

My Way

April 3, 2005

Greek in Proper ConTEXT
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Writing ancient Greek with its plethora of diacritical signs needs some preparation. With the help of many friendly and knowledgeable people, I managed to typeset ancient Greek and provide two input methods.

1 Introduction

TeX comes with basic support for most Greek letters in the math fonts. However, when you want to typeset ancient Greek, these isolated letters will not suffice. You'll need dedicated fonts that provide the multitude of precomposed glyphs that ancient Greek requires. And you'll need a simple way to input Greek in your TeX source. My first aim was just to replicate methods that I had used in L^ATeX. A number of requirements were obvious:

- Most users will want to mix (shorter) Greek passages with a Roman bodyfont. Therefore, a simple and consistent way to switch to Greek input and Greek typeface has to be provided.
- In order to achieve proper typographic quality, the size of the Greek font has to be adapted to the Roman font. Therefore, we'll need a simple mechanism to scale the Greek font.
- If more than one Greek font is available, they have to behave consistently; switching between these fonts must be possible with a simple interface.
- While traditional ASCII input has a number of advantages (esp. portability and backwards compatibility), UNICODE is the future. Hence, it would be desirable to provide a method to have UNICODE Greek in the source file and to use UNICODE fonts for typesetting.

The last two points were the most challenging. They were also the area where ConTeXt's superior abilities were most visible. This MyWay will describe how support for Greek is implemented. It is not meant as a user manual for the Greek modules (which include such a manual), but rather as a short reminder how support for UNICODE scripts can be implemented. The general way shown here should work for other scripts as well.

2 Babel input

The first step was to replicate a method of writing Greek in ASCII characters that has a long tradition in L^AT_EX so-called babel-input. The general idea is clear: every Greek character is mapped to a (more or less) corresponding Latin character:

```
A B G D E Z H J I K L M N X O P R S T U F Q Y W
A B Γ Δ Ε Ζ Η Θ Ι Κ Λ Μ Ν Ξ Ο Π Ρ Σ Τ Υ Φ Χ Ψ Ω
a b g d e z h j i k l m n x o p r s t u f q y w
α β γ δ ε ζ η θ ι κ λ μ ν ξ ο π ρ σ τ υ φ χ ψ ω
```

Accents are written before the vowels; T_EX's internal ligature mechanism is used to typeset the precomposed glyphs that the fonts provide. Instead of a lengthy explanation, here is an example:

```
>'Andra moi >'ennepe, Mo~usa, pol'utropon, <'oc m'ala poll'a
pl'angqjh, >epe'i Tro'ihc <ier'on ptol'iejron >'eperse
```

This becomes:

Ἄνδρα μοι ἔννεπε, Μοῦσα, πολύτροπον, ὃς μάλα πολλὰ

πλάνγχθη, ἐπεὶ Τροίης ἱερὸν πτολίεθρον ἔπερσε

In order to achieve this result, a module t-greek was defined which contains the following macros:

- To define the font and scaling, we'll need variables in a predefined name space [Greek]. The actual mechanism is hidden from the user, who uses the command `\setupgreek` to define the typeface. So the first macro provides just this command:

```
\def\setupgreek{\setvariables[Greek]}.
```

- Next, we define a default configuration. Otherwise, users will get errors when they process the file and forget to include the `\setupgreek` command:

```
\setupgreek[font=Ibycus,altfont=Leipzig,scale=1]. This will provide a default which will be overridden by user-defined values.
```

- Then, we define synonyms for the provided fonts in this form:

```
\definefontsynonym[Ibycus] [fibr] [encoding=agr]
```

- The next macro defines a font "GreekFont" by processing the variables:

```
\definefont[GreekFont][\getvariable{Greek}{font} sa
\getvariable{Greek}{scale}]
```

So the font specified in `\setupgreek` will be used and scaled at the defined value. The definition of an alternative Greek font `AltGreekFont` (in case users want to mix two Greek fonts) is identical.

- Since the Babel encoding uses characters which are normally active inside TeX to input the Greek accents, we have to provide a few catcode changes. We wrap everything up in a collection of `\setups`:

```
\startsetups[enablegreek]
  \catcode'~=\other
  \catcode'|=\other
  \catcode'\'=\other
  \language[greek]
  \GreekFont
\stopsetups
```

This will make the necessary catcode changes, switch to the Greek font and to the Greek language.

- Finally, we use these setups to define the commands that the user will be typing in his source: we have a command `\localgreek{...}` for shorter passages and a `\startgreek` `\stopgreek` environment for longer stretches of Greek text. These are defined as follows:

```
\definestartstop
  [greek]
  [commands=\directsetup{enablegreek}]
\def\localgreek{\groupedcommand{\directsetup{enablegreek}}{}}
```

When users have the proper fonts installed on their system, they can now use the commands described above to produce beautiful Greek output.

3 Steps towards Unicode input

The first step towards providing the possibility to use utf-8-encoded source files was actually useful for babel input as well. Ancient Greek has a couple of symbols outside of the normal alphabet (e.g., for numerals), and most Greek fonts provide symbols that are used in critical or papyrological editions. It was only logical that these symbols should be made accessible to users by providing names for them and mapping these names to the characters. In my first attempts, I did this for every font and defined these names in the `t-greek` module, but Adam Lindsay soon pointed out that there was a better way that provided additional benefits. It was pretty easy to write an encoding that would provide a symbolic name for every character of the Greek fonts. We called this file `enco-agr.tex`. It consists of a long series of definitions for all the glyphs in the fonts (needless to say, we had to make sure that the fonts would have their glyphs in exactly the same order). Most names are straightforward; in some cases, we had to be inventive. So this is what the file looks like:

```
\startencoding[agr]
\definecharacter greeksigmalunate      1
\definecharacter textdoublebracketleft 11
\definecharacter textdoublebracketright 12
\definecharacter greekIotadialytika    14
```

and so on, giving a name for every one of the 256 characters in the font.

However, there was one problem: unicode defines the combination of breathing + uppercase Greek letter as *one* character. The 256 slots that a tfm provides are not sufficient to accomodate all these characters, so we had to map these to combinations of breathing/accent + capital letter:

```
\definecharacter greekAlphapsili      {\psili \greekAlpha}
\definecharacter greekAlphadasia      {\dasia \greekAlpha}
\definecharacter greekAlphapsilivaria {\greekpsilivaria \greekAlpha}
```

Since this would be the default encoding used with polytonic Greek, we defined a couple of short names for common symbols like Greek numeral signs, editorial or papyrological symbols:

```
\definecharacter sampi                 {\greeksampi}
\definecharacter stigma                 {\greekstigma}
\definecharacter lunars                 {\greeksigmalunate}
\definecharacter lunarS                 {\greekSigmalunate}
\definecharacter halfbrackleft         {\floorleft}
\definecharacter halfbrackright        {\floorright}
\definecharacter crux                   {\textdag}
```

The first benefit of this is obvious: glyphs that cannot be input directly via the keyboard can be called via the names. As you can see in the example above, we now have a character-name `\textdoublebracketleft` which will provide the papyrological symbol \llcorner . But in addition to that, every glyph in our 256-character tfm is now accessible via a symbolic name.

4 Providing Unicode Input

The next step was made possible by ConTeXt's internal capability to handle Unicode-vectors. In a way, this does the reverse of what our file `enco-agr.tex` does: it maps a Unicode character to a name. In order for this to work, we had to provide a file that would define an *entire* Unicode vector. In our case, Greek Extended, that's vector "1F = 31. So now we have a file `unic-031.tex` that maps every Unicode character to a name:

```
\unprotect
\startunicodevector 31
\expandafter\strippedcsname
\ifcase\numexpr(#1+1)
\unknownchar \or
\greekalphapsili \or
\greekalphadasia \or
\greekalphapsilivaria \or
.
.
.
\greekoxia \or
\greekdasia \else
\unknownchar
\fi
\stopunicodevector
\protect \endinput
```

So what this file does is: when ConTeXt finds a unicode character from the vector 31 in the source file, it uses this file to map it to a name like `\greekalphadasia`; this name is in turn mapped to a character in the Greek fonts by `enco-agr.tex`. This way, unicode characters in the TeX-source can be mapped to the corresponding glyphs.

All we have to add to our module is a reference to this UNICODE-vector and to our Greek encoding. Since we want this encoding to be active only inside the Greek passages, we also add a line to return to the default encoding for the rest of the document. Finally, the module will load the appropriate mapfile for Greek files (this only works when users have enabled autoloading mapfiles in their `cont-sys.tex`):

```
\loadmapfile[tasgreek.map]
\useunicodevector[31]
\useencoding[agr]
\enableencoding[\defaultencoding]
```

5 The Greek Fonts

There is a wide variety of Greek fonts available; some of them are commercial, many are free and can be downloaded on the web. We can distinguish between two different kinds:

- Type 1 postscript fonts come as “pfb’s.” They contain exactly 256 glyphs. The Greek alphabet, numbers, the usual punctuation marks, and the accented Greek vowels don’t leave space for much else, so these are specialized fonts just for typesetting ancient Greek. Since there is no generally acknowledged order for the glyphs of this kind of font, I had to make sure that they would follow the structure of `enco-agr`.
- TrueType fonts or “tff’s.” These follow the UNICODE encoding and accomodate up to $256^2 = 65,536$ glyphs. Of course, most TrueType fonts really have only a tiny fraction of these glyphs, and very few offer the full range of “Greek Extended.”

Textfont, the tool for creating the necessary support files for using these fonts in ConTeXt, can handle both type 1 and TrueType fonts. In the case of TrueType fonts, however, it is necessary to extract exactly the glyphs that are needed for `enco-agr`. In order to do this, one has to feed textfont a custom encoding which arranges the names of the 256 glyphs we will be needing in exactly the order that our `enco-agr` needs. Unfortunately, there is no standardized method for naming these glyphs, and fonts differ widely. Some use modified forms of the UNICODE value to name the glyphs (so you find something like “u1FB0”), others have names that identify the character (“alphaiotaacute”). Some TrueTypes do not care about names at all and call every character beyond the normal Latin range “.undef”; it would demand hours of work to make them usable for ConTeXt, so I haven’t tried.

Since we are already working with UNICODE input and UNICODE encoded fonts, it is entirely possible to split the TrueType fonts into a number of tfms, corresponding to the different UNICODE vectors, and rely on ConTeXt’s internal mechanism to recognize the input and switch to the corresponding font. Adam Lindsay has made this possible, so if you need to mix glyphs from several scripts or use very few Greek characters and words, this solution might be more suitable for your needs. In that case, the `\localgreek` command is not needed any more. However, as long as TeX is not fully UNICODE aware and as many users will still rely on Babel input because they don’t have a keyboard driver for writing Greek in UNICODE, the module in its present form is useful if you want to write longer passages in Greek and mix them with text in Western alphabets.

Textfont creates a tfm and a vf (virtual font) for every font that it processes. This is very handy when installing Greek fonts. As I said, creating the precomposed glyphs that Extended Greek requires is handled by the internal TeX ligature-mechanism, so

a `LIGTABLE` has to be added to every font. Since all the fonts have the glyphs in the same order, this is the same table for every font. The steps to do this are:

- Run `vftovp` on the pair of `tfm` and `vf` files in order to obtain a virtual property list (`vpl`) that can be edited.
- Open this `vpl` in a text editor and insert the `LIGTABLE` at the appropriate place.
- Run `vptovf` on this modified `vpl`.

6 Acknowledgements

Let me emphasize that all of this wouldn't have been possible without the help of many people in the ConTEXt-community. Almost two years ago, Giuseppe Bilotta got the ball rolling. I was a newbie and couldn't find out how to make Greek work at all, and I was almost ready to go back to LATEX. Without Giuseppe's help, I wouldn't have known where to start in the first place. I then tried and implemented a few home-cooked solutions. When I thought about a consistent and logical way to integrate other fonts (especially TrueType fonts) and enabling UNICODE support, Adam Lindsay was incredibly generous with his time and his knowledge. For a couple of weeks, we exchanged e-mails on a daily schedule, and he provided most of the ideas you find here. Finally, as everyone, I owe an immense lot of gratitude to Hans. Sometimes, I get the eery impression that there must be at least three or four persons behind this name because he's everywhere: developing ConTEXt and pdfTEX, writing code, helping users on the list all the time (and I'm sure he must have some "real" work to do as well). Hans's incredible knowledge of TEX solved many problems that seemed quite insurmountable to me. Thanks Hans, thanks everybody!

7 A Few Samples

In the end, ConTeXt now offers a fair amount of support for typesetting ancient Greek. What follows is just a few samples of the Greek fonts that are now available:

Font: Alkaios

ΜΥΙΑΣ ΕΓΚΩΜΙΟΝ

Ἡ μυῖα ἔστι μὲν οὐ τὸ σμικρότατον τῶν ὀρνέων, ὅσον ἐμπῖσι καὶ κώνωψι καὶ τοῖς ἔτι λεπτοτέροις παραβάλλειν, ἀλλὰ τοσοῦτον ἐκείνων μεγέθει προὔχει ὅσον αὐτῇ μελίττης ἀπολείπεται. ἐπτέρωται δὲ οὐ κατὰ τὰ αὐτὰ τοῖς ἄλλοις, ὡς τοῖς μὲν ἀπανταχόθεν κομᾶν τοῦ σώματος, τοῖς δὲ ὠκυπτέροις χρῆσθαι, ἀλλὰ κατὰ τὰς ἀκρίδας καὶ τέττιγας καὶ μελίττας ἔστιν ὑμενόπτερος, τοσοῦτον ἀπαλώτερα ἔχουσα τὰ πτερὰ ὅσον τῆς Ἑλληνικῆς ἐσθῆτος ἢ Ἰνδικῆ λεπτοτέρα καὶ μαλακωτέρα·

Font: Cardo

ΜΥΙΑΣ ΕΓΚΩΜΙΟΝ

Ἡ μυῖα ἔστι μὲν οὐ τὸ σμικρότατον τῶν ὀρνέων, ὅσον ἐμπῖσι καὶ κώνωψι καὶ τοῖς ἔτι λεπτοτέροις παραβάλλειν, ἀλλὰ τοσοῦτον ἐκείνων μεγέθει προὔχει ὅσον αὐτῇ μελίττης ἀπολείπεται. ἐπτέρωται δὲ οὐ κατὰ τὰ αὐτὰ τοῖς ἄλλοις, ὡς τοῖς μὲν ἀπανταχόθεν κομᾶν τοῦ σώματος, τοῖς δὲ ὠκυπτέροις χρῆσθαι, ἀλλὰ κατὰ τὰς ἀκρίδας καὶ τέττιγας καὶ μελίττας ἔστιν ὑμενόπτερος, τοσοῦτον ἀπαλώτερα ἔχουσα τὰ πτερὰ ὅσον τῆς Ἑλληνικῆς ἐσθῆτος ἢ Ἰνδικῆ λεπτοτέρα καὶ μαλακωτέρα·

Font: Dioxipe

ΜΥΙΑΣ ΕΓΚΩΜΙΟΝ

Ἡ μυῖα ἔστι μὲν οὐ τὸ σμικρότατον τῶν ὀρνέων, ὅσον ἐμπῖσι καὶ κώνωψι καὶ τοῖς ἔτι λεπτοτέροις παραβάλλειν, ἀλλὰ τοσοῦτον ἐκείνων μεγέθει προὔχει ὅσον αὐτῇ μελίττης ἀπολείπεται. ἐπτέρωται δὲ οὐ κατὰ τὰ αὐτὰ τοῖς ἄλλοις, ὡς τοῖς μὲν ἀπανταχόθεν κομᾶν τοῦ σώματος, τοῖς δὲ ὠκυπτέροις χρῆσθαι, ἀλλὰ κατὰ τὰς ἀκρίδας καὶ τέττιγας καὶ μελίττας ἔστιν ὑμενόπτερος, τοσοῦτον ἀπαλώτερα ἔχουσα τὰ πτερὰ ὅσον τῆς Ἑλληνικῆς ἐσθῆτος ἢ Ἰνδικῆ λεπτοτέρα καὶ μαλακωτέρα·

Font: Gentium

ΜΥΙΑΣ ΕΓΚΩΜΙΟΝ

Ἡ μυῖα ἔστι μὲν οὐ τὸ σμικρότατον τῶν ὀρνέων, ὅσον ἐμπῖσι καὶ κώνωψι καὶ τοῖς ἔτι λεπτοτέροις παραβάλλειν, ἀλλὰ τοσοῦτον ἐκείνων μεγέθει προὔχει ὅσον αὐτῇ μελίττης ἀπολείπεται. ἐπτέρωται δὲ οὐ κατὰ τὰ αὐτὰ τοῖς ἄλλοις, ὡς τοῖς μὲν ἀπανταχόθεν κομᾶν τοῦ σώματος, τοῖς δὲ ὠκυπτέροις χρῆσθαι, ἀλλὰ κατὰ τὰς ἀκρίδας καὶ τέττιγας καὶ μελίττας

ἔστιν ὑμενόπτερος, τοσοῦτον ἀπαλώτερα ἔχουσα τὰ πτερὰ ὅσον τῆς Ἑλληνικῆς ἐσθῆτος ἢ Ἰνδικῆ λεπτοτέρα καὶ μαλακωτέρα·

Font: Gentium Italic

ΜΥΙΑΣ ΕΓΚΩΜΙΟΝ

Ἡ μυῖα ἔστι μὲν οὐ τὸ σμικρότατον τῶν ὀρνέων, ὅσον ἐμπῖσι καὶ κώνωψι καὶ τοῖς ἔτι λεπτοτέροις παραβάλλειν, ἀλλὰ τοσοῦτον ἐκείνων μεγέθει προὔχει ὅσον αὐτῇ μελίττης ἀπολείπεται. ἐπτέρωται δὲ οὐ κατὰ τὰ αὐτὰ τοῖς ἄλλοις, ὡς τοῖς μὲν ἀπανταχόθεν κομᾶν τοῦ σώματος, τοῖς δὲ ὠκυπτέροις χρῆσθαι, ἀλλὰ κατὰ τὰς ἀκρίδας καὶ τέττιγας καὶ μελίττας ἔστιν ὑμενόπτερος, τοσοῦτον ἀπαλώτερα ἔχουσα τὰ πτερὰ ὅσον τῆς Ἑλληνικῆς ἐσθῆτος ἢ Ἰνδικῆ λεπτοτέρα καὶ μαλακωτέρα·

Font: Ibycus

ΜΥΙΑΣ ΕΓΚΩΜΙΟΝ

Ἡ μυῖα ἔστι μὲν οὐ τὸ σμικρότατον τῶν ὀρνέων, ὅσον ἐμπῖσι καὶ κώνωψι καὶ τοῖς ἔτι λεπτοτέροις παραβάλλειν, ἀλλὰ τοσοῦτον ἐκείνων μεγέθει προὔχει ὅσον αὐτῇ μελίττης ἀπολείπεται. ἐπτέρωται δὲ οὐ κατὰ τὰ αὐτὰ τοῖς ἄλλοις, ὡς τοῖς μὲν ἀπανταχόθεν κομᾶν τοῦ σώματος, τοῖς δὲ ὠκυπτέροις χρῆσθαι, ἀλλὰ κατὰ τὰς ἀκρίδας καὶ τέττιγας καὶ μελίττας ἔστιν ὑμενόπτερος, τοσοῦτον ἀπαλώτερα ἔχουσα τὰ πτερὰ ὅσον τῆς Ἑλληνικῆς ἐσθῆτος ἢ Ἰνδικῆ λεπτοτέρα καὶ μαλακωτέρα·

Font: Leipzig

ΜΥΙΑΣ ΕΓΚΩΜΙΟΝ

Ἡ μυῖα ἔστι μὲν οὐ τὸ σμικρότατον τῶν ὀρνέων, ὅσον ἐμπῖσι καὶ κώνωψι καὶ τοῖς ἔτι λεπτοτέροις παραβάλλειν, ἀλλὰ τοσοῦτον ἐκείνων μεγέθει προὔχει ὅσον αὐτῇ μελίττης ἀπολείπεται. ἐπτέρωται δὲ οὐ κατὰ τὰ αὐτὰ τοῖς ἄλλοις, ὡς τοῖς μὲν ἀπανταχόθεν κομᾶν τοῦ σώματος, τοῖς δὲ ὠκυπτέροις χρῆσθαι, ἀλλὰ κατὰ τὰς ἀκρίδας καὶ τέττιγας καὶ μελίττας ἔστιν ὑμενόπτερος, τοσοῦτον ἀπαλώτερα ἔχουσα τὰ πτερὰ ὅσον τῆς Ἑλληνικῆς ἐσθῆτος ἢ Ἰνδικῆ λεπτοτέρα καὶ μαλακωτέρα·

Font: Minion Italic

ΜΥΙΑΣ ΕΓΚΩΜΙΟΝ

Ἡ μυῖα ἔστι μὲν οὐ τὸ σμικρότατον τῶν ὀρνέων, ὅσον ἐμπῖσι καὶ κώνωψι καὶ τοῖς ἔτι λεπτοτέροις παραβάλλειν, ἀλλὰ τοσοῦτον ἐκείνων μεγέθει προὔχει ὅσον αὐτῇ μελίττης ἀπολείπεται. ἐπτέρωται δὲ οὐ κατὰ τὰ αὐτὰ τοῖς ἄλλοις, ὡς τοῖς μὲν ἀπανταχόθεν κομᾶν τοῦ σώματος, τοῖς δὲ ὠκυπτέροις χρῆσθαι, ἀλλὰ κατὰ τὰς ἀκρίδας καὶ τέττιγας καὶ μελίττας ἔστιν ὑμενόπτερος, τοσοῦτον ἀπαλώτερα ἔχουσα τὰ πτερὰ ὅσον τῆς Ἑλληνικῆς ἐσθῆτος ἢ Ἰνδικῆ λεπτοτέρα καὶ μαλακωτέρα·

Font: Minion Bold

ΜΥΙΑΣ ΕΓΚΩΜΙΟΝ

Ἡ μυία ἔστι μὲν οὐ τὸ σμικρότατον τῶν ὀρνέων, ὅσον ἐμπίσι καὶ κώνωψι καὶ τοῖς ἔτι λεπτοτέροις παραβάλλειν, ἀλλὰ τοσοῦτον ἐκείνων μεγέθει προὔχει ὅσον αὐτὴ μελίττης ἀπολείπεται. ἐπτέρωται δὲ οὐ κατὰ τὰ αὐτὰ τοῖς ἄλλοις, ὡς τοῖς μὲν ἀπανταχόθεν κομᾶν τοῦ σώματος, τοῖς δὲ ὠκυπτέροις χρῆσθαι, ἀλλὰ κατὰ τὰς ἀκρίδας καὶ τέττιγας καὶ μελίττας ἔστιν ὑμενόπτερος, τοσοῦτον ἀπαλότερα ἔχουσα τὰ πτερὰ ὅσον τῆς Ἑλληνικῆς ἐσθῆτος ἢ Ἰνδικῆ λεπτοτέρα καὶ μαλακωτέρα·

Font: Oxonia

ΜΥΙΑΣ ΕΓΚΩΜΙΟΝ

Ἡ μυία ἔστι μὲν οὐ τὸ σμικρότατον τῶν ὀρνέων, ὅσον ἐμπίσι καὶ κώνωψι καὶ τοῖς ἔτι λεπτοτέροις παραβάλλειν, ἀλλὰ τοσοῦτον ἐκείνων μεγέθει προὔχει ὅσον αὐτὴ μελίττης ἀπολείπεται. ἐπτέρωται δὲ οὐ κατὰ τὰ αὐτὰ τοῖς ἄλλοις, ὡς τοῖς μὲν ἀπανταχόθεν κομᾶν τοῦ σώματος, τοῖς δὲ ὠκυπτέροις χρῆσθαι, ἀλλὰ κατὰ τὰς ἀκρίδας καὶ τέττιγας καὶ μελίττας ἔστιν ὑμενόπτερος, τοσοῦτον ἀπαλότερα ἔχουσα τὰ πτερὰ ὅσον τῆς Ἑλληνικῆς ἐσθῆτος ἢ Ἰνδικῆ λεπτοτέρα καὶ μαλακωτέρα·

Font: Teubner

ΜΥΙΑΣ ΕΓΚΩΜΙΟΝ

Ἡ μυία ἔστι μὲν οὐ τὸ σμικρότατον τῶν ὀρνέων, ὅσον ἐμπίσι καὶ κώνωψι καὶ τοῖς ἔτι λεπτοτέροις παραβάλλειν, ἀλλὰ τοσοῦτον ἐκείνων μεγέθει προὔχει ὅσον αὐτὴ μελίττης ἀπολείπεται. ἐπτέρωται δὲ οὐ κατὰ τὰ αὐτὰ τοῖς ἄλλοις, ὡς τοῖς μὲν ἀπανταχόθεν κομᾶν τοῦ σώματος, τοῖς δὲ ὠκυπτέροις χρῆσθαι, ἀλλὰ κατὰ τὰς ἀκρίδας καὶ τέττιγας καὶ μελίττας ἔστιν ὑμενόπτερος, τοσοῦτον ἀπαλότερα ἔχουσα τὰ πτερὰ ὅσον τῆς Ἑλληνικῆς ἐσθῆτος ἢ Ἰνδικῆ λεπτοτέρα καὶ μαλακωτέρα·

Font: Palatino

ΜΥΙΑΣ ΕΓΚΩΜΙΟΝ

Ἡ μυία ἔστι μὲν οὐ τὸ σμικρότατον τῶν ὀρνέων, ὅσον ἐμπίσι καὶ κώνωψι καὶ τοῖς ἔτι λεπτοτέροις παραβάλλειν, ἀλλὰ τοσοῦτον ἐκείνων μεγέθει προὔχει ὅσον αὐτὴ μελίττης ἀπολείπεται. ἐπτέρωται δὲ οὐ κατὰ τὰ αὐτὰ τοῖς ἄλλοις, ὡς τοῖς μὲν ἀπανταχόθεν κομᾶν τοῦ σώματος, τοῖς δὲ ὠκυπτέροις χρῆσθαι, ἀλλὰ κατὰ τὰς ἀκρίδας καὶ τέττιγας καὶ μελίττας ἔστιν ὑμενόπτερος, τοσοῦτον ἀπαλότερα ἔχουσα τὰ πτερὰ ὅσον τῆς Ἑλληνικῆς ἐσθῆτος ἢ Ἰνδικῆ λεπτοτέρα καὶ μαλακωτέρα·

Font: Palatino Italic

ΜΥΙΑΣ ΕΓΚΩΜΙΟΝ

Ἡ μυία ἔστι μὲν οὐ τὸ σμικρότατον τῶν ὀρνέων, ὅσον ἐμπίσι καὶ κώνωψι καὶ τοῖς ἔτι λεπτοτέροις παραβάλλειν, ἀλλὰ τοσοῦτον ἐκείνων μεγέθει προὔχει

ὅσον αὐτὴ μελίττης ἀπολείπεται. ἐπτέρωται δὲ οὐ κατὰ τὰ αὐτὰ τοῖς ἄλλοις, ὡς τοῖς μὲν ἀπανταχόθεν κομᾶν τοῦ σώματος, τοῖς δὲ ὠκυπτέροις χρῆσθαι, ἀλλὰ κατὰ τὰς ἀκρίδας καὶ τέττιγας καὶ μελίττας ἐστὶν ὑμενόπτερος, τοσοῦτον ἀπαλώτερα ἔχουσα τὰ πτερὰ ὅσον τῆς Ἑλληνικῆς ἐσθῆτος ἢ Ἰνδικῆ λεπτοτέρα καὶ μαλακωτέρα·

Font: Palatino Bold

ΜΥΙΑΣ ΕΓΚΩΜΙΟΝ

Ἡ μυῖα ἔστι μὲν οὐ τὸ σμικρότατον τῶν ὀρνέων, ὅσον ἐμπῖσι καὶ κώνωψι καὶ τοῖς ἔτι λεπτοτέροις παραβάλλειν, ἀλλὰ τοσοῦτον ἐκείνων μεγέθει προὔχει ὅσον αὐτὴ μελίττης ἀπολείπεται. ἐπτέρωται δὲ οὐ κατὰ τὰ αὐτὰ τοῖς ἄλλοις, ὡς τοῖς μὲν ἀπανταχόθεν κομᾶν τοῦ σώματος, τοῖς δὲ ὠκυπτέροις χρῆσθαι, ἀλλὰ κατὰ τὰς ἀκρίδας καὶ τέττιγας καὶ μελίττας ἐστὶν ὑμενόπτερος, τοσοῦτον ἀπαλώτερα ἔχουσα τὰ πτερὰ ὅσον τῆς Ἑλληνικῆς ἐσθῆτος ἢ Ἰνδικῆ λεπτοτέρα καὶ μαλακωτέρα·

Font: Palatino Bold Italic

ΜΥΙΑΣ ΕΓΚΩΜΙΟΝ

Ἡ μυῖα ἔστι μὲν οὐ τὸ σμικρότατον τῶν ὀρνέων, ὅσον ἐμπῖσι καὶ κώνωψι καὶ τοῖς ἔτι λεπτοτέροις παραβάλλειν, ἀλλὰ τοσοῦτον ἐκείνων μεγέθει προὔχει ὅσον αὐτὴ μελίττης ἀπολείπεται. ἐπτέρωται δὲ οὐ κατὰ τὰ αὐτὰ τοῖς ἄλλοις, ὡς τοῖς μὲν ἀπανταχόθεν κομᾶν τοῦ σώματος, τοῖς δὲ ὠκυπτέροις χρῆσθαι, ἀλλὰ κατὰ τὰς ἀκρίδας καὶ τέττιγας καὶ μελίττας ἐστὶν ὑμενόπτερος, τοσοῦτον ἀπαλώτερα ἔχουσα τὰ πτερὰ ὅσον τῆς Ἑλληνικῆς ἐσθῆτος ἢ Ἰνδικῆ λεπτοτέρα καὶ μαλακωτέρα·

Font: FreeSerif

ΜΥΙΑΣ ΕΓΚΩΜΙΟΝ

Ἡ μυῖα ἔστι μὲν οὐ τὸ σμικρότατον τῶν ὀρνέων, ὅσον ἐμπῖσι καὶ κώνωψι καὶ τοῖς ἔτι λεπτοτέροις παραβάλλειν, ἀλλὰ τοσοῦτον ἐκείνων μεγέθει προὔχει ὅσον αὐτὴ μελίττης ἀπολείπεται. ἐπτέρωται δὲ οὐ κατὰ τὰ αὐτὰ τοῖς ἄλλοις, ὡς τοῖς μὲν ἀπανταχόθεν κομᾶν τοῦ σώματος, τοῖς δὲ ὠκυπτέροις χρῆσθαι, ἀλλὰ κατὰ τὰς ἀκρίδας καὶ τέττιγας καὶ μελίττας ἐστὶν ὑμενόπτερος, τοσοῦτον ἀπαλώτερα ἔχουσα τὰ πτερὰ ὅσον τῆς Ἑλληνικῆς ἐσθῆτος ἢ Ἰνδικῆ λεπτοτέρα καὶ μαλακωτέρα·

Font: FreeSerif Italic

ΜΥΙΑΣ ΕΓΚΩΜΙΟΝ

Ἡ μυῖα ἔστι μὲν οὐ τὸ σμικρότατον τῶν ὀρνέων, ὅσον ἐμπῖσι καὶ κώνωψι καὶ τοῖς ἔτι λεπτοτέροις παραβάλλειν, ἀλλὰ τοσοῦτον ἐκείνων μεγέθει προὔχει ὅσον αὐτὴ μελίττης ἀπολείπεται. ἐπτέρωται δὲ οὐ κατὰ τὰ αὐτὰ τοῖς ἄλλοις, ὡς τοῖς μὲν ἀπανταχόθεν

κομᾶν τοῦ σώματος, τοῖς δὲ ὠκυπτέροις χρῆσθαι, ἀλλὰ κατὰ τὰς ἀκρίδας καὶ τέττιγας καὶ μελίττας ἐστὶν ὑμενόπτερος, τοσοῦτον ἀπαλώτερα ἔχουσα τὰ πτερὰ ὅσον τῆς Ἑλληνικῆς ἐσθῆτος ἢ Ἰνδικῆ λεπτοτέρα καὶ μαλακωτέρα

Font: FreeSerif Bold

ΜΥΙΑΣ ΕΓΚΩΜΙΟΝ

Ἡ μυῖα ἔστι μὲν οὐ τὸ σμικρότατον τῶν ὀρνέων, ὅσον ἐμπίσι καὶ κώνωφι καὶ τοῖς ἔτι λεπτοτέροις παραβάλλειν, ἀλλὰ τοσοῦτον ἐκείνων μεγέθει προὔχει ὅσον αὐτῇ μελίττης ἀπολείπεται. ἐπτέρωται δὲ οὐ κατὰ τὰ αὐτὰ τοῖς ἄλλοις, ὡς τοῖς μὲν ἀπανταχόθεν κομᾶν τοῦ σώματος, τοῖς δὲ ὠκυπτέροις χρῆσθαι, ἀλλὰ κατὰ τὰς ἀκρίδας καὶ τέττιγας καὶ μελίττας ἐστὶν ὑμενόπτερος, τοσοῦτον ἀπαλώτερα ἔχουσα τὰ πτερὰ ὅσον τῆς Ἑλληνικῆς ἐσθῆτος ἢ Ἰνδικῆ λεπτοτέρα καὶ μαλακωτέρα

Font: Korinthia

ΜΥΙΑΣ ΕΓΚΩΜΙΟΝ

Ἡ μυῖα ἔστι μὲν οὐ τὸ σμικρότατον τῶν ὀρνέων, ὅσον ἐμπίσι καὶ κώνωφι καὶ τοῖς ἔτι λεπτοτέροις παραβάλλειν, ἀλλὰ τοσοῦτον ἐκείνων μεγέθει προὔχει ὅσον αὐτῇ μελίττης ἀπολείπεται. ἐπτέρωται δὲ οὐ κατὰ τὰ αὐτὰ τοῖς ἄλλοις, ὡς τοῖς μὲν ἀπανταχόθεν κομᾶν τοῦ σώματος, τοῖς δὲ ὠκυπτέροις χρῆσθαι, ἀλλὰ κατὰ τὰς ἀκρίδας καὶ τέττιγας καὶ μελίττας ἐστὶν ὑμενόπτερος, τοσοῦτον ἀπαλώτερα ἔχουσα τὰ πτερὰ ὅσον τῆς Ἑλληνικῆς ἐσθῆτος ἢ Ἰνδικῆ λεπτοτέρα καὶ μαλακωτέρα

