) cliable for large genera)				Remaining Taxa (3) Andropogon Chlorige Eurysine I	000
Used		ОК	Cancel	Notes	Imnges		inated Taxa (11) Synodon chinochlea	
anni	execute o spicate maniformation	5					11) Postan 11) Postan 12) Post 12) Agonta 12) Agonta 12) Apostan 12) Festuca 12) Presuca 13) Antsopogon	
赶 S	art 🥌 💽 🐨 🖄 🖏 🛄 📑	🖬 🕑 👋	S Inbox - Microsoft Outlook	C INTKEY	C sample	deka_tutoria	ILdoc - Micros	« 📾 😺 闭 3:35 PM

This will result in message on the screen below. It is sent when you are using a subset of characters whose attributes cannot separate the remaining taxa. To return to the full list of remaining taxa, in order to continue the identification, click on the subset button and choose '**all**'. This will return all the remaining characters to the left hand pane. In this way you can flip between specialised sets of characters and the full list.

MINTKEY : DELTA Sample Data			_ 5 ×
File Window Help			
			▶?
Best Characters (0)		Remaining Taxa [3]	
Characters have been excluded from the identification process, and the available characte the remaining texa. <u>Help</u>	rs cannot separate	Androgogon Chloria Eleveine	
alumon present		(1) Comeden	
ngper glume 3 nerved man branches inforescence of splicate namb branches culms 10 cm high		II) Pose 27 Agrastis 27 Agrastis 20 Oryza 20 Ory	
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SWAPPING BETWEEN SUBSETS

You can swap between subsets as often as you like. To return to the full character list choose **'all'** from the subset list. Any characters which you have chosen whilst in 'subset' mode will remain as 'used characters' when you choose another subset.

MISMATCHES

Sometimes it is possible to exclude all the taxa depending on the character values you select. This is called 'mismatching'. The software will tell you this and displays a button allowing the programme to accept mismatches. To illustrate this, remove the 'culm' character by clicking on it, removing the '10' and clicking **OK**. Then choose the top character in the 'best characters' pane and type '21' in the dialogue box.



As you can see a 'mismatch' has occurred...

🔥 INTKEY : DELTA Sample Data	X
Ele Window Help	
rel	N?
Best Characters (0) No matching taxa remain. Help Allow 1 mismatch.	Remaining Taxa (0)
Used Characters (5)	Eliminated Taxa (14)
olumes present unper glume 3 nerved annual ennual female ferfile florets 21 or more	11 Andropegen 11 Chloris 12 Elevsine 12 Cynodon 12 Echnicohlea 13 Oryza 14 Praum 15 Praum 16 Prava 17 Partue 18 Bambusa 13 Persuca 13 Persuca 14 Antsopogon

MISMATCHES (CONTINUED)

Clicking on the 'Allow 1 mismatch' button instructs the software to recalculate the list of remaining taxa and 'best' characters and allows you to continue identification, as seen below...

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Ele Window Help			
			▶?
Best Characters (46)	🗠 = = 🛛 ~ 🔾 🗛	Remaining Taxa (3)	0 O A
Itemate-fertile] spikelets [location of disarticulation positions] spikelet-bearing axes [whether disarticulating; note that spikelet-bearing axes may be greatly reduced] rachilla (of temale-fertile spikelets, whether terminated by a female-fertile floret, or 'prolonged'] hairy callus [presence] glumes (of female-fertile spikelets, lengths relative to proximal [adjacent] lemmas; refers to the longer glu the incomplete [male or strile] florets [position in spikelet] [female-fertile] lemmas (whether remurante [i.e., one-keeled at least to the middle on the back] fruit (or grain surface pattern) [adaxia] ligule (form; avoid seedlings) awns (of female-fertile lemmas, in present, number] palea (female-fertile) glorether strile] florether straight or geniculate when dry] pericarp (whether r increander strile) [female-fertile] spikelets (plane to strile) [female-fertile] lemmas (stripersent, number] palea (female-fertile] lemmas, whether straight or geniculate when dry] pericarp (whether in regular 'long-and-short' combinations, as exemplified in typical andropogonoids] [female-fertile] spikelets (plane of compression) [female-fertile] spikelets (plane of compression) [female-fertile] spikelets (plane of compression) [female-fertile] spikelets (plane of compression) [female-fertile] lemmas, sposition of (main, median)] the proximal incomplete loreto is spikelets] awns (of female-fertile loreto is ofted length, excluding any awns) [female-fertile] lemmas, position of (main, median)] the proximal incomplete loreto soft the temale-fertile spikelets (sessile or shorter-pedicelled, sexuality) leaf blade XyMS: reliably indicative of C4 type stamens (number per female-fertile floret] (loret [sessile or shorter-pedicelled, sexuality] leaf blades (whether pseudopetiolate) inforescence (whether comprising a complex of 'partial inforescences' and intervening foliar organs (= le spikelets (whether secund) glumes (of female-fertile lerense, texture) lore of temale-fertile lerense, texture) lore of t	rences in form) me when glumes unequal) panicoids)) aves, spathes, spatheoles))	(1) Andropogon (1) Chloris (1) Eleusine	
Used Characters (5)		Eliminated Ta×a (11)	
glumes present upper glume 3 nerved inflorescence of spicate main branches annual female-fertile florets 21 or more		 [2] Cynodon [2] Echinochloa [2] Oryza [2] Panicum [2] Poa [2] Zea [3] Agrostis [3] Bambusa [3] Festuca [3] Phragmites [4] Anisopogon 	

NOTE THAT THE CHARACTER YOU LAST SELECTED HAS REMAINED IN 'USED CHARACTERS'

I

THE DIFFERENCES BETWEEN TAXA BUTTON

At any time during the identification you can display the differences between some or all of the remaining or eliminated taxa. This can be a useful tool in determining characters which may help you discriminate between a small number of remaining taxa.

To display the differences between taxa:

- Hold the **control key** down and highlight the taxa to be differentiated
- Click on the 'differences between taxa' button...

NTKEY : DELTA Sample Data	_ 8
File Window Help	
	🔶 🕴 🕨
Best Characters [46]	
[female-fertile] spikelets [location of disarticulation positions]	
spikelet-bearing axes (whether disarticulating; note that spikelet-bearing axes may be greatly reduced) [1] Chloris	
rachilla [of female-fertile spikelets, whether terminated by a female-fertile floret, or 'prolonged']	
alumes (presence)	
glumes (of f Fae Fee Vindow	
the incomplication of the second	
itemate-teti Andropogon	
fruit (or grai 8-430 cm high	
[adaxia]] lig Chloris	
awns to ren 10-300 cm high	
spikelets (w 10–150 cm high	
(female-ferti Leaf blades	
awns (of ten Andropogon Dericarn fwt Andropogon	
female-ferti	
[female-ferti C/2075 pot resudence folder	
Itemate-terti no possopennate	
stamens (n, not pseudopetiolate	
spikelets [g] Ligule	
awns (of fen Andropogon	
ine proxima an unimee memorane, or a migee memorane	
the 'shorter' a fringed membrane; or a fringe of hairs	
leaf blades Eleusine	
Inforescence a fringed membrane	
glumes (of Androngan	
locicules (o of spicate main branches; or paniculate	
Chloris	
of spicate main branches	
glumes pret Lieusine fisicate main branches	
upper gluma of spicate main of ancies	
annual Andropogon	
female-fertil a complex of 'partial inflorescences' and intervening foliar organs, or not comprising 'partial inflorescences' and foliar organs	
Childris	
Bleutine	
not comprising 'partial inflorescences' and foliar organs	
Spikelet-bearing axes	
Andropogon	
disarticulating Children	
Dersistent	
Eleusine	
persistent	
Spikelets	
Anaropogon	
🐮 Start 😸 🐼 🕅 🖄 🕵 🐂 🔯 🛸 🔛 👘 🖉 👋 📉 Inbox - Microsoft Outlook 🔓 INTKEY 👘 Sample 🕅 delta_tutorial.docMicrosoft Outlook	.TA Sa 🤘 🐻 🚺 3:20 P

The resulting dialogue box lists the characters that differ between the chosen taxa.

Characters in bold signal a clear separation of values between all or some of the taxa.

To continue, close the 'Differences' box.

THE NEXT CHARACTER...

Scroll down the character list to the bottom and select 'culm nodes'. Note that you can choose characters to score from anywhere in the character list....



This character is presented as a photograph. In this example, the feature alluded to within the character state is shown by the red ring. Highlight this state (hairy), and click the OK button on the box or double-click in the red circle.

This character choice has resulted in a successful identification. There is only one remaining taxon – *Andropogon*. To see the extra information available for *Andropogon*, just click on the information button in the top right pane

MINTKEY : DELTA Sample Data			_ 8 ×
File Window Help			_
			<u>\</u> ?
Best Characters (0)	<u> </u>	Remaining Taxa (1)	0 🛇 🔿 🐴
ldestification complete. Help		(1) Andropagon	1
Used Characters (b)		Eliminated Taxa [13]	
glumes present upper glume 3 neved influescence of spicate main branches transler drift legtets 21 or more culm nodes hairy		 Choirs Flexine Panisum Solution Cynodon Cynodon Cynodon Cynodon Cynodon Cynodon Agrantise Agrantise Anisopogon 	
Rectard Comment Review	🖂 annala 🛛 🖓		

DISPLAYING INFORMATION ABOUT A TAXON

NTKEY : DELTA Sample Data						_ <i>B</i> ×
File Window Help						NO
LE Rest Characters (0)					aining Taya (1)	
Dest Characters (0)					annny raxa (r)	
	Identification com Help Taxon Information Androsopon L. Other Full description Brief description Diagnostic description	ıplete.	Illustrations No Images	? [x]	Andropogon	
	Display	fultiple images Web Sear	ch Deselect All	Done	. 17 (40)	
Used Characters (6)					iated Taxa (13)	
glumes present upper glume 3 nerved inflorescence of spicate main branches annual female-fertile florets 21 or more culm nodes hairy				(2) (2) (2) (3) (3) (3) (3) (3) (3) (4) (4) (4) (4) (4) (4) (4)	hloris Elevisine Panicum Poa Cynodon Echinochloa Oryza Zea Agrostis Bambusa Festuca Phragmites Anisopogon	
ಶ Start 🥭 🖸 🐨 🕿 🖫 🕲 🐚 🔡 🎯 👋 🚺	🖸 Inbox - Microsoft Outlook	D INTKEY	🗀 sample	🔄 delta_tutorial.doc -	Micros INTKEY : DELTA Sa	« 🥘 🤘 🕅 3:23 PM

A Taxon Information dialogue box is displayed listing information for this taxon. For *Andropogon*, **full**, **brief** and **diagnostic** descriptions are available.

Often there are illustrations associated with the selected taxon, e.g. maps, taxon images or photographs of interesting or diagnostic features.

You can display any or all of the available information sets for this taxon. To continue highlight all descriptions and click the display button.

DESCRIPTIVE, DIAGNOSTIC AND IMAGE INFORMATION

In the sample Data	_				
					<u></u>
Best Characters (0)			0~(🜔 🗛 Rema ning Taxa (1)	🚺 🛇 🗢 🕅
E Full description	Describe	•		Diagnose	
File Edit Window	Eile Edit Win	ndow		File Edit Window	
Andronogon L.	Andropogon	1 L.		Andropogon L.	
 Andropogon L. Inchuding Anatherum P. Beauv., Arthrostachys Desv., Arthrolophis (Trin.) Chiov., Dimeiostemon Raf., Eriopodium Hochst, Heterochiao Desv., Homoeatherum Nees, Leptopogon Roberty Habit, vegetative morphology. Annual, or perennial. Culms S-250(-450) cm high; herbaceous; branched above, or unbranched above. Leaf blades linear. pseudopetiolate, or not pseudopetiolate. Ligule an unfringed membrane to a fringed membrane. Inflorescence. Plants bisexual, with bisexual spikelets. Inflorescence. Plants bisexual, with bisexual spikelets. Inflorescence of spicate main branches, or paniculate (usually with paired or digitate 'racemes', these often spatheate and aggregated into false panicles); a complex of 'partial inflorescences' and intervening foliar organs. (Stellet), or not comprising 'partial inflorescences' and foliar organs. Spikelet-bearing axes disarticulating, disarticulating at the joints. Spikelets paired, consistently in 'long-and-short' combinations, in pedicellate 'sessile combinations. Pedicels of the 'pedicellate' spikelets free of the rachis. The 'short'' spikelets. <i>The pedicellade Spikelets male or barren</i>, usually awnless, occasionally suppressed. Female-fertile spikelets, florets, fruit. Spikelets compressed laterally, on toniceaby compressed, or awnless (Grosmetinaty, falling with the glumes. Rachila terminated by a female-fertile floret. Hairy callus present. Glumes two, more or less equal, long relative to the adjacent lemmas; awned, or usules of (jo. sometimes aristate). Upper glume 1–3 neved. Spikelets with incomplete florets. The proximal incomplete florets 1; sterile. The proximal lemmas awnless. <i>Female-fertile florets</i> 1; sterile. The proximal lemmas awnless. Female-fertile florets 1; sterile. The proximal lemmas awnless. <i>Female-fertile florets</i> 1; sterile. The proximal lemmas awnless. Female-fertile florets 1; sterile. The proximal lemmas	Ana opogo, Including Arthrolophis Hochst, Hen Roberty Taxonou. Andropogone Cape. Anatomi	1.1. Anatherum P. Beauv., Arthrostachys Desv., (Trin.) Chiov., Dimeiastemon Raf., Eriopodi erochloa Desv., Homoeatherum Nees, Lepto ny, distribution. Panicoideae. Andropogonod. ae. 100 species. Holarctic; Paleotropical; Neor ical references. Metcalfe 1960; this project.	ium ipogon ae. tropical;	Spiklet-bearing axes disarticulating. Diagnotic level 1 attained.	

All the information you have selected is tiled on the screen.

This can all be saved to another file on your computer or printed, in the usual Windows manner.

To continue, close the information windows by selecting 'Window – Close All' from the toolbars on any of the panes (see arrows). This returns you to the previous Taxon Information dialogue box. Click 'Done'.

L

THE FIND BUTTON

FOR CHARACTERS

If you want to find a particular character or characters containing particular words, use the 'find' button on the left-hand toolbar. Click on the button, enter **culm** and click 'find'. All characters matching this search will be highlighted within the character list of the left.

NTKEY : DELTA Sample Data	
File Window Help	
	<u></u>
Best Characters (66)	🖍 🚍 🔳 🎱 പ 🔘 🏘 Remaining Taxa (14) 🛛 🚺 🚫 🔿 🏘
Iodicules (of female-fertile florets, whether hairy) inflorescence (whether comprising a complex of 'partial inflorescences' and intervenit stigmas (number) fruit (length when mature) Zea mays spikeletbearing axes (whether disarticulating; note that spikeletbearing axes may be lodicules (presence in female-fertile florets) fruit (or grain surface pattern) glumes (of female-fertile spikelets, whether carinate (i.e., one-keeled to middle or belo (female-fertile) lemmas (presence of germination flap) longevity of plants spikelets (grouping: recorded mainly in spikes and racemes) the proximal (imperfect) lemmas (of the female-fertile spikelets: whether awned) leaf blades (mid-width: data very incomplete) awns (main, median of the female-fertile lemmas, relative length) culms (whether branched above) (female-fertile) spikelets (whether rachilla disarticulates between the florets of spikele glumes (of female-fertile spikelets, whether awned) leaf blade XyMS; reliably indicative of C4 type	ng foliar organs (= leaves, spathes, spatheoles)) Andropogon Andropogon Anisopogon Bambusa Chloris Cynodon Echinochloa Eleusine Festuca Oryza Panicum Phragmites Poa Zea
Inflorescence (whether open or contracted: mainly applied to panicles) the proximal incomplete florets (of the female-fertile spikelets: sexuality) (adaxia) ligule (presence) glumes (of female-fertile spikelets (sessile or shorter-pedicelled, sexuality) spikelets (detail of 'long-and-short' combinations (intended mainly for andropogonoids pedicels of the 'pedicellate' spikelets (whether fused with the rachis: intended for and the 'longer' (andropogonoid) spikelets (pedicelle or longer-pedicelled, sexuality) [female-fertile) spikelets (whether containing sterile or male-only florets in addition to - culm nodes (whether harry or glabrous) maximum cells-distant count; reliably indicative of photosynthetic pathway	s)] ropogonoids] female-fertile florets)
Used Characters (0)	Eliminated Taxa (0)
🏄 Start 🥔 🖸 😿 😫 🔪 📴 📓 🗮 🧭 \Rightarrow 🔯 Inbox - Micro 🗁 INTKEY 👘 🏠	sample 📄 wag_current 📄 sample 📓 delta_tutorial 🛕 INTKEY : We 🚺 INTKEY : 🔍 🥥 🚺 12:14 PM

When searching through the character list there is a choice of searching the character names only or the characters and their states. Clicking on '**search states**' in the 'find' dialogue box will return more highlighted characters. 'Wildcard' symbols are not accepted but whole or partial words can be entered as the search program will match strings of letters. As an exercise, enter **lea** and also click 'Search states'

THE FIND BUTTON

М

FOR TAXA

If you are searching for a particular taxon, use the 'find' button on the right-hand toolbar and type in the name, and tick the 'select one' button. . Click 'find'...

INTKEY : DELTA Sample Data						_ <u>-</u>	1
ile Window Help							
						₩ ?	1
est Characters (66)				Remaining	1 Taxa (14)		i 📥
ner slume ((e the single slume) of female festile esitelate wid some server sum)	h	<u> </u>					
emale-fertile) lemmas (number of nerves traversing mid-region)	uerj		ŕ	Andronog	10		
davia) liquie (form's avoid seedlings)				Anisonog	500 100		
emale-fertile) spikelets (location of disarticulation positions)				Bambusa			
e incomplete (male or sterile) florets (position in spikelet)				Chloris			
tamens (number per female fertile floret (not applicable to male spikelets or male	florets))			Cynodon			
emale-fertile) spikelets (approximate length, excluding any awns)				Echinochl	oa		
ilum (form)				Eleusine			
number off temale-tertile florets (per temale-tertile spikelet)				Festuca			
emale-tertilej spikelets (plane of compression)				Uryza			
morescence (chasmogamous: overall form)				Panicum			
naturej cullits (maximum nelynt, uata unrenable for large generaj lumes (of female-fertile enikelete, lengthe relative to provimal (adiacent) lemmas:	refere to the lon	aer alume when	alumee unequal	Phragmite	8		
emple-fertile) lemmas (whether carinate i.e. one-keeled at least to the middle on	the back)	ger grunne when	giunes unequui,	Zea			
lumes (of female-fertile spikelets, whether markedly unequal in the intact spikelet	; regardless of a	ny differences i	n form)				
odicules (of female-fertile florets, texture)		.,					
pikelets (whether secund)							
achilla (of female-fertile spikelets, whether terminated by a female-fertile floret, or	'prolonged')						
tigmas (colour, in chasmogamous spikelets)							
airy callus (presence)							
emale-tertilej lemmas (whether mucronate or awned)	Find in taxa: 1 fou	nd	?	×			
wns (of female-fertile lemmas, if present, number)							
alea (lemale-terule, relauve size)	Enter search string	1	Elizati				
rants (whether monocclous, with disexual spikelets, or directous)			TXC/X				
erican (whether fused or loose (or free))	eleusine			1			
vary (of female-fertile florets, whether apex glabrous or hairy)			Elizoritas				
emale-fertile) lemmas (shape of apex)	Select one			1			
ne proximal incomplete florets (of the female-fertile spikelets, when present, num	-		Done				
wns (of female-fertile lemmas, position of (main, median))	💭 Select all						
was lot female-tertile lemmas, whether straight or geniculate when dryj	E a b						
ear blades (whether pseudopetiolate)	Search synony	ms					
	📃 Search Elimina				T		1
sed Characters (U)				Liminated	Taxa (U)		
	~	~	[A DUTREN AND	A	- 1
/ Start 🛛 💭 🕑 🖉 🖄 🖾 🕲 🗒 🖬 🖼 🎯 👋 🚺 Inbox - Micros 🗀 INTKEY	sample	wag_current	🗀 sample 🕅	detta_tutorial	MINTREY : We	MINTKEY : « 🔰 12:22 PM	

You can also search on **parts of the word**, as shown below: no special 'wildcard' character, such as an asterisk * is needed. If you wish to search among remaining and eliminated taxa tick 'select all' and 'search eliminated taxa'. Click 'find'...

MINTKEY : DELTA Sample Data			_ <u>-</u> 8 ×
File Window Help			
			▶?
Best Characters (60)		A Remaining Taxa (8)	0 O A
the incomplete (male or sterile) florets (position in spikeled) (number of temate-terilis florets (por temate-terilis spikeled) (number of temate-terilis florets (por temate-terilis spikeled) (nor secret c) (chasmogenous: overall form) (temate-terilis) (chasmogenous: soverall form) (temate-terilis) (chasmogenous: spikelets) (adaxia) liquie (form: avoid seedings) (temate-terilis) (presence) (temate-terilis) (spikelets (proximate length, excluding any avms) spikelets (whether secund) hairy callus (presence) (temate-terilis) (spikelets (proximate length, excluding any avms) spikelets (whether secund) temate-terilis) lemmas (presence) (temate-terilis) lemmas (presence) (temate-terilis) lemmas (presence) (temate-terilis) lemmas (presence) (temate-terilis) lemmas (presence) (temate-terilis) lemmas (present, number) making (of temate-terilis) spikelets (spikelets, whether terminated by a temate-terilis) flore avms (of temate-terilis) (spikelets), the spikelets) avms (of temate-terilis) (spikelets), the spikelets average averagence) spikelets (whether is used or loase (or tree)) prictary bardier fused or loase (or tree)) spikelets (whether is none closes, with biscusta spikelets) arises averagence) spikelets (whether is none closes, with biscusta spikelets), whet presend in the instact spikelets (temate-terilis) (spikelets, whether tertilis) price (spike) (temate-terilis) (spikelets), whether markedy unequality in the instact spikelets (temate-terilis) (spikelets, whether tertilis) (spikelets) (spikelets) (spikelets), spikelets), spikelets), spikelets (spikelets), spikelets) (temate-terilis) (spikelets), spikelets), spikelets), spikelets) (temate-terilis) (spikelets), spikelets), spikelets), spikelets), spikelets), spikelets), spikelets) (temate-terilis) (spikelets), spikelets), spikelets	the back) refers to the langer glume when glumes unequal) 'prolonged'] Find in taxe: 4 found Finds Finds feach string Finds Select one Select at Select at	Andropogon Chloria Ecusine Festuca Panicum Phraymites Poa	
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