

A set of multi-entry identification keys to African frugivorous flies (Diptera, Tephritidae)

Massimiliano Virgilio¹, Ian White², Marc De Meyer¹

1 *Royal Museum for Central Africa, Leuvensesteenweg 13, B3080 Tervuren, Belgium* **2** *Buxton, UK; previously The Natural History Museum, Cromwell Road, London, SW7 5BD*

Corresponding author: *Massimiliano Virgilio* (massimiliano.virgilio@africamuseum.be)

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<http://zoobank.org/0C5847D5-EC3D-4CE6-9579-282846092D99>

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a set of multi-entry electronic identification keys to African FF

the keys are provided as supplementary files to the paper,
(<http://dx.doi.org/10.3897/zookeys.428.7366>)

BUT NO IMAGES THERE!

(sorry, the download of all images would have been problematic)

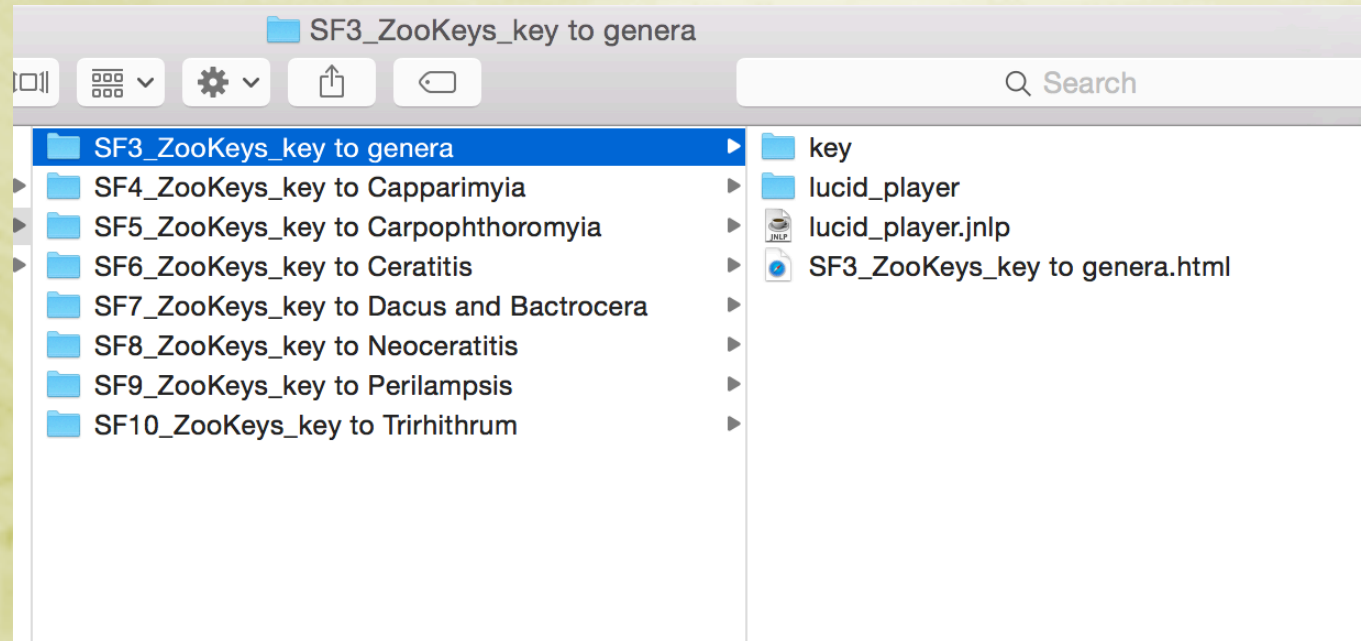
for a full version of the keys please contact:

massimiliano.virgilio@africamuseum.be
marc.de.meyer@africamuseum.be

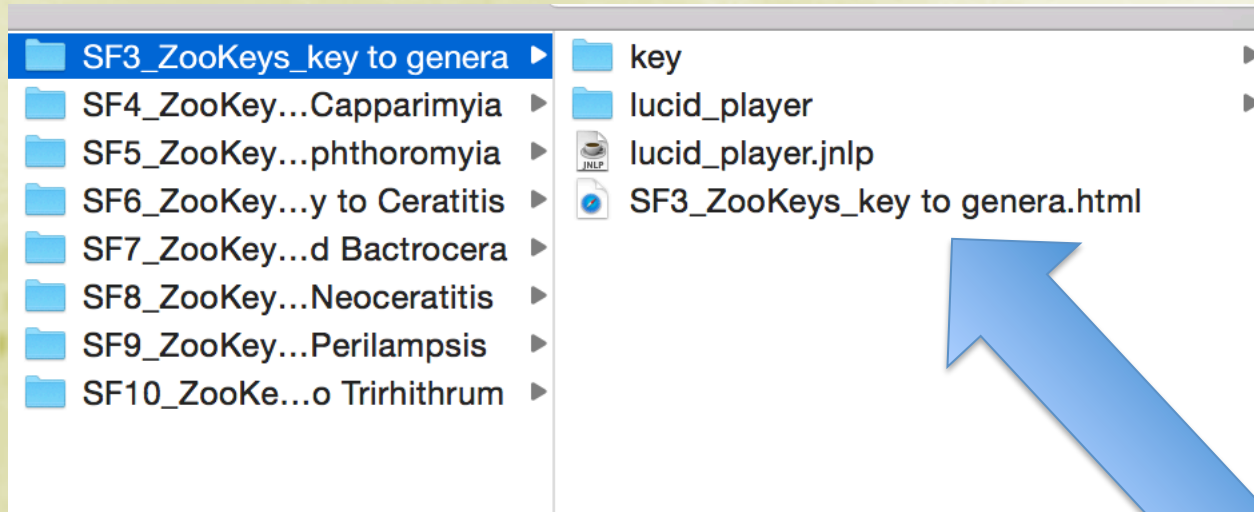
choose a key

genus ID

species ID

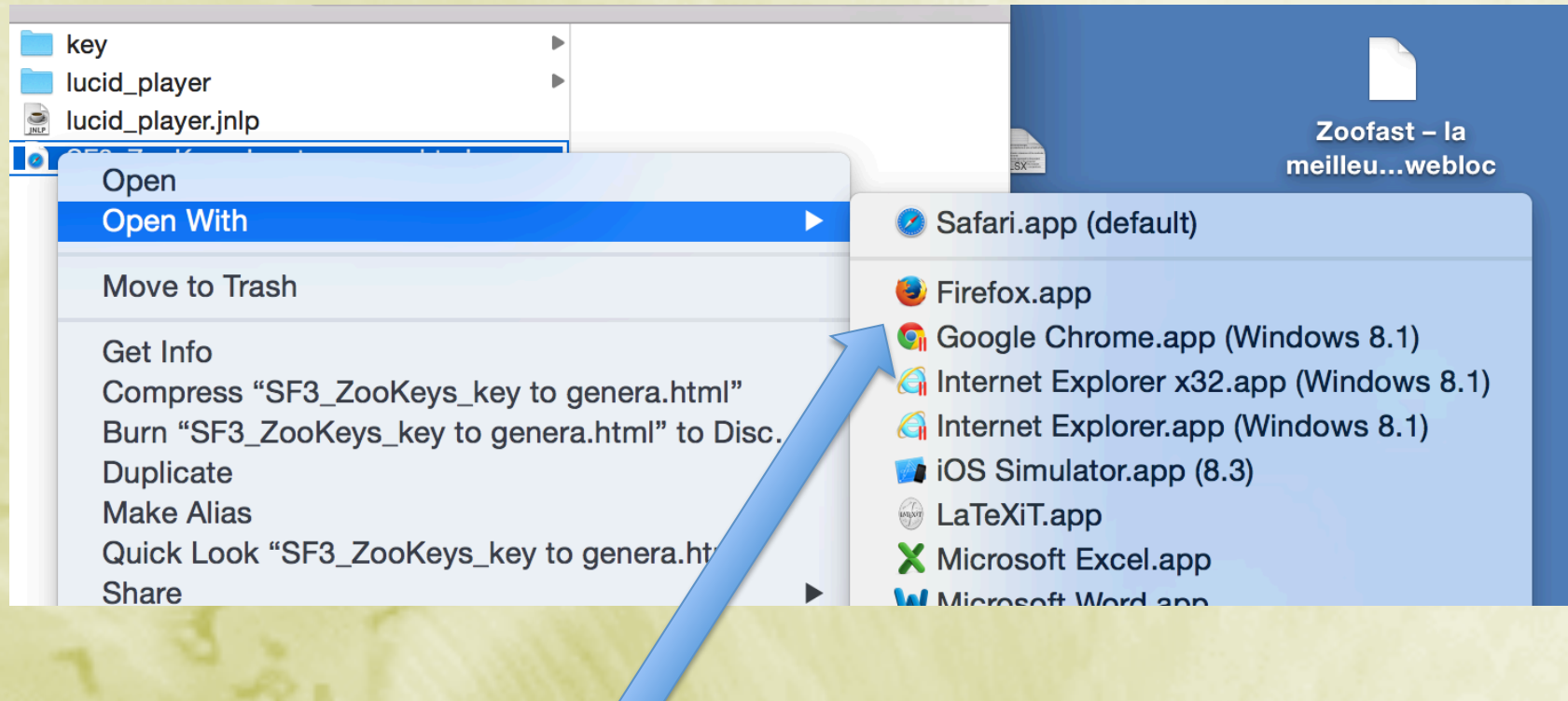


launch a key



right click html file

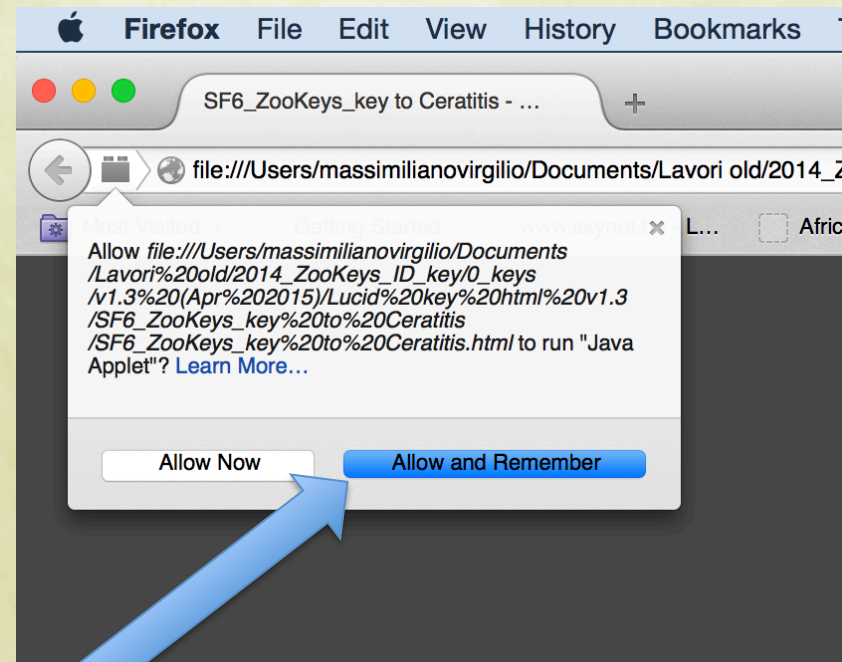
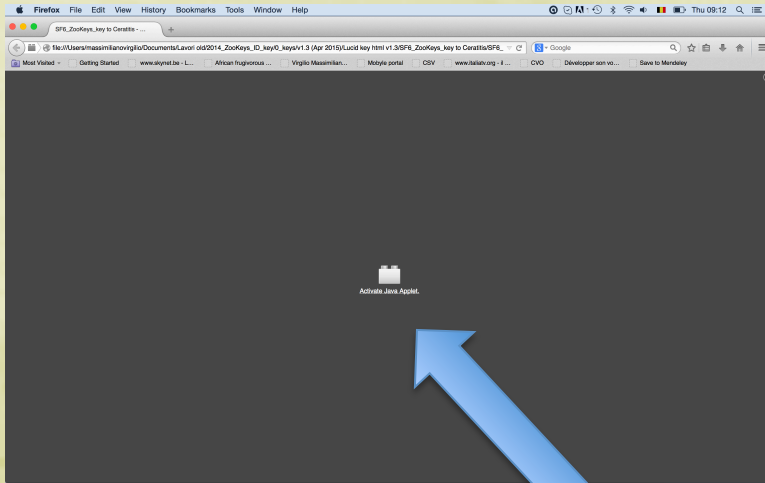
launch a key



choose a browser

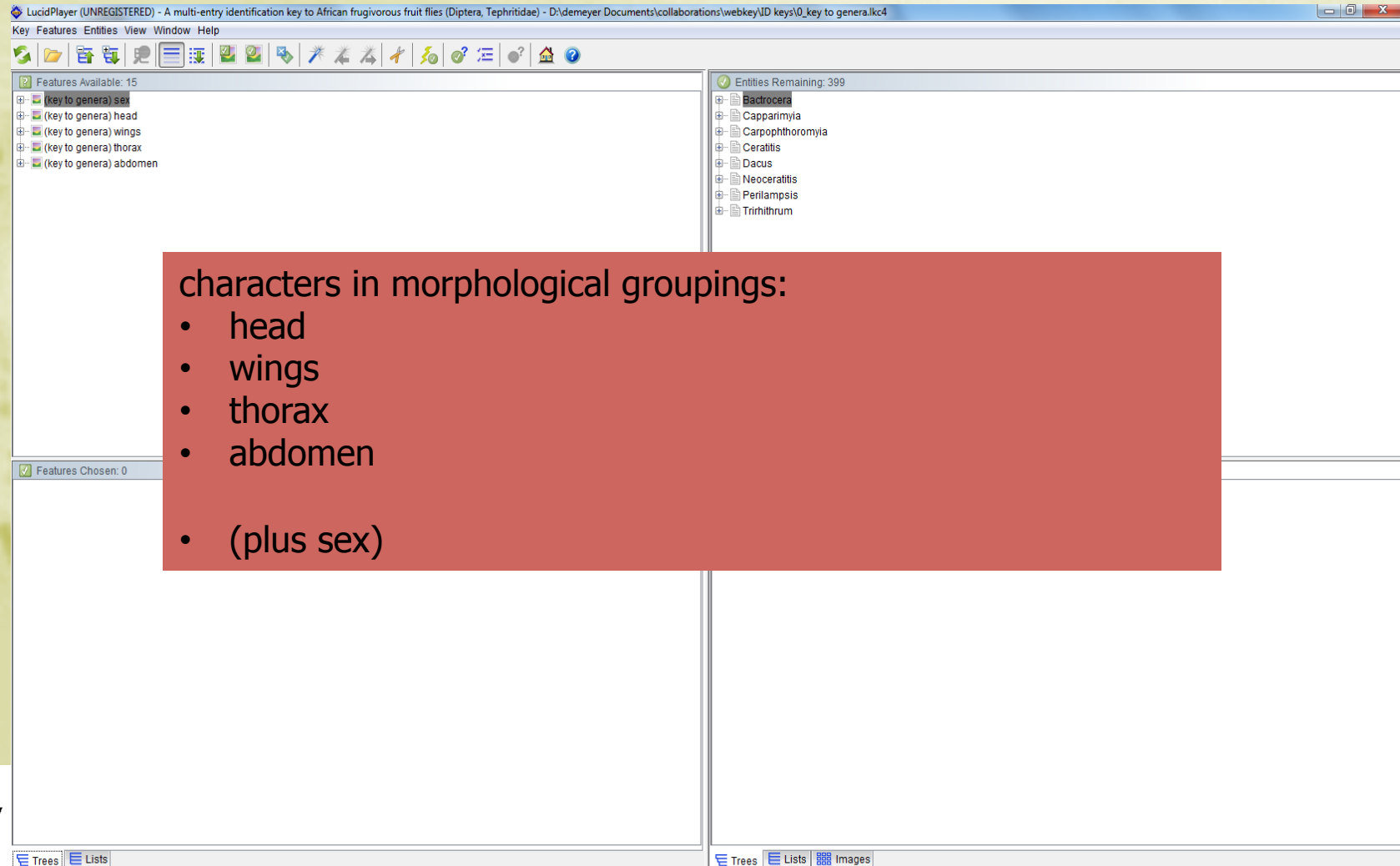
- be sure your Java is uptaded (google: "verify java version")
- if it doesn't work try a different browser (explorer, firefox, safari, etc.)
- first time you open a key it might take a while

launch a key



activate and authorise whatever you can activate and authorise

key structure



key structure

click to unfold and see images

LucidPlayer (UNREGISTERED) - A multi-entry identification key to African frugivorous fruit flies (Diptera, Tephritidae) - D:\demeyer Documents\collaborations\webkey\ID keys\0_key to genera.lkc4

Key Features Entities View Window Help

Features Available: 15

- (key to genera) sex
 - ☒ female
 - ☐ male
- (key to genera) head
- (key to genera) wings
- (key to genera) thorax
- (key to genera) abdomen

Features Chosen: 0

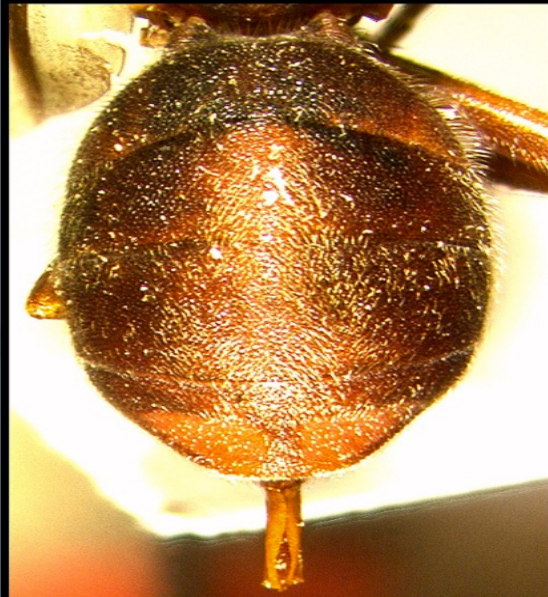
- (key to genera) sex
 - ☒ female

Entities Remaining: 399

- Bactrocera
- Capparimyia
- Carpophthoromyia
- Ceratitis
- Dacus
- Neoceratitis
- Perilampus
- Tririthrum

Entities Discarded: 0

female - Lucid3

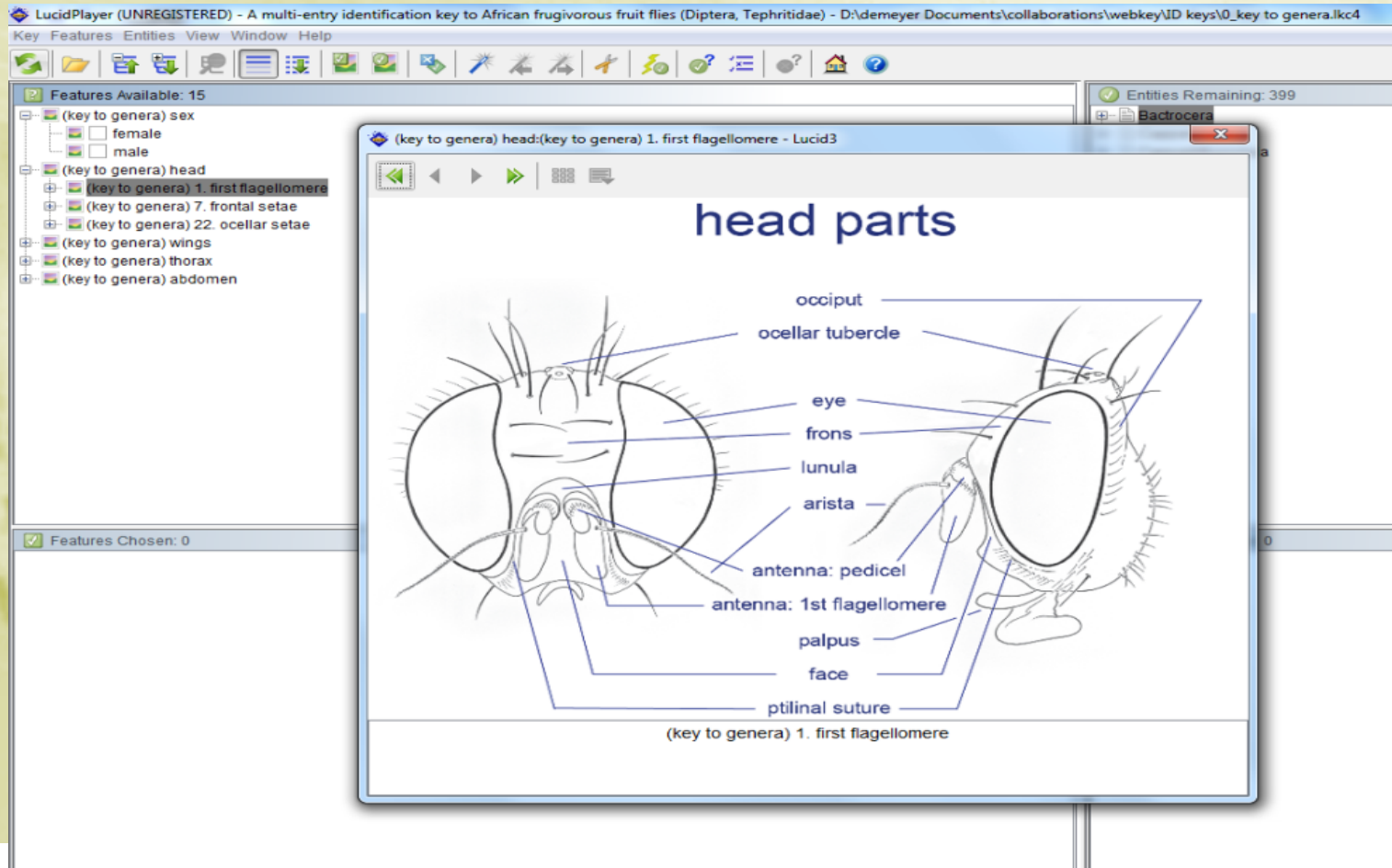


Dacus phantom (HT female) abdomen x0.8 (ZMHU) [© NHM 2003]

female

key structure

click to see explanatory illustrations



key structure

tick box to select

LucidPlayer (UNREGISTERED) - A multi-entry identification key to African frugivorous fruit flies (Diptera, Tephritidae) - D:\demeyer Documents\collaborations\webkey\ID keys\0_key to genera.lkc4

Key Features Entities View Window Help

Features Available: 14

- (key to genera) sex
 - ☐ female
 - ☒ male
- (key to genera) head
 - (key to genera) 1. first flagellomere
 - ☒ longer than facial margin
 - ☐ shorter than facial margin
 - (key to genera) 7. frontal setae
 - (key to genera) 22. ocellar setae
- (key to genera) wings
- (key to genera) thorax
- (key to genera) abdomen


Entities Remaining: 211

- Bactrocera
- Dacus

Features Chosen: 2

- (key to genera) sex
 - ☐ female
 - ☒ male
- (key to genera) head
 - (key to genera) 1. first flagellomere
 - ☒ longer than facial margin

longer than facial margin - Lucid3



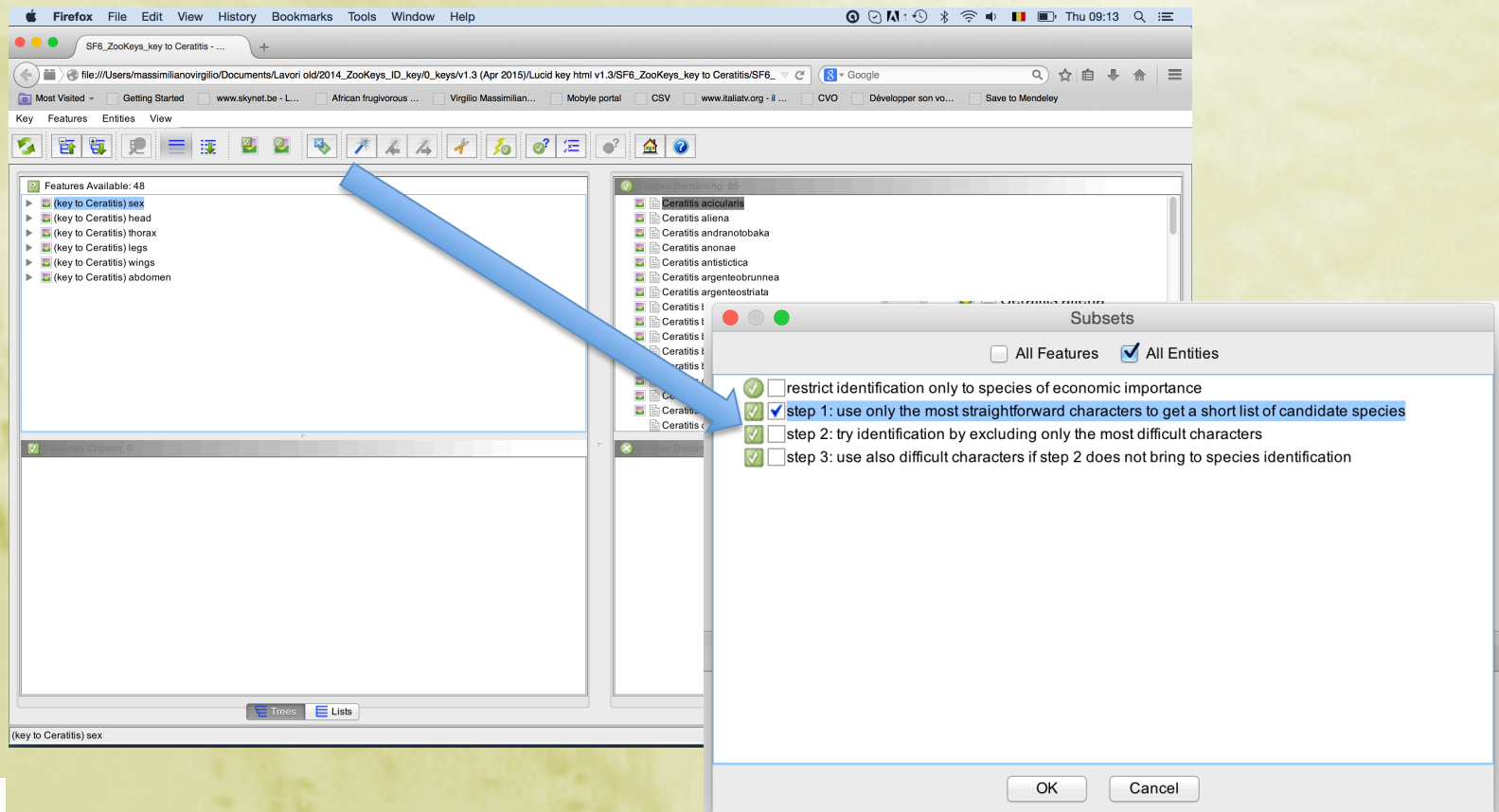
Dacus famona (PT male) face x1.8 (BMNH 532563) [© NHM 2003]

longer than facial margin

Entities Discarded: 188

- Capparimya
- Carpophthoromyia
- Ceratitis
- Neoceratitis
- Perilampus
- Trirhithrum

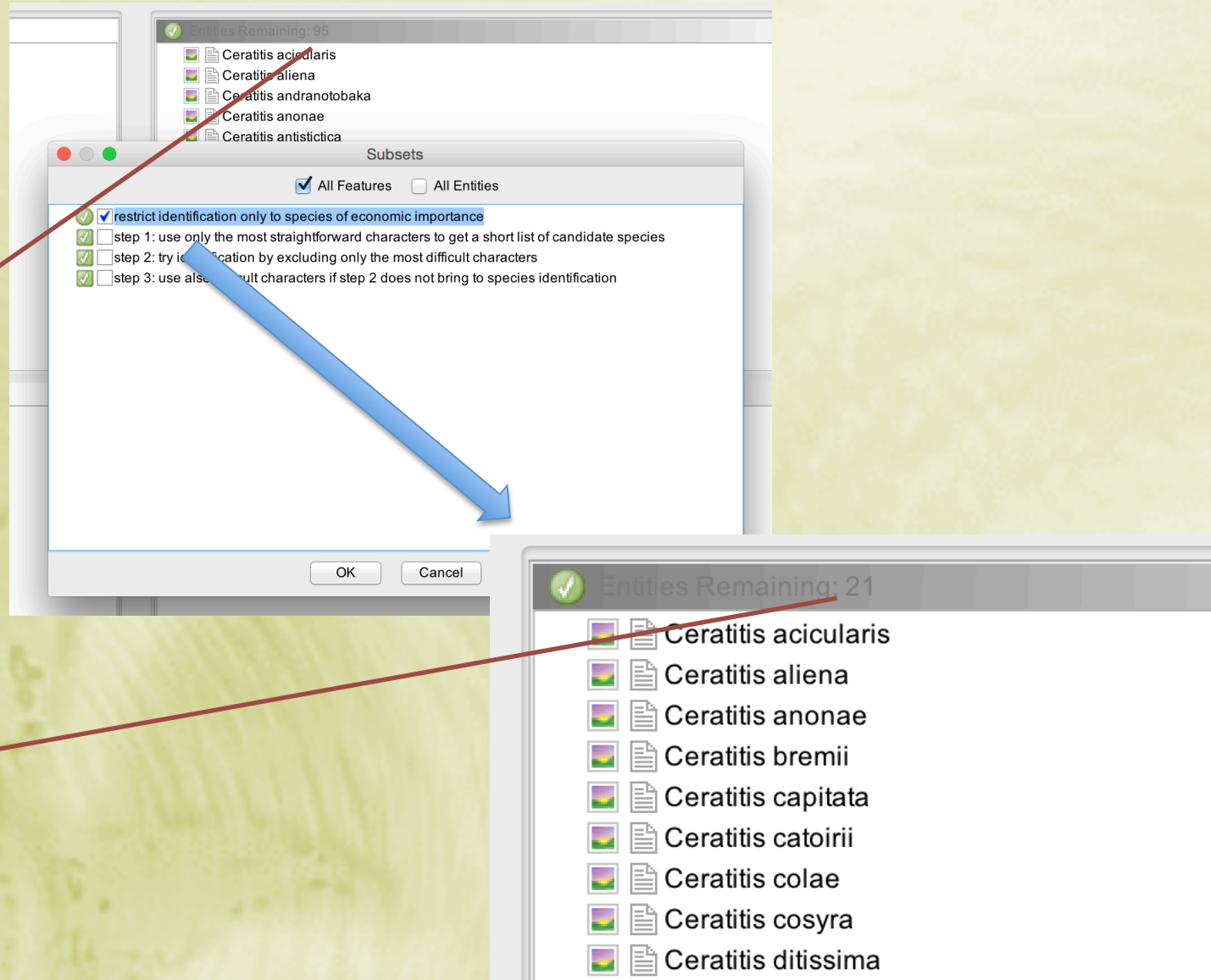
the most important thing:
reduce the key complexity:
using the option “subsets”



reduce the n. of species
(e.g., for a preliminary screening)

from 95 species

to 21
economically
important
species



reduce the n. of characters:
start trying “easy characters”!

from 48
“mixed”
characters

to 15
“easy”
characters

The screenshot shows a web application interface for character selection. The main window displays a list of 48 mixed characters, including (key to Ceratitis) sex, head, thorax, legs, wings, and abdomen. A blue arrow points from this list to a dialog box titled "Subsets". The dialog box has two tabs: "All Features" and "All Entities". Under "All Features", there are three options: "restrict identification only to species of economic importance", "step 1: use only the most straightforward characters to get a short list of candidate species", and "step 2: try identification by excluding only the most difficult characters". The "step 1" option is selected. A red arrow points from the text "from 48 'mixed' characters" to the main list. Another red arrow points from the text "to 15 'easy' characters" to a smaller window at the bottom left showing a list of 15 easy characters: (key to Ceratitis) sex, head, thorax, legs, wings, and abdomen.

Subsets

☐ All Features ☒ All Entities

- ☒ restrict identification only to species of economic importance
- ☒ step 1: use only the most straightforward characters to get a short list of candidate species
- ☒ step 2: try identification by excluding only the most difficult characters
- ☒ step 3: use also difficult characters if step 2 does not bring to species identification

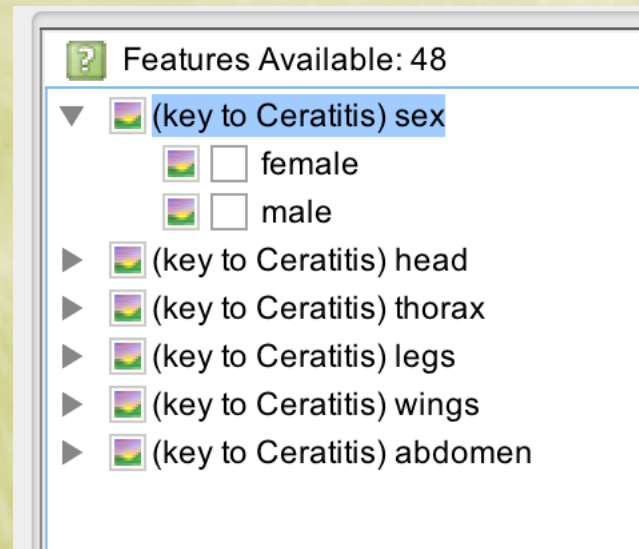
OK Cancel

Features Available: 15

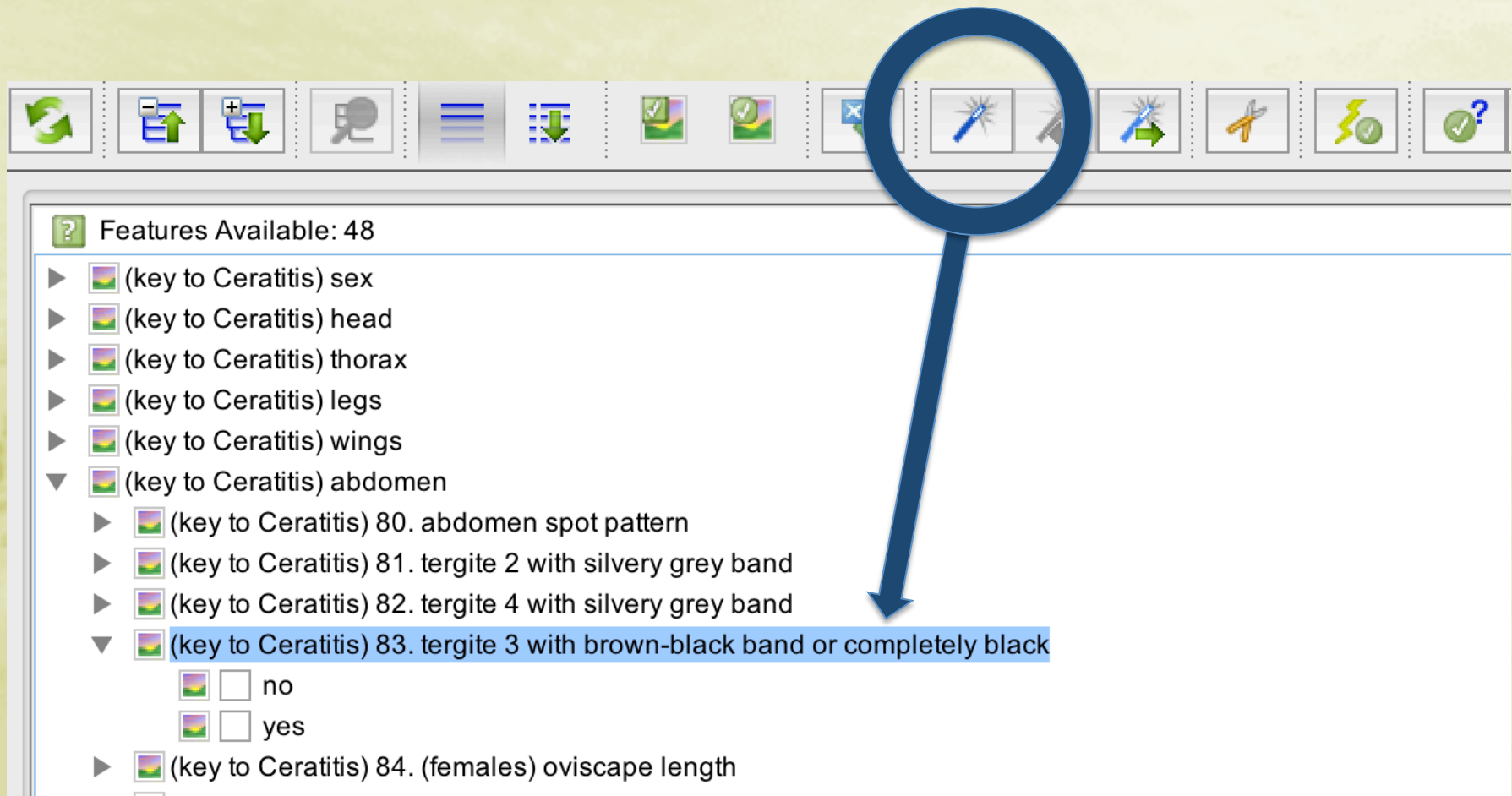
- (key to Ceratitis) sex
- (key to Ceratitis) head
- (key to Ceratitis) thorax
- (key to Ceratitis) legs
- (key to Ceratitis) wings
- (key to Ceratitis) abdomen

many characters are sex related:

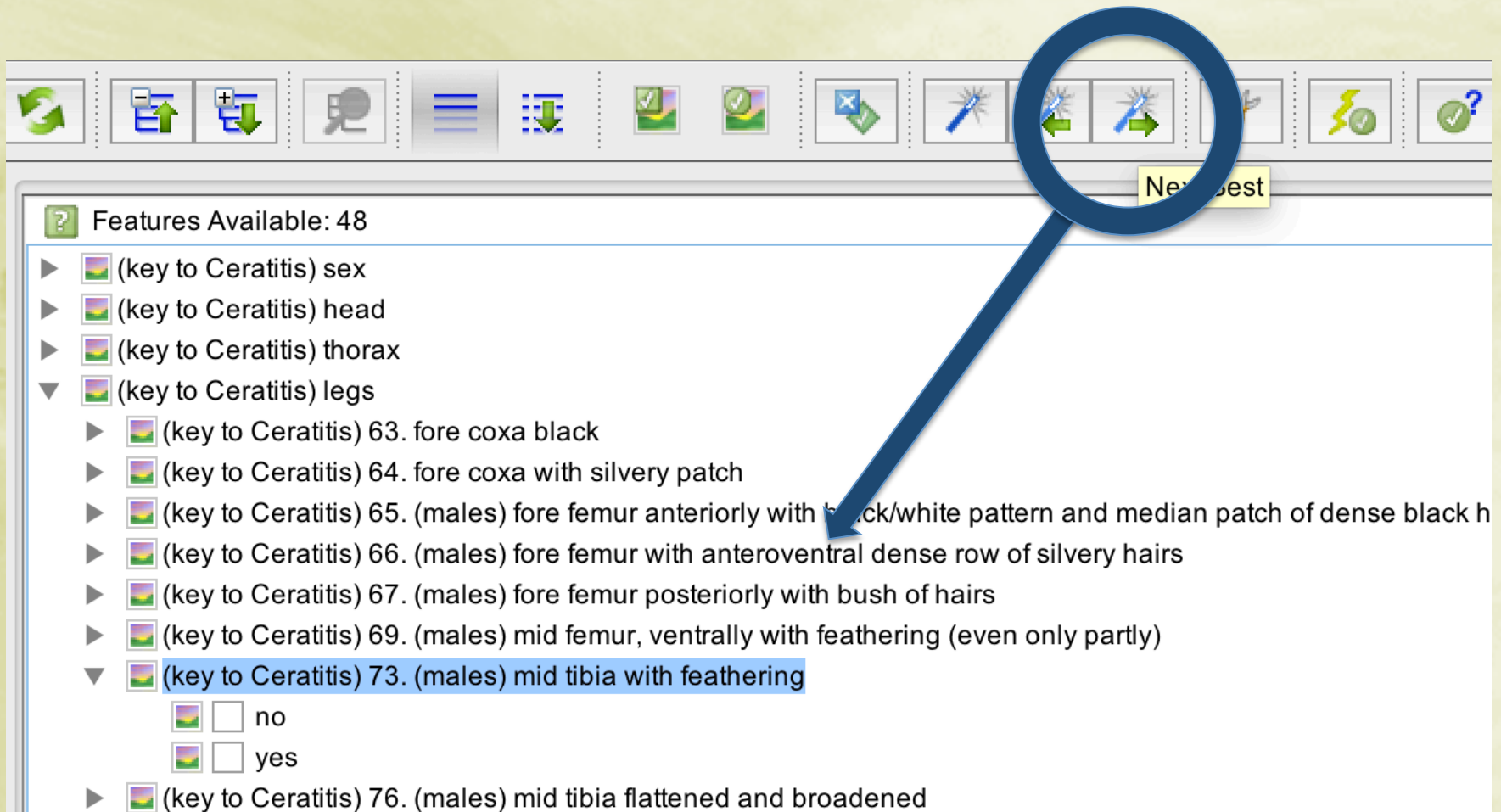
eliminate the unnecessary characters
by specifying the specimen sex
AT FIRST



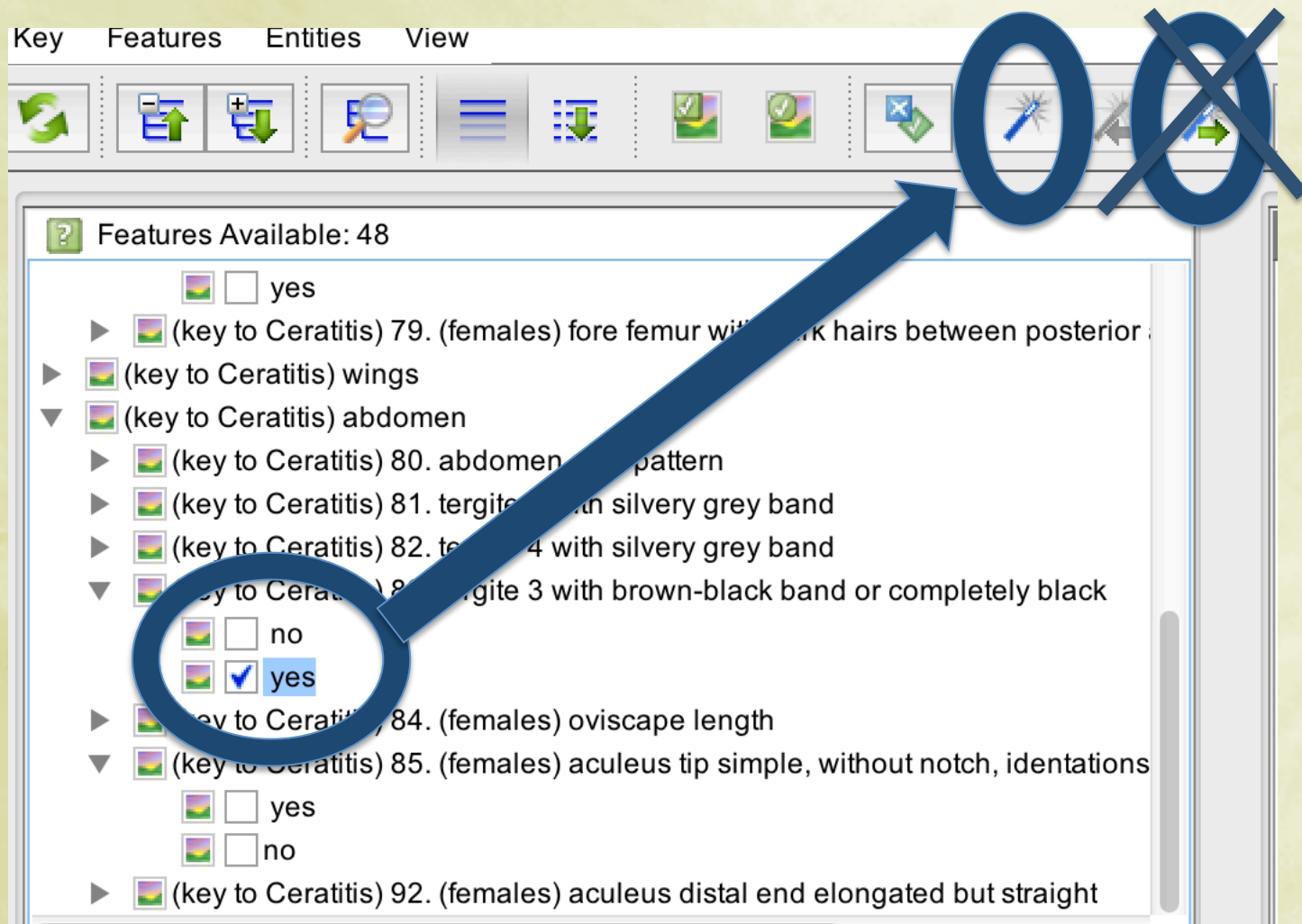
let the software choose the “best” character



if you can't answer,
skip to the "next best" character





if you do answer,
use "best" to go on (not "next best"!)





if you are not sure
you can give multiple answers

▼  (key to Bactrocera, Zeugodacus and Dacus) legs

▼  key (to BZD) 72. fore femur colour

 ☐ fuscous / black

 ☒ pale basally, black apically

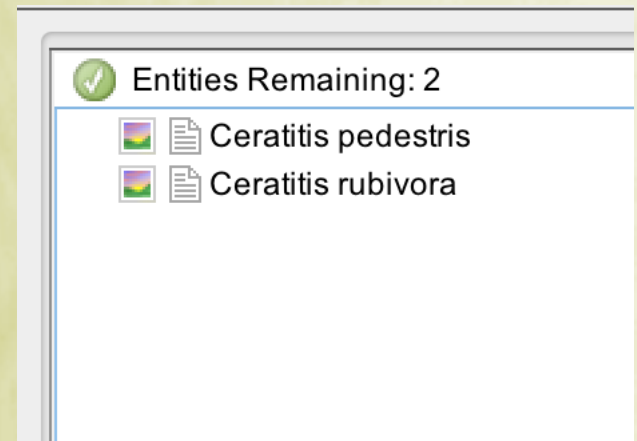
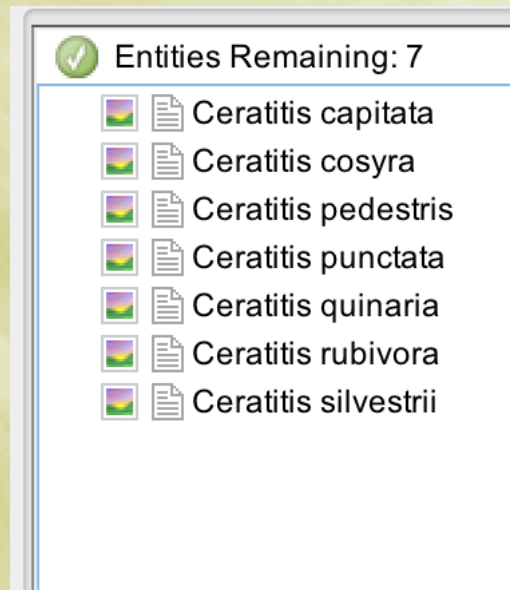
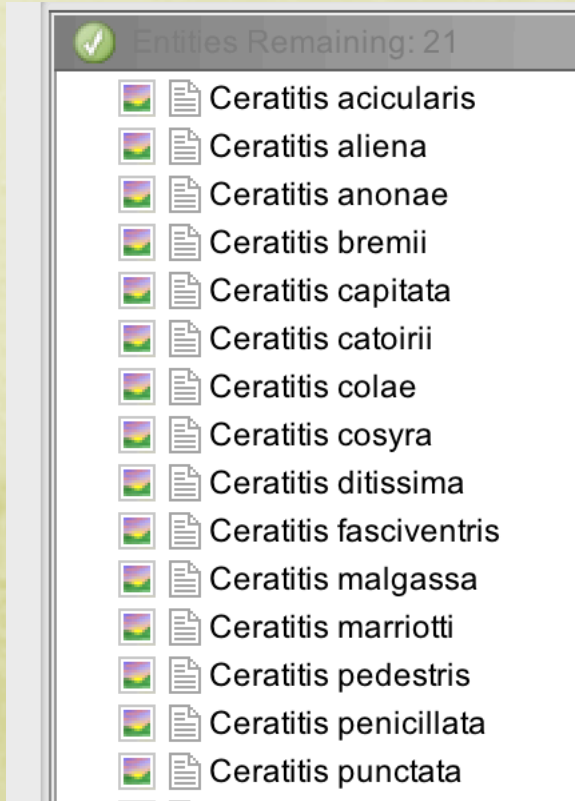
 ☒ pale basally, red-brown apically

☐ pale, with dark spot

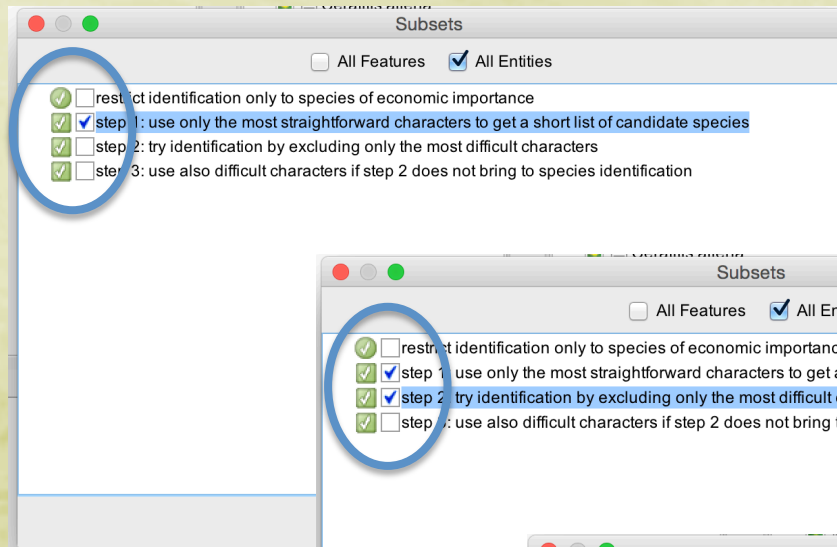
 ☐ red-brown

 ☐ yellow / pale

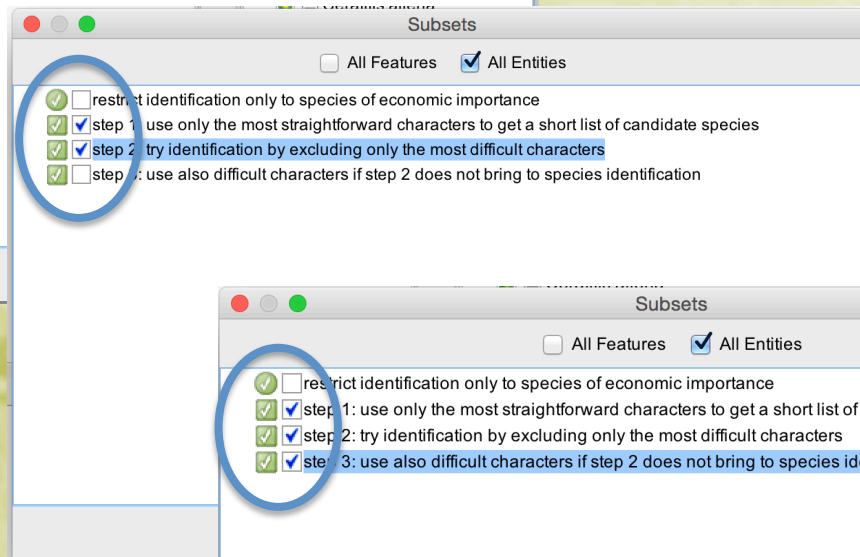
check the n. of species remaining
after every character score



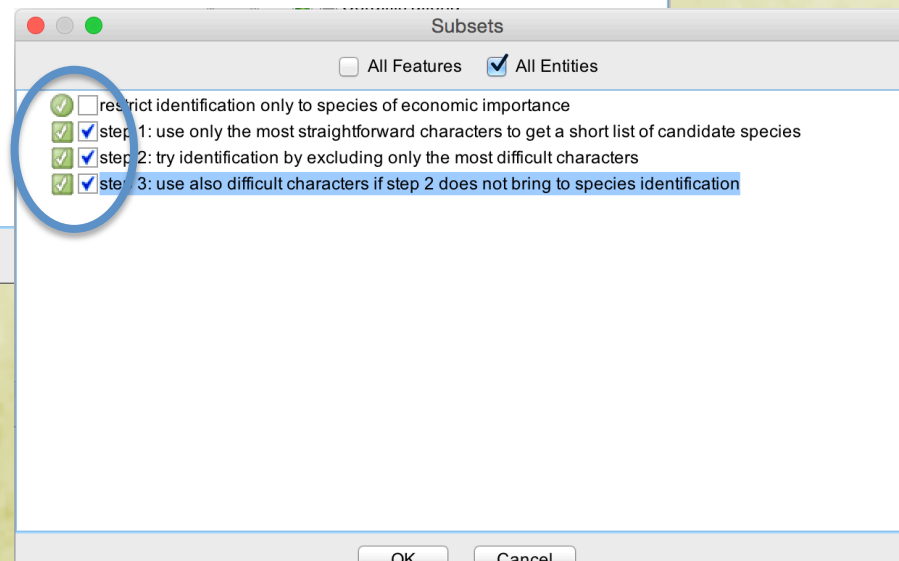
if you can't reduce the n. of species
increase the n. of characters
(option "subsets"):



easy characters

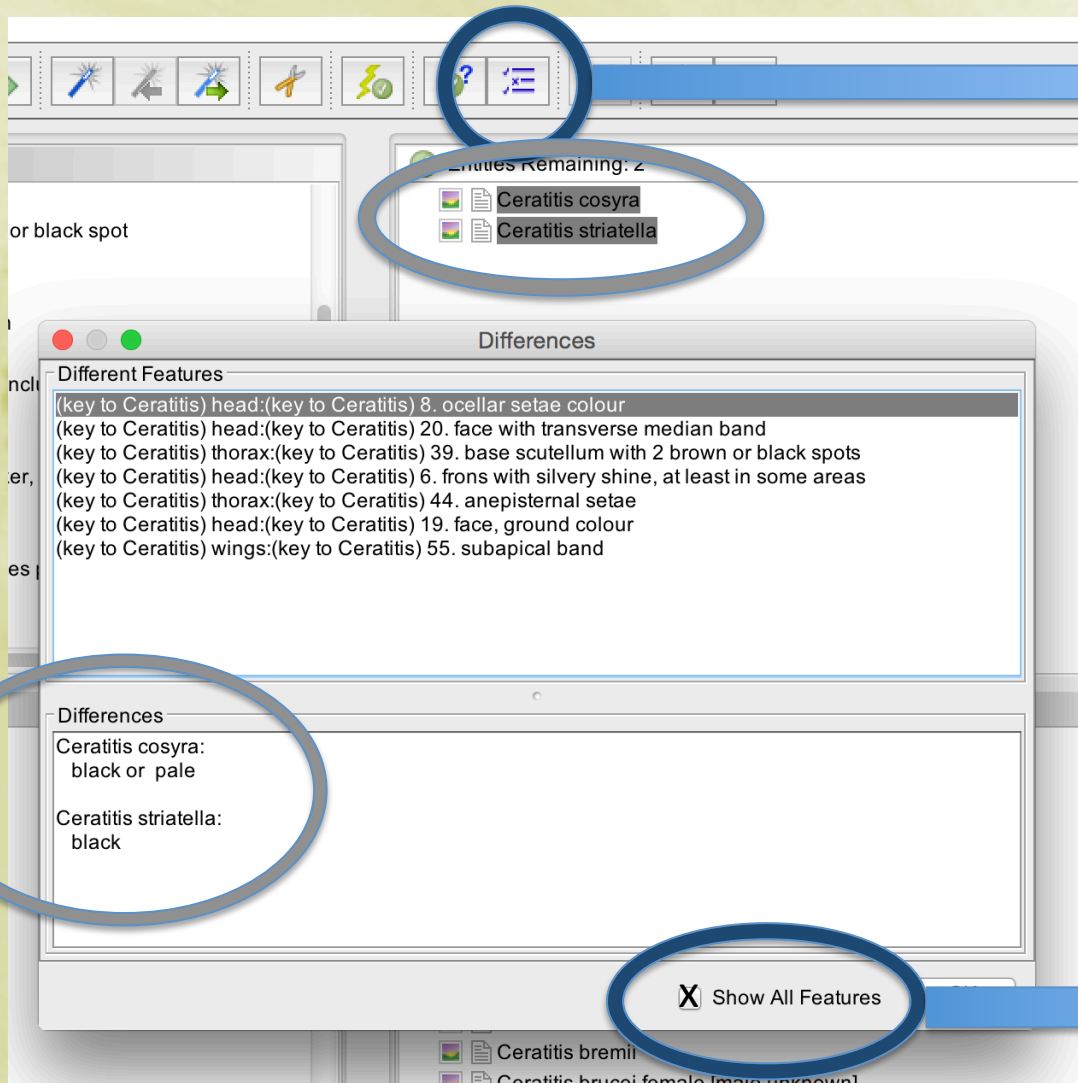


medium



difficult

if you are stuck then
just check the differences
between the few remaining species



option "differences + show all
features"
(e.g. between *C. cosyra* and *C. striatella*)

final selection

Features Available: 49

- (key to Ceratitis) 77. (males) mid tibia anterior side with long (and dispersed) hairs
- (key to Ceratitis) 77bis. (males) mid tibia anterior side with long (and dispersed) hairs
- (key to Ceratitis) 78. (males) mid tibia anterior side with silvery shine when viewed from certain angle
 - ☐ no
 - ☒ yes
- (key to Ceratitis) 79. (females) fore femur with dark hairs between posterior and posterodorsal row of bristles
- (key to Ceratitis) wings
- (key to Ceratitis) abdomen
- (key to Ceratitis) 80. abdomen spot pattern
- (key to Ceratitis) 81. tergite 2 with silvery grey band
- (key to Ceratitis) 82. tergite 4 with silvery grey band
- (key to Ceratitis) 83. tergite 3 with brown-black band or completely black
 - ☐ no
 - ☒ yes
- (key to Ceratitis) 84. (females) oviscaple length
- (key to Ceratitis) 85. (females) aculeus tip simple, without notch, indentations, serrations or appendages

Entities Remaining: 1

Ceratitis rubivora

- species description
- taxonomy, description, distribution (bebif)
- Encyclopedia of Life (eol)
- Barcode of Life Data Systems (BOLD)
- all character states

verify species description and images!

Entities Remaining: 1

Ceratitis rubivora

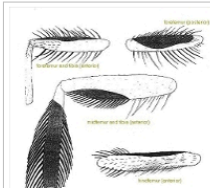
- species description
- taxonomy, description, distribution (bebif)
- Encyclopedia of Life (eol)
- Barcode of Life Data Systems (BOLD)
- all character states

Firefox File Edit View History Bookmarks Tools Window Help

Ceratitis rubivora - Lucid3



Ceratitis rubivora



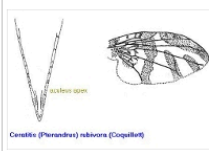
Ceratitis rubivora



Ceratitis rubivora



Ceratitis rubivora



Ceratitis rubivora



Ceratitis rubivora



Ceratitis rubivora

***Ceratitis (Pterandrus) rubivora* Coquillett**

Ceratitis rubivora Coquillett, 1901: 29.

Body length: 4.56 (3.95-5.00) mm; wing length: 4.98 (4.45-5.45) mm.

Male

Head: Antenna yellow. First flagellomere 2-3 times as long as pedicel. Arista with short to moderately long rays; ventral rays shorter and sparser than dorsal rays, especially basally. Frons pale, in center more yellow; with short scattered setulae of same color as frons. Frontal setae well developed, occasionally anterior one slightly underdeveloped. Face white. Genal seta and setulae dark or dark reddish, latter moderately to poorly developed.

Thorax: Postpronotal lobe yellowish white, without spot, at most with darker yellow coloration near postpronotal seta. Scutal pattern: ground color, grayish-brown, usually with orange tinge, sometimes without; with streaks and darker markings but without distinct spots or clearly defined stripes, except prescutellar white separate markings, with paler gray area in between. Scapular setae dark reddish or black. Scutellum yellowish white, basally with ill defined separate dark spots (occasionally well developed), apically with three separate black spots, extending to basal 0.33, sometimes only to half-way. Anepisternum on ventral half yellowish orange to brown; setulae pale.

Legs: Yellow except where otherwise noted; setation typical for subgenus, mixed pale and dark. Foreleg: femur anteriorly with dorsal margin brownish over entire length; posterodorsally brown, with dispersed long dark setulae along entire length, but not forming distinct bush; ventral setae pale, distally dark, rarely dark over entire length. Midleg: femur brown on distal half to 0.66 (usually only ventral part brown anteriorly) except at apical margin where white, with weak silvery shine; ventrally with dark feathering along distal half, basally with more dispersed pale or dark setulae; tibia broadened, largely brownish black except at extremities, with conspicuous silvery shine when viewed from certain angle, with black feathering dorsally along distal 0.8-0.9 and ventrally along distal 0.8. Hindleg: femur partly brownish colored; at apical 0.25 with longer setulae dorsally and ventrally. Darker coloration of legs in some specimens more pronounced and more extensively blackish.

Wing: banding yellowish brown. Interruption between marginal and discal bands near vein R₁ clear and complete; discal band often partly, occasionally fully interrupted in discal cell; cubital band free; medial band free (not always well defined, sometimes missing); crossvein R-M at or just proximal to middle of discal cell. Apex of vein R₁ distal to level of crossvein R-M. Crossvein DM-Cu oblique anterobasally.

Abdomen: Mostly yellow. Tergite 1 with black patches across posterior margin. Tergites 2 and 4 with pale gray band on posterior half; tergite 4 with anterior margin brown. Tergite 3 with brown transverse band along posterior half to 0.66; tergite 5 with brown band along anterior 0.33 and narrowly brownish black across posterior margin. Brown bands on tergites 3, 4 and 5 often interrupted in middle. Male epandrium in lateral view with posterior lobe of lateral surstylus short and slightly curved, anterior lobe pronounced.

Female

have a look at the hyperlinks

Entities Remaining: 1

Ceratitis rubivora

- species description
- taxonomy, description, distribution (bebif)
- Encyclopedia of Life (eol)
- Barcode of Life Data Systems (BOLD)
- all character states

BOLDSYSTEMS Databases | Taxonomy | Identification | Workbench | Resources

Ceratitis rubivora [species] - [Arthropoda](#); [Insecta](#); [Diptera](#); [Tephritidae](#); [Dacinae](#); [Ceratitids](#); [Print](#)

[Sub-taxa](#)

[Taxon Description \(Wikipedia\)](#)
[full article at Wikipedia](#)

[BOLD Stats](#)

Specimen Records:	15	Public Records:	9
Specimens with Sequences:	12	Public Species:	1
Specimens with Barcodes:	10	Public BinIs:	1
Species:	1		
Species With Barcodes:	1		

[Species List - Progress](#) [Access Published & Released Data](#)

[Contributors \(Specimens & Sequencing\)](#)

Specimen Depositories:

- Mined from GenBank, NCBI [8]
- International Centre of Insect Physiology and Ecology [3]
- Royal Museum for Central Africa [2]

Sequencing Labs:

- Mined from GenBank, NCBI [8]
- Biodiversity Institute of Ontario [3]
- Royal Museum for Central Africa [1]

[Images](#)

Navigation: Home, Taxa list, Taxa trees, Basic search, Advanced search, Specimen search, Fulltext search

Ceratitis rubivora Coquillett

Taxonomy

Status: valid

Current Taxonomy	
Subfamily	Dacinae
Tribe	Ceratitidini
Genus	Ceratitis
Species	rubivora

Original Taxonomy	
Subfamily	Dacinae
Tribe	Ceratitidini
Genus	Ceratitis
Species	rubivora

[Species description](#)
[download](#)

[Specimens](#)

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Encyclopedia of Life

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Ceratitis rubivora
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EOL has data for 4 traits [see all](#)

type specimen repository	National Museum of Natural History, Smithsonian Institution (USNM)
habitat	woodland
habitat	non-marine
extinction status	extant

Found in 4 classifications [see all](#)

Species recognized by NCBI Taxonomy:
Ceratitis rubivora
Ceratitis acicularis
Ceratitis anonae
Ceratitis colae
Ceratitis copelandi
Ceratitis curvata
Ceratitis FAR complex sp. HD-2013
Ceratitis fasciventris
Ceratitis flexuosa

Ceratitis (Tephritidae) rubivora (Coquillett)
© R.L.S. Copeland 2008

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Source: Afrotropical Fruityfly Project