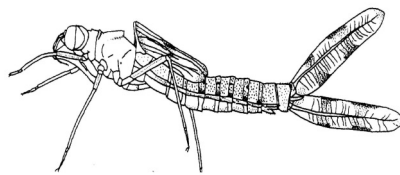
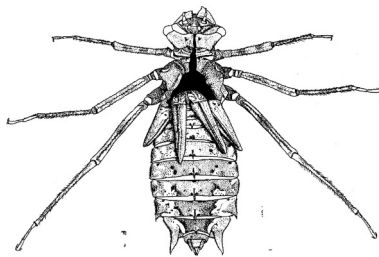
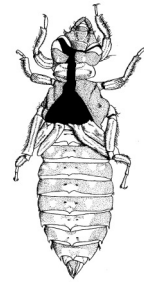
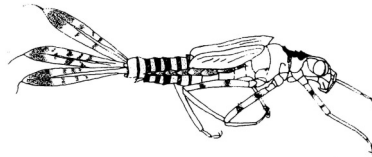
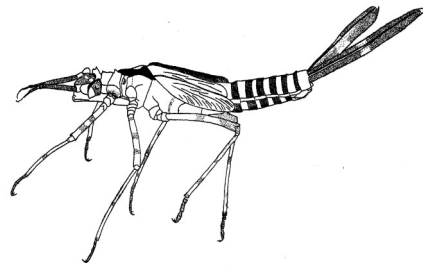
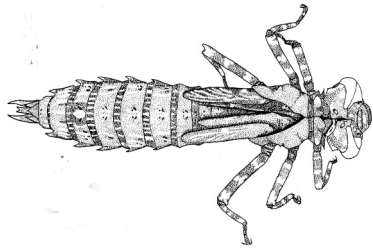


*KEY TO THE
WESTERN PALAEARCTIC EXUVIAE
OF ODONATA*



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RICHARD SEIDENBUSCH

MÄRZ 2010

INTRODUCTION

Nearly twenty years have passed since the trials for this key began. At that time no larval key existed and a lot of exuviae were unknown then and had to be collected and described.

Often reliable identification was very problematical because of the undetermined or sometimes wrong labelled specimens that were examined. Even now there are about half a dozen species of exuviae unknown or undescribed and about the same number unavailable for studies or inclusion, even after many years of searching.

Another handicap was the lack of sufficient material in certain species, one or two specimens can only give preliminary results and are not sufficient for reliable measurements and ratios. Nevertheless a lot of the latter were obtained from the available material, especially in species with similar skins.

Using comparisons more than 9/10 were eliminated from the flood of data again, because of overlapping or identic ratios. Exuviae being very similar in comparison, data had to be separated from all those species, which could be confused.

Why base this key on ratios and not on measures ?

Simply put : when comparing a very large and a very small exuviae of the same species— measurements would be very different, but ratios about the same. Unusual here is the integration of features not yet used before in larval keys : wingbud-venations, submental width, inner width of m, combined measures (ft3, DS 8+9, ant 5-7), subgonapophyseis, frons border, distances of levels, lateroscapal and interscapal lobes, ocellar-tubercle, and many others).

The following pages show a glossary with abbreviations used in this key. Without these the text would have been a formidable „monster“. But it should be possible to become familiar with these shortenings, ratios and for comparison with data of other species.

Also unusual is the dual system used here : the more or less binary system leading in steps (and ratios in importance) from family to genera and to species (ie. a separating system) - developed then at species level by an „unitary“ system, not always using the usual bipolar comparison.

What is an unitary system ?

If you take a ratio from 6 Sympetrum species - and in 5 the ratio is identical, in 6th one different – then the ratio is only used from 6th one normally . If the 6th species matches, then it belongs here, if not then it belongs to one of the others..

The lists with additional ratios added to species are mainly there for comparison with unavailable similar species and thus placed in alphabetical order for an easier search. For instance in a list with 15 ratios – then maybe 3 will separate from species A, 5 from species B, 4 from species C and 3 from

species D+E.....

Why this complicated system ?

When using the normal bipolar comparing system, then a list of about 40 ratios at present and confusing by mainly comparing, not separating ratios.

Whilst the binary separating-system, leading in steps to species, has a determination function, the unitary species system has a wideranging comparison-function. In species, which are to be separated from more similar ones, it is useful to have not only hierarchic separation but more data in order to separate them from the most similar ones, even if being from areas outside WP range.

This flexible approach filters the range of species data covering the closely related species. Even if some of offered parameters deviate out of range – the complete range of features and ratios still should lead to a sure determination.

Bipolar steps are expressed by sizes, forms and colours of italics. If contrapoints are separated by three or more pages they are connected with hyperlinks.

This key is not complete one, lacking exuviae of such species as: *Calopteryx spl. orientalis*, *Pyrrhosoma elisabethae*, *Ischnura aralensis*, *I. intermedia*, *Coen. ponticum*, *Coen. australocaspicum*, *Pseudagrion torridum*, *Coenagrion vanbrinkae*, *Mesocnemis robusta*, *Gomphus kinzelbachi*, *Cordulegaster vanbrinkae*, *C. mzymtae*, and various „borderhoppers“ or „neighbours“ from the Palaeotropics and Eastern Palaeartic.

Otherwise – as far as available – such neighbours or relatives are included for comparison if belonging to a WP genus (like Paragomphus, Orthetrum, Diplacodes, Trithemis, e.g.) or to similar genera (Ictinogomphidae, Neurothemis, Indothemis, Palpopleura, Brachydiplax, e.g.) for a better fencing at genera level. These „outrangers“ „borderhoppers“ and "none-WPs" are indicated in *Lucida Handwriting*.

Taking into account all these remarks – this key should be treated as an experimental preliminary key, by reducing or eliminating potentially invalid data, measures and ratios, or by integrating currently unavailable useful separation data. It should be a basis for further improvements and for developing a reliable instrument for determination.

The separation of certain species in families Ischnura, Platycnemis Pseudagrion is as yet unsatisfactory and splitting within some monomorphic genera or at subspecies level (as in *Cal.splendens* – *Cord.insignis* – groups) also should be used only with caution.

Any currently unavailable exuvial materials, additional data, corrections, improvements and information for completing and optimizing this key would therefore be welcomed by the author for inclusion into the next edition of this noncommercial key.

Searches for unknown exuviae covered more than two decades and

I am very grateful to those helpers who subsidised my project by contributing exuviae from border areas or outside of WP. In addition I give special thanks to those dozens of odonatologists like O. Kosterin, H.U. Kohler, E- Klimsa, S. Butler, B. Kunz, R. Jödicke, B. Samraoui, M. Sugimura, J.B. Boudot, J. Arlt, M. Bedjanic, H. Heidemann, S. Dunkle, B. Trockur, S. Gorb, P. Valtonen, G. Reels, M. Samways, O. Müller, E. Malikova, D. Grand, G. Jaquemin, M. Pavesi, M. Lohr, G. Peters, F. Kakassery, and some others – may forgive me in forgetting names here -, who contributed lacking materials or comparison-materials by donation, loan or exchange.

This key deals with exuviae and is therefore more useful for the determination of exuviae and final instars, it is not established yet how far and how many of the given features are also valid for other larval instars.

Mostly specialists prefer to collect larvae as it is easier. An exuvial search, limited to a time window, presupposes the presence of the species (based upon observations of the adults). Larval searches can be conducted in suitable habitat all year round, without any prior knowledge. The collection of various larval instars, however can lead to many more problems with identification later. The determination of exuviae can also prove problematical, with damaged or incomplete exuviae. Often gills or antennal segments or even endsegments, mentum or part of the eyes are absent. Therefore the exuvial key should contain - as far as possible – discriminating features of head, mentum, wingbuds, abdomen, leg and gills and should enable -as far as the exuviae allows – even the identification of incomplete exuviae - otherwise the key would be extremely impracticable, as „single feature dependent keys“ often prove.

Last, but not least you may be surprised by the rather unprofessional outlay. It is constructed by one of the last odonatological computer-dinosaurs, who can handle neither textual nor graphical tools or improvements using a computer. But after having waited fruitlessly now year by year for promised outlays, I would probably be dead before their arrival.....and so decided to complete key by „simple handmade homework“ within the coming months.

I am greatly indebted to Stephen Butler for his linguistic improvements, and to Harald Heidemann for providing a systematic overview and some of his drawings out of our guide.

Sulzbach-Rosenberg, March 2010

Richard Seidenbusch

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SHORTENINGS (ABBREVIATIONS) AND GLOSSARY FOR LARVAL KEY

SHORTENINGS

*pure shortening mainly means the **length measure** of subject:
(m = length of m, ce = length of ce, f = length of femur, ep - length of ep, e.g.)*

A

ant. antennal segment - segment of tentacle

B

b basal / or border (in connect.with cg and Lib. palpus)

bg basal part of gill (nodation of main tracheae to base)
(having spinulated borders of varying length = borders ratio)

bpm basal part of mentum, artificial separation between wide headpart and narrowed stickpart below the neck – measures are useful in Lestids, some Gomphids or Aeshnids --artificial horizontal (transverse) separation lines also can get set above submental opening (in Libellulids) or at beginning of mental setae level (Lestids,Coen)

bovi basal part of valvae laterales of ovipositor with styli

bp basal palpus (inner =from knee to base – outer= from base of movable hook to base of palpus)

br border ratio in spinules of bg in Coenagrionidae

bs spiny setulae along borders of basal caudal gill (bg)

bw basal width (used when bipolar to dw = distal width)

bwm basal width of m

bwsu basal width of supraanalis

bwte basal width of te...

C

ce cerci

ced distance of level of tip of ce to level of tip of supraanalis

cg caudal gills (= caudal lamellae = terminal lamellae = procts....)
two lateral gills (paraprocts) and one median gill (epiproct)
with or without node; lanceolate, leafshaped, saccoidal (Epallage) or triquetral (triangular in section with three flat sides)
within ratios it means the length of gills (mg, cg)

D

d distal (at beginning of shortening)) or

distance (at end of shortening) and when comparing levels

dp distal part of

distal part of palpus

dbp distal border of palpus (Lib)
 dg distal part of gills (from nodation of main tracheae to tip) with hairy borders
 (postnodal setae) and tip (filament)
 dpm distal part of mentum
 dovi distal part of lat valve of ovi
 dp distal palpus (Gomph/Aeshn)cont.bp
 distal part of cont.bp of...
 dbp distal border of palpius - l of distal border
 dw distal width
 dwp distal width of p
 dwm distal with of m
 dwfr = fr

E

ep epiproct (= appendix dorsalis = median cg in Zygoptera)

F

f 1 femur 1 (= third segment of legs : thigh of 1.pair of legs)- ...f2,,,f3...
 fr (w of) distal border of frons – at secondary suture between frons and vertex
 straight, wavy, narrow or wide, bilobed, with narrow or wide median notch
 fw forewing -case

G

gen genital prints: male expression of secondary genitalia on sternites 2
 (anterior lamina) and 3 (posterior hamuli)
 gon gonapophyses : genital expressions , valvula vulvae (=genital lobes) or ovi
 in females on st. 8+9, covering genital pore –
 or genital expressions on males st 9 with lateral valves
 and mediad gonopore

H

hlo height of lo- level from tip of ligula to level of basal width of lo –
 hw hindwing- case (=hw bud = hw –sheaths) partly with recognizable
 venation features in triangles, spaces, pt, e.g. spinules and hairs and for w / l – ratios

I

ibp length of inner basal palpus (Gomphids)
 iwm inner width = endpoints below the inner flatcircular curve of basal mentum

L

lg lateral caudal gill
 lo median lobe of m - very variable -with or without median cleft (notch, fork)
 or with teeth or hairseams; or with median ligula forming an angle,
 describes the shape of lo :flat or erected ,wide or narrow;
 lo within ratios means the basal width of the lobe (= wlo)

M

- m means within ratios the length of prementum;
complete mentum includes labium (= prementum) + labial palpus
+ submentum (=postmentum)
m is also used for describing the shape and form of prementum :
mentum is flat (flat mask) or spoon-shaped (helmet mask)
prementum with basal part (bm) including the submental opening and distal
part (dm) (where widening starts above the submental opening to tip)
or specially formed as in Lestids & Calopteryx:
- mg median caudal gill = median lamella = central gill = median proct
mh movable hook on corner at end of outer border of palpus

N

- no nodal line –separates bg from dg

O

- obp outer basal palpus (Gomphids)
outer border of palpus (Libell)
ovi ovipositor shaped gon in females in families as Aeshnidae
Cordulegasteridae and Zygoptera – with valves laterales
having a basal part (bovi) and distal part (dovi)
ovid distance between tip of ovi and sternital hindborder

P

- ph palpal hook (crenated incurve in Gomph/dp in Aeshn)
pp paraprocts (= appendices laterales = lateral cg)
py anal pyramid : cerci, paraprocts, epiproct around anus
composed to an endpyramid

S

- smw submental width : inner width of submentum from joint hole to joint hole
st sternites
su supraanalis (males anal projection.) on dorsal ep
sud distance from tip of su level to ce-tip level in males
sg subgonapophyses = length of inner valvulae
sgd distance between tip of sg and st-hindborder
soc width of basal subocellar groove

T

- t3 fourth segment of legs : tibia 3 = shin of 3. pair of legs)
te tergites
tw tubercular width = width of mediofrontal ocellar protrusion

V

- vfr vertical length of frons from distal border to border of palpus
(in frontal view) ; vertical measures from dfr to level of
scapal openings or to level of epistomal suture

W

w	width
wep	width of basal ep
wdp	width of distal palpus (=dwp)
CS	carinal shortspiny setulae seaming the lateral borders of abdomen
DS	mediodorsal spines on abdominal tergites (erected to small to absent)
ES	„eyespines“ in Zygoptera, row of spiny setulae set near to the ventral eyes border, stout to long or hairy- in varying numbers-
LS	lateral spines on abdominal segments
Mas	marginal rows of spiny or hairspiny setulae, seaming the borders of tergites or sternites
MS	mental setae (bristles on m) numbers given are for one side only, complete number would be doubled (2x)
PS	palpal setae (bristles on palpus) – numbers refer to one palpus
RS	raptorial setae (setulae on distal border of palpus and lo of m) –also used for PS and MS
TeS	scattered spiny to hairy setulae surfacing tergites or sternites

GLOSSARY

a

aboral	away (distal) from (mouth)
adoral	near to (proximal) (mouth)
apical	in direction of head
antennae	with scape (seg. 1.), pedicel (2.) and flagella (= terminal segments))
anterior lamina	genital print on st 2 in males
arch	basal hinge socket = palpal socket of m near joint of palpus = width of arch (w arch) straight, lenseshaped to semicircular protruding
arch-lo	arch-lobus contact

b

basal	proximal = to mid
basoscapal socket	frontal shield with a circular opening, where movable scape of antennae arises
bilobed	curved borders with a median clefting or notching become parted in two lobes

c

carina	border seam, median carina, lateral carinae
caudal	at the end (tail) in direction tail,
cercoids	= cerci in Zygoptera
clypeus	postclypeus and anteclypeus sclerites below the frons
collar	between head and pronotum ..sometimes with protruding

lateral endtubercles.
 coxae first segment of legs with: prothoracic apophyseis (coxal armature)
 crenation regular waved borders –small scallops on distal border of
 palpus (min. crenulations)
 cuticula = cuticule,, upper surface of integument

d

distal apical = away from mid to tip (apex)
 distal comb median distal lobe of palpus in Zygoptera with teeth or serrations
 distal hooks distal hooks of palpus (endhook, adoral, aboral hook,)
 dorsal tergital = from top (surface above)

e

eyes incurve dorsomedian eyes incurve on laterodistal occiput
 epicranium dorsal surface of head (postfrons, vertex dorsal part of occiput)
 often with processes or tubercles
 epistomal suture epistomal seam - separating postfrons from anteclypeus
 exuviae shell of the cast larval skin, larval integument

f

filiament long threadlike (Platycnemis), short filamentous (Coen)
 or rattailed (Epallage) tip in dg
 flagellum antennal segments from ant 3 to tip
 frontal shelf protruding border or horn between scapal sockets
 furca fork - furcasternites and furcal branches of sternum

g

gaps "empty windows", wide clefts, outcuts
 genital prints prints on sternites 2 (lamina anterior) +3 (hamules) + 9
 (gonapophyseis with valves and gonopore) in males

h

hamules genital prints on st.3 in males
 hooks movable hook, palpal hooks of mentum, cuticular hooklike spines;
 hypopharynx bottom of pharynx

i

incurve narrow to wide incavations or inlets or convex or concave parts
 of border (in dorsal eyes, lo, m, node, te, ,e.g.)
 concave side of lateral lobe from arch of joint to base
 of ligula (in Cordulegaster)
 crenated incurved border of palpus (Gomph)
 incisions irregular and deep insertions
 integument = cuticule, larval skin
 interscapal width distance between basoscapal hollows
 interscapal protrusion frontal protrusion (or lobe) between basoscapal hollows
 interommatidial angle darkened ommatidial elongation of eye ending at begin
 of mediodistal border of occiput ; with occipital leg more or less
 curved and frontal leg straight both forming an angle

k

knee kink between the inner basal palpus (ibp) and the palpal hook

l

labium prementum with labial palpus

labrum lip

lateroscapal lobes globular or brushlike (partly with hairs, spine hooks) protrusions between basoscapal socket and lateral border of frontal shield

laterosternal sclerites on both sides of sternites (= spiracular sclerites = pleurites)

legs coxa with armature – two trochanter rings – femur – tibia-tarsi (2-3 segmented) -unguis (2 seg+ clawhooks)

m

main trachea with lateral tracheae and median horizontal (axial) trachea (primary vein) straight to wavy and mostly with visible lateral tracheae (veins = secondary veins) branching in big or small angles from main trachea

mandibles biting mouthparts, with incisori (outer teeth) and mola (inner teeth)

maxillae sensitive and clinging mouthparts. with outer hairy setulated galea and inner lacinia (long spiny hooks)

median mid (vertical level)

median sulcus medial rimming of prementum

mediofrontal protrusions „noses“ „horns“ „lobes“ „tubercles“ shelves" on frons

meso- mid-

meta- hind-

n

node = nodal line separating bg and dg = nodal commissure

o

occiput postoccipital lobes with spinules, hairs, tubercles, muscle scars, postocular lobes and postocellar area

occipital tubercles rear head at corners with big or small tubercular protrusions in certain genera

ovipositor protruding gon in females of Zygoptera, Aeshnidae & Cordulegasteridae with gon (outer valves and sg (inner valves))

p

palpus labial palpus of mentum often set with setae and with distal borders straight, wavy, crenated, serrated or irregularly toothed deep scoopshaped (spoonshaped m as in Cordulegasteridae, Macromiinae, Corduliinae, Libellulinae or Lestidae) or narrow and flat, forceps-like (flatmasked as in Aeshnidae, Gomphidae, (Calopterygidae, Coenagrionidae, Platycnemididae) palpus includes basal palpus (bp), distal palpus (dp), movable hook (mh) outer basal border (obp) inner basal border (ibp) and palpal hook (inner border often with spines, teeth or tubercles, or incurved) with endhook, palpal comb (Zygoptera), or branches

pedicel ant.seg.2

pigmented cg	bg or dg with dense brownish or greyish coloured pigmentation
pleurites	pleural sclerites (= lateralsternites of abdomen)
poststernal fork	fork between metasternum and poststernum
pro-	fore-
pronotum	lobes of dorsal prothorax with defined formed borders, hairy to spiny setulated, partly tuberculated , with protrusions and transparent scar fields
procoxae	coxal armature on first pair of legs

s

scape	ant.seg.1
scars	muscle scar areas of integument on head , abdomen, pronotum are smooth specially shaped surfaces without setulae and mainly transparent
sclerotized dg	with thickened, at least partly chitinized borders of dg
serrate	regular small notching, sawlike, „teethed“ (min.serrulate)
setae	long hairs (bristles) with basoscapal ring- as PS and MS set along inside of palps and mentum or movable hook
setulae	hairy or spiny setae , very short to medium, fine or thick – acute or truncate , bifid to trifid , fanshaped; all having a basoscapal ring (breaking neck) as ES,TS, Mas, CS..
side	here : side of lobe = mediolateral section of frontal border in m from inside arch to begin of ligula (Corduleg)
spines	outgrowths of integument (melted with cuticle) as DS and LS : blunt or acute, erected or flat, thick, flattened or recurved
sternum	ventral side of thorax ; separated in pro-meso-meta-sternum
styli	acute to fingershaped processes or appendices on dovi (lateral valves)
subocellar groove	= soc - length of groove below median ocellar tubercle
synthorax	meso- + metathorax (= pterothorax)

t

tarsi	2-3 segmented, between tibia and claw hooks
teeth	of palpal comb , of lateroscapal brush
triquetral	= lateral cg trifoliated along median vein (mg lamellate = flat = bifoliated) as in Calopteryx
	= valves orientated in three directions
transverse	in horizontal level
trochanter	second segment of legs : 2 rings
tubercles	of cuticula –frons, occiput, e.g.

v

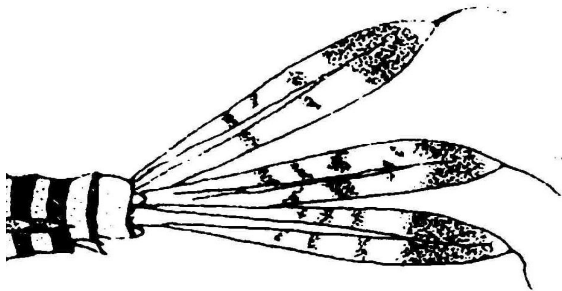
valves	= valvulae
valvulae	= valves in gon : paired lateral apophyses (genital lobes) ; on st.9 in males framing the genital porus
ventral	= sternital = from bottom (surface below)
vertex	includes frontal occiput and postocciput

**LARVAL KEY TO SPECIES OF
WESTERN PALAEARCTIC ODONATA**

KEY TO FAMILIES

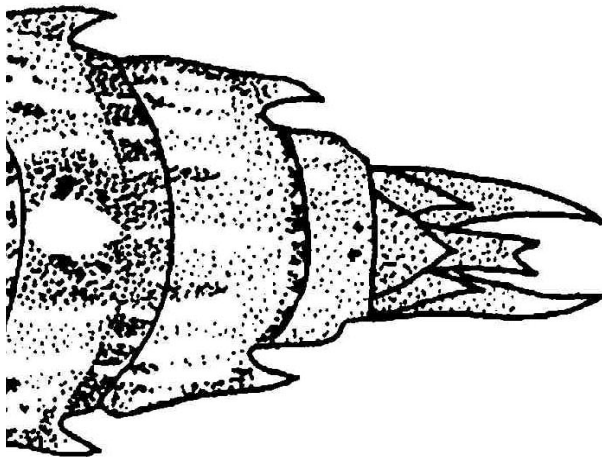
End of abdomen with 3 caudal gills (lamellae/procts)

> Zygoptera



End of abdomen with spiny processes producing an anal pyramid

> Anisoptera



ZYGOPTERA

> ant1 \geq flagellum (ant 3-7); m with a deep and wide median gap

> **Calopterygidae (> 14)**

> ant1 \ll flagellum ; m without a median gap

> *with strong laterally spined mandibles, laterosternal lamellae
and saccoidal cg* > **Euphaeidae (> 21)**

> *without laterally spined mandibles , no laterosternal lamellae
and no saccoidal cg*

> spoonshaped labium in frontal view

movable hook set with setae

> **Lestidae (> 23)**

> flat bowlshaped labium in frontal view

movable hook without setae

> MS in transverse row - cg lanceolate,

without node and with a long filiform tip

> **Platycnemididae (> 32)**

> MS in conical row, forming an angle,

cg normally with node and without a long filiform tip

> **Coenagrionidae (> 42)**

ANISOPTERA

> *flat labium*

> - no cleft at median lobe of mentum

- antennae max. 4-segmented

> **Gomphidae (> 72)**

(= Desmoproctida)

> - with cleft at median lobe of mentum

antennae ≥ 5 (-8) segmented

> **Aeshnidae (> 95)**

(= Euaeshnodea)

> *spoonlike labium*

> - with cleft and processes at median lobe of mentum

- deep and irregular incisions at distal border of palpus

> **Cordulegastridae (> 114)**

> - no cleft at median lobe of mentum

- distal border of palpus crenulated, wavy or straight

> MCL (Macromiidae-Corduliidae-Libellulidae) -Complex

(syn.Libelluloidea =Trichodopalpida)

> - ep \leq ant 1+2 - ep : f3 = 1: > 4

- median sulcus and groove deeply incised, reaching base of m

> **MC (Macromiidae/Corduliidae) (> 124)**

> - ep \gg ant 1+2 - ep: f3 = 1: < 4

- median sulcus (groove) not incised deeply, seldom reaching base of m

> **L (Libellulidae) (> 137)**

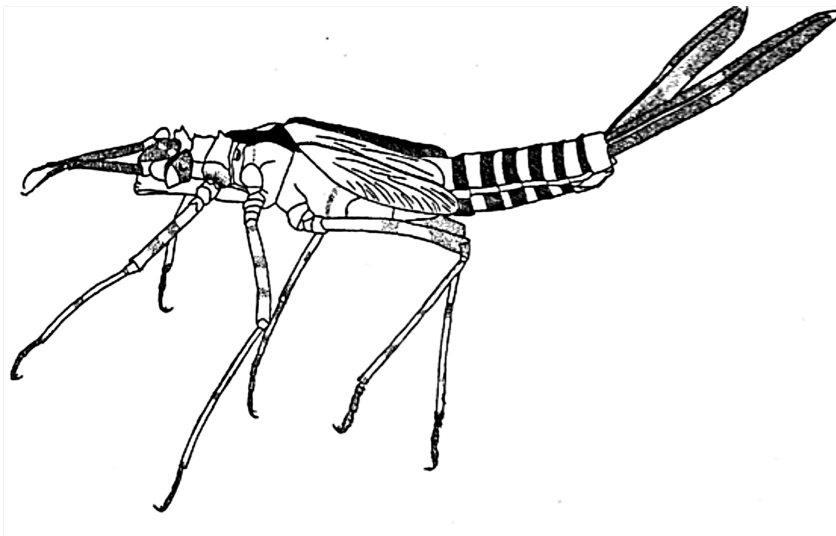
ZYGOPTERA

Fam:

- ant 1 \geq flagellum
- m with a deep and wide median gap (m distal „forked“)
- slender larvae with very long legs
- triquetral lateral gills (three-edged in cross section)
and lamellate median gill

> CALOPTERYGIDAE

> CALOPTERYGINAE



> WINGCASES WITH TIP BROADLY SEMICIRCULAR

- distal part almost parallel bordered
- very dense venation

> ATROCALOPTERYX

> mediiodistal angles of pronotal margin absent

ant1 : m = 1 : \approx 1,25

ant3 : ant1 = 1 : \approx 8

cleft angles: lateral \approx 140° distal \geq 50°

mg : lg = 1 : \geq 1.4

whw : hw = 1 : \leq 4

> *Atrocalopteryx atrata* (EP)

> WINGCASES WITH TIP OVOID NARROWED

- dense venation

> CALOPTERYX

> ant 1 : m = 1 : ≥ 1.4 (**> 17**)

bp : ant1 = 1 : 7-8

ibp : ovi = 1 : ≈ 4

ibp : mh = 1 : < 3

branch of lo : ant1 = 1 : ≤ 2.4

ovi : ant1 = 1 : < 2

> *mg : lg = 1 : $> 1,5$*

m > f1 (1 : 0.8-0.95)

ant1 : ft3 = 1 : ≤ 4.5

mh : m = 1 : ≤ 4

lo with branches less oblique

gap angles: lateral $\approx 140^\circ$

distal $\approx 50^\circ$

gap : w : l = 1 : ≈ 3

- mg and occipital tubercle blunt
- mediодistal corner of pronotum blunt, wideangled ($\geq 100^\circ$) and with legs straight
- valves in males and ovi in females are slightly longer than in splendens and reaching about hindborder of sternites 9/10
- dp(inner distal palpus) with no distinctly bigger teeth

ant1 : mg = 1 : < 2.3

ant2 : ant1 = 1 : ≤ 4

ant2 : m = 1 : > 5

ant2 : ovi = 1 : > 2

bw ant1 : ant3 = 1 : ≈ 1.5

bw ant2 : dw ant1 = 1 : ≈ 1.5

ibp (inner basal palpus): w of cleft = 1 : ≈ 1.5

hw : mg = 1 : ≈ 1

m : f3 = 1 : ≤ 1.5

m : ft3 = 1 : ≤ 3

m : mg = 1 : < 1.5

whw : hw = 1 : \approx 3.3

> C. haemorrhoidalis group

(incl occasi, asturica, almogravensis)

> mg : lg = 1 : < 1,4

m \approx f1 (0.85-1.15)

ant1 : ft3 = 1 : \approx 5

mh : m = 1 : > 4

lo with branches more oblique

gap angles: lateral \geq 150°

distal \leq 40°

gap : w : l = 1 : \approx 5

gap : dp : bp = 1 : \geq 1.4

- mg and occipital tubercle acute
- mediobasal corner of pronotum acute, erected, \approx 90° and with legs often slightly concave
- valves in males and ovi in females not reaching the endborder of sternites
- dp with some stronger and wideset teeth

ant1 : mg = 1 : \geq 2.3

ant 1 : f1 = 1 : \approx 1.5 (\leq 1.6)

ant2 : ant1 = 1 : \leq 3.6

ant2 : m = 1 : < 5

ant 2 : ovi = 1 : < 2

bw ant2 : ant1 = 1 : \approx 2

bw ant1 : ant3 = 1 : \leq 2

bw ant2 : dw ant1 = 1 : \approx 2

ibp : w of gap = 1 : < 1.5

ibp : ovi = 1 : \approx 4

hw : mg = 1 : \leq 1.5

m : f3 = 1 : > 1.5

m : ft3 = 1 : > 3

m : mg = 1 : > 1.8

ovi : ft3 = 1 : \leq 9

whw : hw = 1 : \leq 3

> C. virgo group

(incl meridionalis, festiva)

> ant1: m = 1 : < 1.4
 ibp : ant1 = 1 : > 8
 ibp : ovi = 1 : \approx 4.5
 branch of lo : ant1 = 1 : > 2.5
 ovi : ant1 = 1 : \approx 2
 ant2 : m = 1 : \approx 5
 ibp : w of gap = 1 : \geq 1.5 (-2)
 f1 : hw = 1 : < 1.4
 hw : ft3 = 1 : 2.5-3
 hw : mg = 1 : \geq 1.5 (-2)
 m : hw = 1 : 1.25 -1.6
 mg : lg = 1 : \geq 1.4
 whw : hw = 1 : > 3
 lo with branches less oblique
 gap angles : lateral \approx 140°
 distal \geq 50°
 gap . w : l = 1 : \approx 3-4
 occipital tubercle short and blunt
 ovi not reaching the border of st 10
 pronotum with mediodistal angle
 mostly blunt, wide angled
 (\geq 100°) and with legs straight

> ant1 : f1 = 1 : > 1.6
 ant1 : ft3 = 1 : \geq 5
 ant2 : ant1 = 1 : \leq 4
 gap : dp : bp = 1 : \geq 1.4
 ibp : mh = 1 : \leq 3
 m : mg = 1 : > 2
 m : f1 = 1 : \geq 1.3
 mh : m = 1 : \approx 4
 ibp : ant 1 = 1 : 9-10
 w ant1 : ant3 = 1 : \approx 1
 m : ft3 = 1 : \approx 4 (\pm 0.3)
 m : t3 = 1 : \geq 2
 ovi : ant1 = 1 : \leq 2
 ovi : ft3 = 1 : \approx 10
 dp with some wideset stronger teeth

Altai/ C-E-Asia > *C.japonica altaica*
(*C. japonica* group)

- > *ant1 : f1 = 1 : ≤ 1.5*
- ant1 : ft3 = 1 : ≈ 4.5*
- ant2 : ant1 = 1 : 4.2-5.1*
- gap : dp : bp = 1 : < 1.4*
- ibp : mh = 1 : > 3 (- 3.5)*
- m : mg = 1 : ≤ 2 (1.4-2)*
- m : f1 = 1 : 1.1-1.2*
- mh : m = 1 : ≈ 3*
 - ibp : ant1 = 1 : ≥ 10*
 - branch of lo : ant1 = 1 : < 3 (2.5-)*
 - bw ant1 : ant3 = 1 : ≤ 1.3*
 - m : ft3 = 1 : ≤ 3.8*
 - ovi : ft3 = 1 : 7.5-9.5*
 - dp without distinct stronger teeth*

> *C. splendens* group

- > *whw : hw = 1 : < 3.5 (2.9-) (males) (>20)*
= 1 : < 3.8 (3-) (females)

- > *ant1 : ft3 = 1 : ≈ 4*
- ant1 : m = 1 : ≤ 1.2*
- ant2 : m = 1 : < 5*
- ovi : ft3 = 1 : ≤ 8*
 - ant2 > bw ant1*
 - m : hw = 1 : ≤ 1.4*
 - ovi : ant1 = 1 : < 2*
 - whw : hw = 1 : 2.9-3.3(m)*
3.3-3.6(f)

> **Levante:** *C.spl.syriaca/hyalina*

- ? > **Pontocaucasia:** *C.spl.taurica/tschaldirica*
(not available)

> ant1 : ft3 = 1 : ≈ 4.5
ant1 : m = 1 : ≥ 1.2
ant2 : m = 1 : ≥ 5
ovi : ft3 = 1 : > 8.5

> whw : hw = 1 : ≤ 3.2 (m)
= 1 : ≤ 3.5 (f)

> m : hw = 1 : ≤ 1.4

> ovi : ant1 = 1 : < 2

> W- Balcans : C.spl.balcanica

> ovi : ant1 = 1 : ≥ 2

> W-Asia/Asia minor : C.spl.intermedia

> m : mg = 1 : < 1.5

ant2 : ant1 = 1 : ≈ 5

hw : ft3 = 1 : ≈ 2.5

> C- Asia: C..spl.maracandica

> C-N-W-Europe: C.spl.splendens

> E- SE-Europe: C.spl.ancilla

> whw : hw = 1 : ≤ 3.5 (m)
= 1 : ≤ 3.8 (f)

> ant2 < bw ant1

m : hw = 1 : ≤ 1.4

ovi : ant1 = 1 : < 2

gap angles : lateral $< 140^\circ$

distal $> 55^\circ$

> Francoiberia: C.spl.xanthostoma

> ant2 > bw ant1

> ant2 : m = 1 : \approx 5.5
m : hw = 1 : > 1.4
ovi : ft3 = 1 : \approx 9
ovi : ant1 = 1 : \leq 2
gap angles : lateral > 140°
distal \approx 50°

> **SE-Ponticum** : C.spl.waterstoni

> m : hw = 1 : \leq 1.4
ovi : ant 1 = 1 : > 2

> **Italy** > C. spl. caprai

? > **SE- Caspis** : C.spl orientalis
(transcaspica)
(not available)

> **whw : hw = 1 : \geq 3.6 (males)**
= 1 : > 3.8 (fem)

> **Maghreb** > C.spl. exul

? > **SW Caspis** > C.spl.orientalis (risi)
(not available)

*annotations : some of the included and also other unmentioned
„subspecies“(like tschaldirica, taurica, erevanense ,transcaspica
,risi ,iohannsoni ,unicolor ,pseudosyriaca, femivarians ,cretensis,
shachrudica ,mingrelica ,persica, caprai, cartvelica balcanica,
favrei),may prove not to be subspecies, but only forms, hybrids
or synonyms - and so larval separation of certain "ssp" mostly
will prove invalid, even when being valid ones in imagines.
Maybe genetical investigations may improve our understanding
the splendens hierarchy*

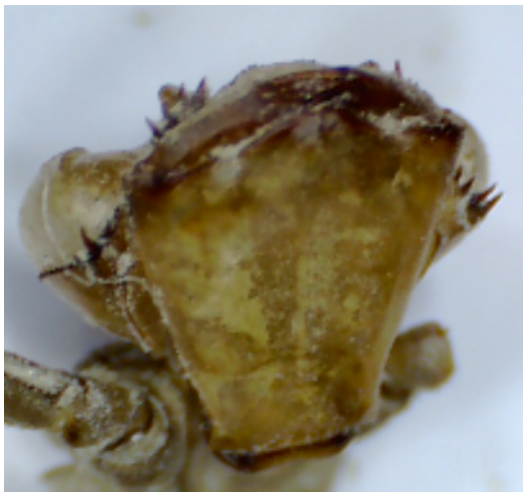
Fam:

- ant1 << flagellum
- m not forked and without a gap
- strong and shortlegged larvae with a broadly conical body
- with lateroabdominal gills (lamellae)

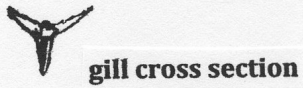
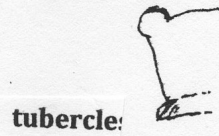
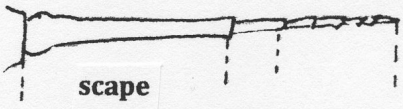
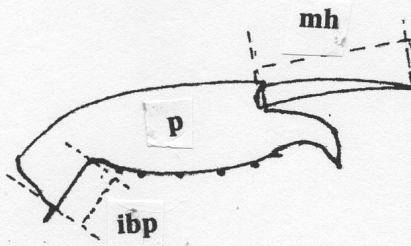
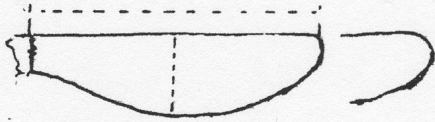
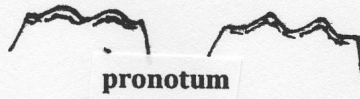
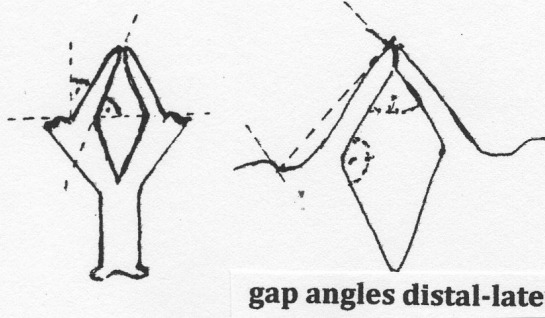
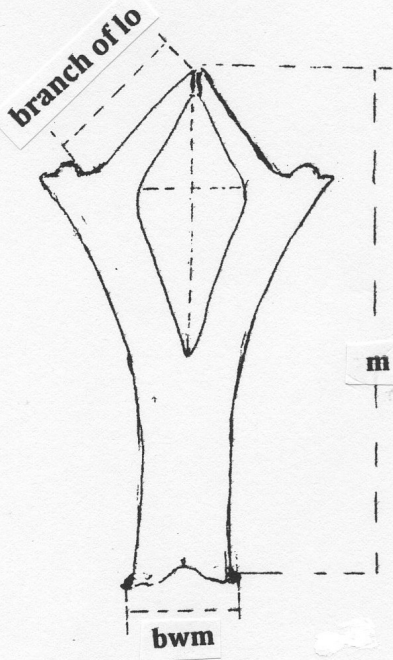
> EUPHAEIDAE > EPALLAGINAE

- > - mandibles spined (toothed) laterally
 - saccoidal cg
 - flat tibiae, legs very short
 - head and m big
 - lo notched and highly circular
 - hw : ft3 = 1 : \approx 1.7
 - m : ft3 = 1 : \approx 2.5
 - m : hw = 1 : \approx 1.5

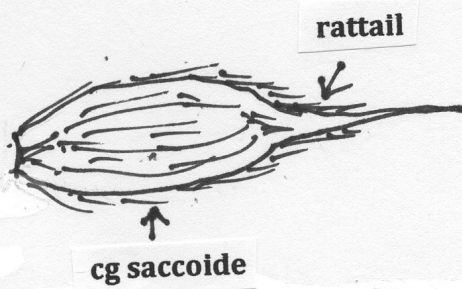
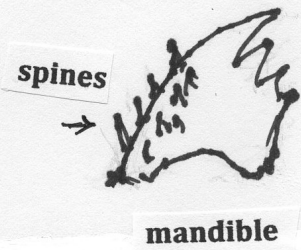
**> Epallage fatime
gen.EPALLAGE**



Calopterygidae



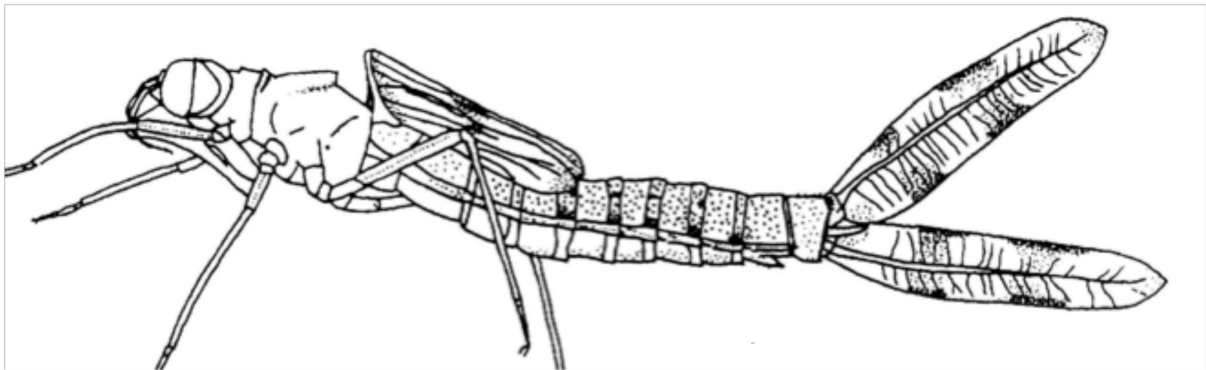
Euphaeidae



Fam.

- movable hook of palpus with setae
- spoonshaped (helmet-) mask
- m with ligula notched (clefted)
- palpus deeply forked (bilobate)
- cg with lateral (secondary) tracheae at about right angles to the main (primary) tracheae and without node

>LESTIDAE



- > - m NOT STALKED , APPROX. LONG CONICAL SHAPED
- TIP OF cg BLUNT, CIRCULAR OR OVOIDE CURVED
- mh WITH TWO SETAE (> 26)

- > - PALPAL COMB NARROW AND WITH A DISTINCT PROTRUDING A D O R A L TOOTH ONLY
- cg WITH APPROX. PARALLEL BORDERS AND A BROAD CIRCULAR CURVED TIP

MS (4) 5-6 (7)

wcg : cg = 1 : \approx 3-4

ant2 : ant3 = 1 : 1.2-1.3

ant4 : ant3 = 1 : \leq 1.2

> SYMPECMA
(SYMPECMATINAE)

- > - *median w of m : m (unpressed) = 1 : 2.3-2.6*
- *lo of m distinctly protruding*
- *submarginal spiny setulae along the rim of lo lined*
- *aboral branch of palpus with a small pointed tooth and a distinct incurve*
 - tip of dovi straight and slender conical,
 - internal border of the adoral hook sinuate
 - cg pale banded or colourless
 - ant4 : ant3 = 1 : 1-1.1

> **S.paedisca**

- > - *median w of m : m (unpressed) = 1 : 2.75- 3*
- *lo of m weakly protruding*
- *submarginal spiny setulae along the rim of lo not lined*
- *aboral branch of the palpus with a small blunt tooth and a weak incurve*

> - **MS short**

- cg coloured, with 3 pigmented bands
- tip of dovi slightly curved
- internal border of the adoral hook less sinuate
- ant4 : ant3 = 1 : 1.1-1.15
- ant2 : ant4 = 1 : >1
- ant4 : whw = 1 : ≈ 1.5
- ant3 : M1-M1 = 1 : ≤ 1

> **S. fusca**

> - **MS very long**

- cg with 2 pigmented bands
(after Dumont)

? (not available) > **S. gobica**

- > - PALPAL COMB VERY BROAD AND WITHOUT ANY LONG ADORAL AND ABORAL TOOTH
- cg WITH MINIMALLY NARROWED LATERAL BORDERS AND WITH A BROAD OVOIDE TIP

MS 6-8

wcg : cg = 1 : \approx 4.1-5

ant2 : ant3 = 1 : 1-1.2

ant4 : ant3 = 1 : 1.2-1.3

> CHALCOLESTES (LESTINAE)

- > - *smw* : *m* = 1 : > 5.5 (*iwm* : *m* = 1 : 6-7.5)
- *MS* < *mh* (from distal setae to tip)
- *palpus* : *m* = 1 : \geq 2.4
- *distal comb of palpus straight and regularly teathed and with a small tooth on adoral corner well expressed*
- *base of comb distinctly narrowed at inside by a wide incurve*
 - distal hook of palpus distinctly curved at inside
 - cercoides in males and females circular blunt tipped or conical blunt tipped
 - lateral valves of dovi wide and curved to an acute tip
 - MS 1+2 often shorter than length of mh
 - mh- distance from apical setae to tip is mostly longer than distance from base to apical setae
 - lateral valves - bovi : dovi = 1 : \approx 1
 - te 10 : cercoids male = 1 : \leq 1

> Chalcolestes viridis

- > - *smw* : *m* = 1 : \leq 5.5 (*iwm* : *m* = 1 : 5.5-6.5)
- *MS* > *mh* (from distal setae to tip)
- *palpus* : *m* = 1 : \leq 2.4
- *distal comb of palp slightly convex and irregularly teathed with tooth on adoral corner absent or weakly expressed, but tooth on aboral corner better visible*
- *base of comb scarcely narrowed at inside because of a small incurve*

- distal hook of palpus weakly curved at inside
- cercoides in males and females slightly shorter and acutely tipped
- lateral valves of dovi narrow and about conical narrowing to tip
- MS 1+2 often longer than length of mh
- mh- distance from apical setae to tip is mostly shorter than distance from base to second setae
- lateral valves - bovi : dovi = 1 : > 1.1
- te 10 : cercoids male = 1 : > 1
- ant2 : ant4 = 1 : < 1
- ant4 : whw = 1: ≈ 2
- ant3 : M1-M1 = 1 : ≥ 1.3

> Chalcolestes parvidens

> - m WIDE TO NARROW STALKED OR LONG TO SHORT STALKED
- PALPAL COMB WITH DISTINCT PROTRUDING ADORAL AND ABORAL TOOTH

> LESTES
(LESTINAE)

- > - *m short and wide stalked*
- *head : stick = 1 : ~ 1.4*
- *bwm : w of neck = 1 : > 1*
- *4 setae on mh normally*
 - adoral branch of palpus with about parallel lateral borders and a small endhook
 - distance from level of basal MS to tip of ligula : l of the stick from base to level of basal MS = 1: < 2.5
 - cg pale, with slightly conical borders
 - MS (7) 8 (9)

> L. macrostigma

> - *m* of medium length (< 4.5mm) and
more narrow stalked

- head : stick = 1 : > 1.4 (-1.75)

- *bwm* : *w* of neck = 1 : < 0.8

- 3 setae on *mh* normally

- adoral branch of palpus with strongly narrowed lateral borders towards distal hook (branch looking conical)
- distance from the level of basal MS to the tip of ligula:
l of stick from base to the level of basal MS = 1 : 3-3.5
- basal border of the stick nearly straight
- *dovi* slender and conically narrowed to tip
- short and fine cuticular spiny setulae at abdominal endsegments
- incurve between distal comb and adoral tooth narrow and weak
- *cg* slender, with nearly parallel or slightly conical borders and a broadconical to ovoide tip, pale and often with slightly darkened seams of tracheation
- ant2 : ant3 = 1 : < 1.5 (other species > 1.5)
- ant2 ≈ ant4
- *hw* ≥ *f*3
- MS 6 (7)

> *L.virens*

- > - *cg* with intensive and broad brownish seams along median tracheae
- palpal comb small, distal oblique and more angulated
- *m* slightly longer

> *v. virens* (incl. *numidica*?)

- > - *cg* with absent or weakly expressed seams along main tracheae
- palpal comb small and curved
- *m* slightly shorter

> *v. vestalis* (incl. *marikovskii*)

> - *m* long ($\geq 5\text{mm}$) and narrow stalked

> - *cg* with strong conical to concave narrowed lateral borders and a narrow to acute tip
- 3 setae on *mh* normally

> - short and strong cuticular spiny setulae at abdominal endsegments

- adoral branch of palpus with strongly narrowed lateral borders

- incurve between distal comb and adoral tooth is wide

- *m* - arch small and asymmetric

- *mh* - distance between 1st (basal) and 3rd (apical) setae
: distance between 3rd setae and tip = 1 : < 2

- lateral valves - *bovi* < *dovi*

- *w* of comb : *l* of adoral hook = 1 : ≥ 1 (1 : < 1.5)

- distance from the level of basal MS to tip of ligula :

l of stick from base to the level of basal MS = 1 : 3.5-4

- basal border of the stick distinctly waved

- *cg* tip with narrow convex to straight conical borders,

- *cg* often dark or uniformly coloured

- *l* of adoral tooth \approx *w* comb / *w* palpus

hw \geq *f* 3

m : *f* 3 = 1 : 1.1

MS 7 (8)

ovi : *m* = 1 : ≤ 1.6

male cercoid : *m* = 1 : < 4

female cercoid : *m* = 1 : < 6

te 10 : cercoid = 1 : ≈ 1

te 1-3 set with short and stout hairspiny setulae

w of neck : *bw* of stick = 1 : 1.5 – 2

> *L. dryas*

- > - *long and fine cuticular hairspiny setulae at abdominal endsegments*
- *adoral branch of palpus with nearly parallel lateral borders*
- *incurve between distal comb and adoral tooth is flat and wide*
- *m - arch big and approx. symmetric*
- *mh - distance between 1st(basal) and 3rd (apical) setae : distance between 3rd setae and tip = 1 : > 2*
- *lateral valves- bovi ≥ dovi*
 - **w of comb : l of adoral tooth = 1 : ≤ 1**
 - **distance from level of basal MS to the tip of ligula : l of stick from base to level of basal MS = 1 : 4-4.5**
 - **lat.valves- dovi broad and abruptly narrowed to the tip**
 - **cg often palecoloured, very broad, strongly narrowing to an acute, often concave bordered tip**
 - **l of adoral tooth < wcomb/wpalpus**
 - ant2 : ant3 = 1 : ≈ 1.65**
 - m- head : stick = 1 : 1.8-1.95**
 - MS 7-8**
 - mh with 3 (4) setae**
 - ovi : m = 1 : > 1.7**
 - male cercoid : m = 1 : > 4**
 - female cercoid : m = 1 : > 6**
 - te 10 : cercoid = 1 : > 1.1**
 - te 1-3 surfaced with long and fine hairspiny setulae**

> **L. barbarus**

- > - *cg with less narrowed borders, slightly conical and ovoide to broad convex tipped*
- *mh with 2 setae normally*
- *MS (5) 6 (7)*

> adoral branch of palpus with borders weakly converging towards endhook

> - *distal comb slender* -

- *w of comb : l of adoral tooth = 1 : ≤ 2*

- *adoral tooth : aboral tooth = 1 : ≈ 2*

- *mh- distance 1-2 setae : 2nd setae - tip = 1 : 3.5-4*

- cg slightly conical narrowed and with a mostly darkseamed tip

- distance from level of basal MS to the tip of ligula :

l of stick from base to the level of basal MS = 1 : 3.5-4

- incurve between comb and adoral tooth deep

ant2 : ant3 = 1 : ≈ 1.5

hw ≤ f3

m : f3 = 1 : ≈ 1.2

neck of m : bw of stick = 1 : 2.5-3

> *L. sponosa*

> - *distal comb minuite* -

- *w of comb : l of adoral tooth = 1 : 3-5*

- *adoral tooth : aboral tooth = 1 : ≈ 1.5*

- *mh- distance 1-2 setae : 2nd setae - tip = 1 : ≈ 3*

- cg nearly parallel bordered and less narrowed to a pale tip

- ant2 : ant3 = 1 : ≈ 2

> *Lestes (Xerolestes) pallidus*
(afrotropic)

> - adoral branch of palpus with borders strongly conical converging to its distal endhook

- adoral border near endhook strongly incurved

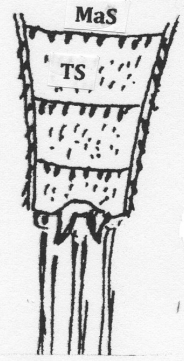
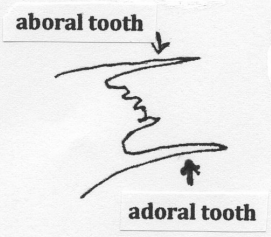
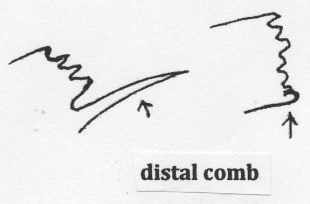
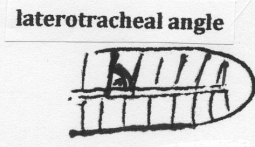
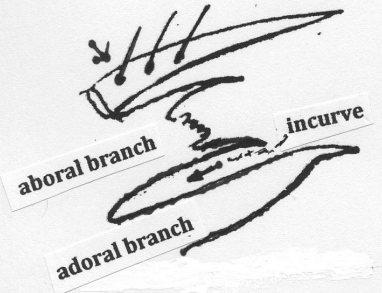
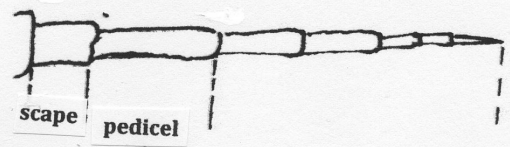
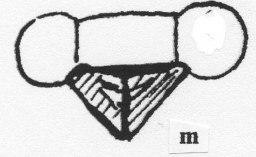
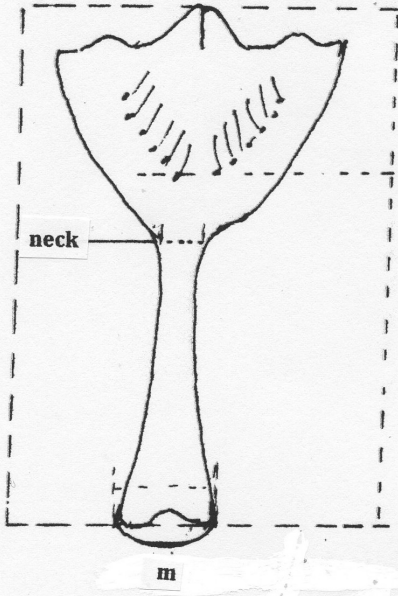
- distance from level of basal MS to the tip of ligula :

l of stick from base to the level of basal MS = 1 : 4,5-5

- ligula of lo distinctly flattened out

> *L. temporalis* (EP)

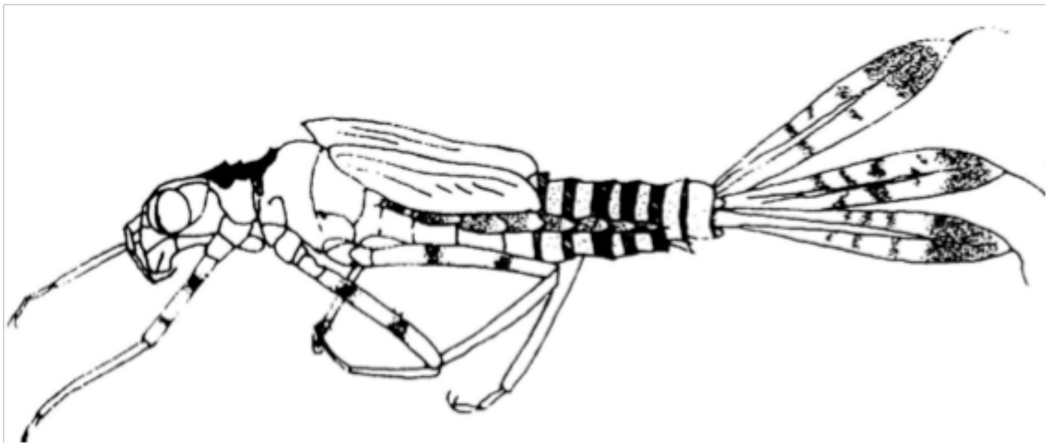
Lestidae



Fam :

- cg slender lanceolate to clubshaped with hairy borders and a long filium
- cg without node
- cg lateral tracheae widely angled ($>70^\circ$), weakly expressed and scarcely visible
- MS 2 (-4-6) set at transverse level (row)
- flat shaped m im frontal view wide angled ($\approx 120^\circ$)
- head in dorsal view rectangular shaped with occipital corners angled and flat tubercled
- m short , not surpassing first pair of legs
- abdomen short conical
- PS 3 (2-4)
- ant: 7-segmented
- l of comb : palpus (tip-knee) = 1 : ≥ 2.5
 - endhook : dp from knee to base of endhook = 1 : 4.5-7
- w of palpus : mh = 1 : ≤ 2

> PLATYCNEMIDIDAE > PLATYCNEMIDINAE
> PLATYCNEMIS



> **WESTERN EUROPE
AND WESTERN MEDITERRANEIS
(> 37)**

> *ant3 : ant2 = 1 : ≈ 1 (0.9-1.1)*

ant6 : ant3 = 1 : ≈ 3

ant6 : smw = 1 : ≥ 3.5

iwm : ant2 = 1 : ≈ 1

- **pronotum:**

dorsal view : - with dorsobasal branch broadtipped
and not erected

- dorsomedian tubercle mediadsized,
blunt and less erected

lateral view: - tip of basal tubercle approx. circular
and smaller than median tubercle

- **sternum :** - with poststernal angle wide
- furca branches less than 180°

ant2 : bwm = 1 : ≈ 1.75

ant2 : smw = 1 : > 1.2

ant 2 : f1 = 1 : ≥ 5

ant4 : ant2 = 1 : ≤ 1.8

bwm : m = 1 : < 3

bwm : t3 = 1 : ≤ 4.7

cg- w : l = 1 : 4-8

cg angle ≈ 10-15°

dovi very shorttipped (tip ≈ 1/10 of dovi)

filium > wcg

f1: t3 = 1 : ≈ 1.75

hlo : lo = 1 : ≈ 3

hw > t3

iwm ≈ w of arch

ligula > 90°

m : t3 = 1 : < 2

m : ft3 = 1 : < 3.5

Maghreb > **Pl. subdilatata**

> *ant3 : ant2 = 1 : ≥ 1.1 (-1.4)*

ant6 : ant3 = 1 : 2-2.5

ant6 : smw = 1 : < 3.5
iwm : ant2 = 1 : ≥ 1.1 (-1.5)

> *ant2 : bwm = 1 : > 1.55 (-1.8)*

filium < wcg

cg angle 20-30°

wcg : cg = 1 : ≈ 3- 4.5

- pronotum

dorsal view: - with dorsobasal tip narrow,
indifferent coloured and less erected
- with dorsomedian tubercle very
small and acutetipped

lateral view: - both tips small circular and
about samesized

- rear occiput with narrow curved corner

- sternum: - with metasternal lobes conical

narrowed and contact short

- poststernal angle narrow (< 120°)

- furca branches ≤ 180°

- arch of m small and circular curved (w arch < dovi)

ant2 : hw = 1 : 7.5-9

ant2 . smw = 1 : ≥ 1

ant2 : fl = 1 : ≤ 4.5

ant4 : ant2 = 1 : ≤ 1.8

ant4 : iwm = 1 : 1.2-1.5

ant6 : ant3 = 1 : < 2.5

bwm : t3 = 1 : > 5

bwm : m = 1 : ≤ 3

dovi slendertipped

fl : t3 = 1 : ≈ 1.75

fl : cg = 1 : ≤ 2.4

hw : ft3 = 1 : ≥ 2

hlo : lo = 1 : ≤ 3

iwm : m = 1 : ≤ 6

iwm : ant2 = 1 : 1.2-1.4

iwm : hw = 1 : ≥ 10

ligula $\geq 90^\circ$
m : t3 = 1 : ≈ 2
m : ft3 = 1 : < 3.5
wcg : t3 = 1 : < 3

Franco-Iberia > Pl. latipes

> ant2 : bwm = 1 : ≤ 1.55
ant4 : ant2 = 1 : ≈ 2
cg angle 15-20°

> ant4 : iwm = 1 : ≤ 1.2
ant4 : smw = 1 : ≤ 1.5
iwm : m = 1 : ≥ 6
iwm : ant2 = 1 : 1.4-1.5
iwm : hw = 1 : > 10
iwm \approx w of arch

- pronotum

dorsal view : - with dorsobasal branch acutetipped,
slightly erected and often curved backwards
- with dorsomedian tubercle small to
mediasized and less erected

lateral view : - basal tip in lateral view smaller
than median tip
- circular tips wider separated
than in acutipennis

- iwm : distance between tubercles = 1 : > 1

- sternum - with poststernal angle narrow ($< 130^\circ$)
- furca with curved branches ($\geq 180^\circ$)

- rear occiput with corner narrow angled (curved)

ant2 : hw = 1 : < 7.5

ant2 : smw = 1 : ≤ 1

ant6 : ant2 = 1 : ≥ 3

bwm : m = 1 : ≥ 3

f1 : t3 = 1 : ≈ 1.6

f1 : hw = 1 : ≈ 1

filium \approx wcg

hlo : lo = 1 : > 3

hw : ft3 = 1 : \approx 2
ligula > 90°
m < f1 (m \approx f1 in hyalina)
m : ft3 = 1 : > 3.1
smw : m = 1 : > 4
wcg : cg = 1 : \approx 4-8

Eurasia, W-C-Palaearctis > Pl pennipes

- > ant4 : iwm = 1 : \approx 1.5
ant4 : smw = 1 : > 1.5 (-1.8)
iwm : m = 1 : \approx 5
iwm : ant2 = 1 : \approx 1,2
iwm : hw = 1 : \leq 10
iwm \leq w of arch
- pronotum
 - dorsal view: - with dorsobasal branch broadtipped (f)
to mediatetipped (m) and well erected
 - with dorsomedian tubercle big, blunt,
globular and strongly erected
 - lateral view: - both tips ovoide and often
whitish marked
 - basal tip smaller than median tip
- sternum: - with poststernal angle wide (>130°)
- furca with curved branches (>180°)
- metasternal lobes about parallel bordered,
broadly contacting at mid with broad circular tips
- rear occiput with corners narrow angled (curved)
- ant2 : smw = 1 : \geq 1
ant3 : ant2 = 1 : 1.3-1.4
ant 6 : ant2 = 1 : \geq 3
bwm : m = 1 : \leq 3
dovi very shorttipped
(tip \approx 1/10 of dovi)
f1 : t3 = 1 : \approx 1.7
f1 : cg = 1 : \leq 2.5
filium \leq wcg
hlo : lo = 1 : < 3
hw: ft3 = 1 : < 2

ligula $\leq 90^\circ$
m : t3 = 1 : 1 : ≤ 2
m : ft3 = 1 : > 3.5
wcg : t3 = 1 : $>> 3$
wcg : cg = 1 : $\approx 4.5-9$

Franco-Iberia,,W-medit. > Pl. acutipennis

> **EASTERN AND CENTRAL-EUROPE
AND W-C-ASIA / ASIA MINOR**

> *ant3 : ant2 = 1 : ≥ 1.1 (-1.4)*
ant4 : ant2 = 1 : ≈ 2

> *ant2 : bwm = 1 : > 1.55 (-1.8)*
ant2 \leq smw
bwm : m = 1 : < 3
f1: t3 = 1. 1.7-1.8
iwm : ant2 = 1 : ≥ 1.2

- pronotum

dorsal view : - with tip of dorsobasal branch acute,
whitish and strongly erected

- with dorsomedian tubercle big,
blunt and protruding

lateral view: - median tip bigger than small
circular basal tip

- iwm : distance between tubercles = 1 : < 1

- sternum: - with poststernal angle narrow ($< 120^\circ$)

- furca with branches about transverse
or slightly wavy ($\leq 180^\circ$)

- metasternal lobes with borders conical
narrowed to mid

- rear occiput with narrow curved corner

arch : dovi = 1 : \approx 1.3
 bwm : t3 = 1 : \leq 5
 bwm : f1 = 1 : \geq 3
 dovi slender, acute tipped
 f1 : cg = 1 : \geq 2.4
 filium \gg wcg
 hlo : lo = 1 : \geq 3
 hw : ft3 = 1 : \geq 2
 iwm : m = 1 : \leq 6
 iwm : f1 = 1 : \leq 6.5
 iwm : hw = 1 : $<$ 10
 iwm : arch = 1 : $<$ 1
 iwm : dovi = 1 : \approx 1.1
 ligula angle $>$ 90°
 m : ft3 = 1 : $<$ 3.5
 smw : m = 1 : \leq 4
 t3 \geq fw
 w of arch $<$ dovi
 wcg : cg = 1 : 5-7

Asia Minor, W-Asia > Pl. dealbata

> *ant2 : bwm = 1 : \leq 1.55*
ant2 \approx smw
bwm : m = 1 : \geq 3
f1 : t3 = 1 : \approx 1.6

> *ant4 : iwm = 1 : \approx 1.5*
iwm : ant2 = 1 : 1.1-1.3
iwm ; hw = 1 : \leq 9
iwm : m = 1 : 5- 5.5
iwm : f1 = 1 : $>$ 6

- pronotum

dorsal view: - with tip of dorsobasal branch
 very broad , blunt , less erected

- with dorsomedian tubercle big and acute tipped
- lateral view: - basal tip broad, flattened and less erected
- basal tip slightly smaller than big median tubercle
- distance between tubercles slightly shorter than in pennipes
- iw m : distance between tubercles = 1 : ≤ 1
- sternum: - with poststernal angle narrow ($< 130^\circ$)
- with furca narrow angled ($\leq 190^\circ$) and with wide set big tracheal hollows
- rear occiput with corner widely angled (curved)
 - arch : dovi = 1 : ≥ 1.2
 - ant6 : ant2 = 1 : 3-4
 - cg angle $10-15^\circ$
 - dovi broadly tipped
 - f1 : hw = 1 : ≤ 1.7
 - filium \approx wcg
 - iw m : w arch = 1 : ≈ 1
 - iw m : dovi = 1 : > 1.2
 - ligula $> 90^\circ$
 - hlo : lo = 1 : ≈ 4
 - hw : ft3 = 1 : < 2 (> 2 ?)
 - m : t3 = 1 : < 2
 - m : ft3 = 1 : > 3.5
 - smw : m = 1 : > 4
 - wcg : f1 = 1 : > 2

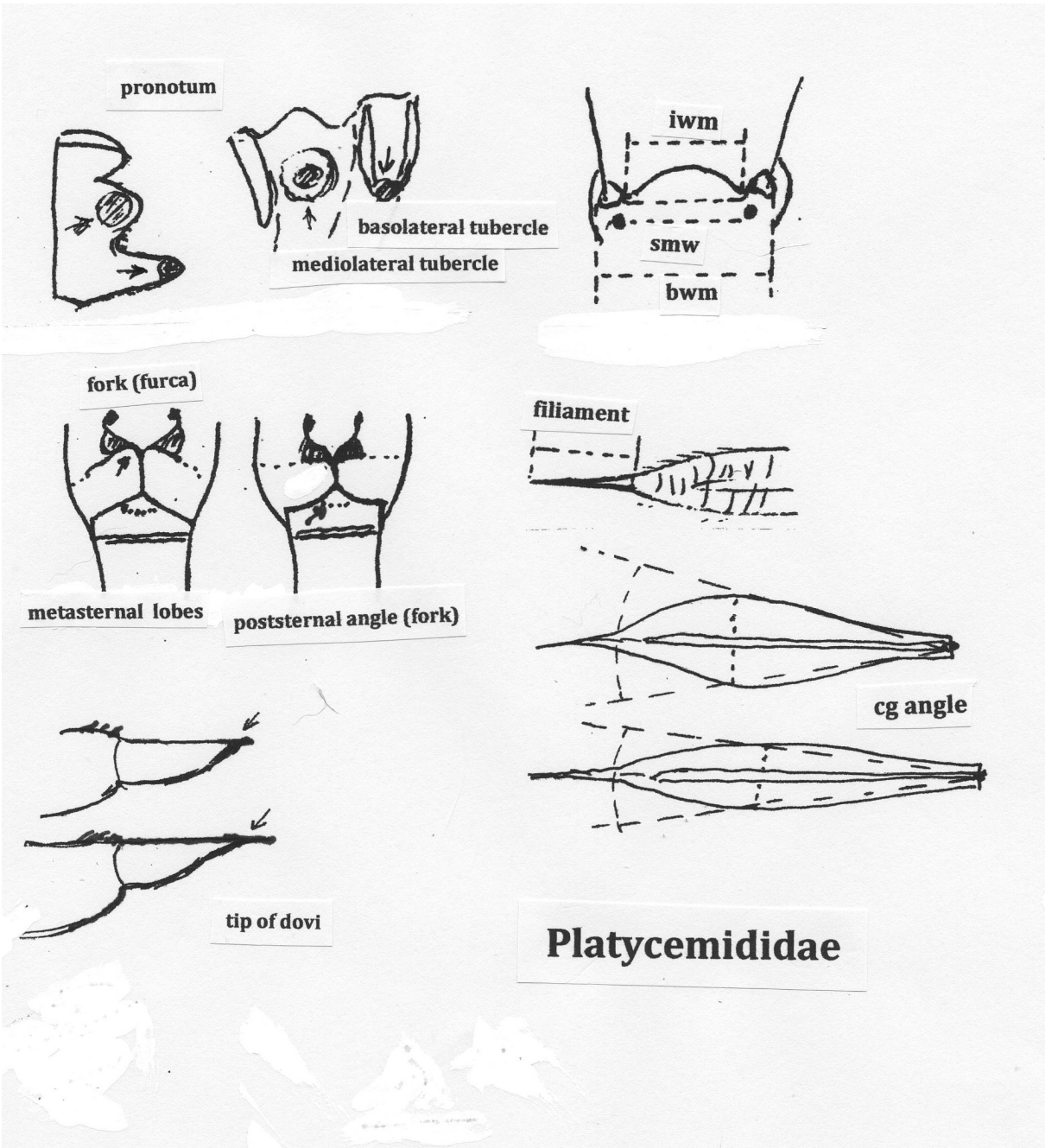
Asia Minor, W-Asia > Pl.kervillei

- > ant4 : iw m = 1 : ≤ 1.2
- iw m : ant2 = 1 : 1.4-1.5
- iw m : hw = 1 : > 10
- iw m : m = 1 : ≥ 6

- pronotum
 - dorsal view : - with tip of dorsobasal branch acute, slightly erected and curved backwards
 - dorsomedian tubercle small to mediadsized, blunt and less erected

- lateral view :**
 - basal tip slightly smaller than median tip
 - tips slightly wider separated than in *kervillei*
 - **iwm : distance between tubercles = 1 : > 1**
- **sternum:**
 - with poststernal angle narrow (< 130°)
 - furca with curved branches (≥ 180°)
- **rear occiput with corner narrow curved**
 - ant2 : hw = 1 : < 7.5**
 - ant6 : ant2 = 1 : ≈ 3**
 - cg angle 15-20°**
 - dovi broadly tipped**
 - f1 : hw = 1 : ≥ 1.8**
 - filium ≈ wcg**
 - hlo : lo = 1 : > 3**
 - hw : ft3 = 1 : ≈ 2**
 - iwm : dovi = 1 : > 1.2**
 - iwm ≈ w arch**
 - ligula > 90°**
 - m : ft3 = 1 : > 3.1**
 - smw : m = 1 : ≈ 4.5**
 - wcg : f1 = 1 : 1.5-2**

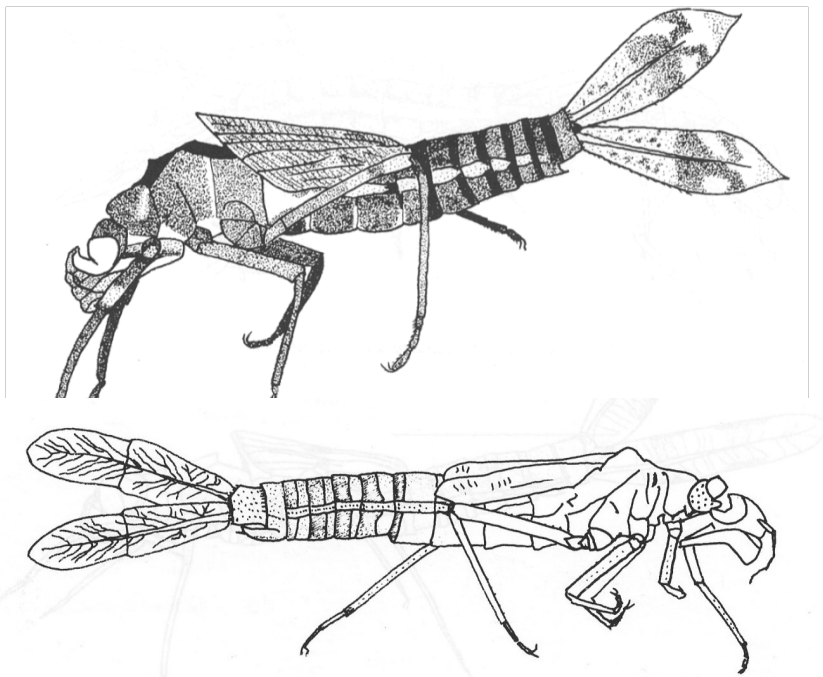
Eurasia, W-C-E- Palearctis > **Pl pennipes** (id.p.35)



Fam.

- **cg with oblique lateral (secondary) tracheae well visible and without a long fady filium**
- **normally with node**
- **MS conical converging (rows converging to an angle)**

> COENAGRIONIDAE



- > - ABDOMEN WITH A THICKSPINY SETULATED CUTICULA , SPINY SETULAE REACHING APICAL ABDOMEN OR EVEN STERNUM**
- **cg WITH PIGMENTATION (MARBLING) AT LEAST ALONG MEDIAN TRACHEA**
- **dg WITH PARTLY SCLEROTIZED LATERAL BORDERS AND A NOTCH (INCURVE) AT NODE**
- **bg and dg WITH ABOUT SAME DENSITY OF LATERAL TRACHEATION**
(> 47)

- > - OCCIPUT WITH CORNERS CURVED
(BOWLSHAPED) AND WITHOUT TUBERCLES
- METASTERNUM AND / OR STERNITES 1-2
WITH ROWS OR FIELDS OF SPINY SETULAE
- CERCOIDS ACUTE
- PS ≥ 5 (-7) MS 3-5 ES 2-4 MS ANGLE 80-95°
- FRONS WIDE- W OF LATERAL INCURVE : W OF
FRONS (AT SAME TRANSVERSE LEVEL)
L = 1: > 2 (> 2.5 NAJAS)
- FRONS LOW : h : w = 1 : ≈ 5 (4.5- 5.5)
(> 45)

> ERYTHROMMA

- > - *distal comb of palpus broad , looking about
quadrangular (bw of mh < w of comb)*
- *large exuviae (25-33mm)*
- *f1 : m = 1 : ≤ 1.1*
- *te3 scarcely surfaced with spiny or hairspiny setulae*
- *antennae 6-segmented*
- *with spiny setulae on metasternum a n d st 1/ 2*
ant4 : ant3 = 1 : ≈ 1.8
cg very broad and long, approximately circular at tip
dwm : m = 1 : ≥ 2
node of cg strong, vertical straight or weakly
curved, set well into the basal half
wcg : cg = 1 : 3.5-4.5

> Erythromma najas

- > - *distal comb of palpus narrow, distinctly
longer than wide (bw of mh \approx w of comb)*
- *small exuviae (19-23mm)*
- *f1 : m = 1 : ≥ 1.2*

- *ant2 ≈ ant4*
- *ant4 : ant3 = 1 : ≈ 1.5*
- *bwm : m = 1 : ≈ 4*
- *lo : m = 1 : > 2*

- > - *te 3 surfaced with fine hairspiny setulae and with thickened MaS*
- *distance from lateral border of m to MS1 : distance between MS1-MS1 = 1 : ≈ 1.6*
- *metasternum mostly with few spiny setulae*
- *antennae less hairy*
- *arch about symmetric curved*
- *node bent and vanishes shortly before reaching the border*
- *node sometimes with mediotracheal widened pseudonodal area*
 - row of setulae on lateral border of l m >> 1/3 of lateral borderline of m , and reaching about level of basal MS
 - adoral border of palpus curved ; endhook strong
 - basal angle (inner knee) of palpus about 90° and weakly bulging
 - crackline on occiput with incurve
 - ant2 ≥ ant4*
 - bsr = 1 : ≈ 2.5-4*
 - bg : dg = 1 : < 1 (lg) 1: 1-1.4 (mg)*
 - bwm : dwm = 1 : > 3*
 - cg tip broad ovoid*
 - dwm : m = 1 : 1.8-1.9*
 - hlo : lo = 1 : ≈ 5*
 - occipital fine spiny setulae widespread*
 - st 1/2 : with 1- 2-rows of spiny setulae*
 - wcg : cg = 1 : 5-7*
 - smw: lo = 1: >> 2*
 - smw: M1-M1 = 1: ≤ 2*

> **Erythromma lindeni**

- > - *te 3 strong and densely set with hairspiny setulae but without thickened MaS on hindborder*

- *distance from lateral border of m to MS1 :*
distance MS1-MS1 = 1 : ≈ 1.9
- *metasternum without spiny setulae*
- *antennae hairy*
- *arch slightly curved asymmetrically*
- *node curves or vanishes basalwards shortly after mediotracheal crossing*
 - row of spiny setulae on lateral border of m ≤ 1/3 of lateral borderline, widely set, and not reaching the level of basal MS
 - adoral border of palpus nearly straight; endhook slender
 - inner angle (knee) of palp > 95 °, strongly bulging
 - crackline on occiput with slightly wavy incurve
 - endhook of of palpus scarcely curved and very long (about three times the length of the bw)
- distal third of pronotum not narrowed conically (in dorsal view)
 - ant2 < ant4
 - bg : dg = 1 : ≥ 1(-2)
 - bs 40 – 50 / 0 - 5
 - bsr = 1: 1.7-3
 - bwm : dwm = 1 : ≥ 2.5
 - hlo : lo = 1 : 4-4.5
 - wcg : cg = 1: 3.5-5

> **Erythromma viridulum**

> - **OCCIPUT WITH ANGLED OR PROTRUDING CORNERS , TRAPEZOIDAL OR QUADRANGULAR**

- **PS 3-4 MS 1 (-2)**
 - palpus with a narrow distal comb with teeth arranged in curve and with a very long endhook, surpassing distinctly the level of tip of palpal comb
 - lo highly erected
 - arch flat
 - ant1 : ant2 = 1 : < 1.4
 - ant3 > ant2
 - endhook : adoral border of palpus to knee = 1 : ≈ 4

- dovi with slender elongated tip
- smw : m = 1 : ≥ 4
- w of palpus : mh = 1 : ≈ 2.5
- want2 : want3 = 1 : < 0.4

> PSEUDAGRION

> wcg : cg = 1 : ≈ 4

- > ant1 : ant4 = 1 : ≈ 1.15
- ant2 : ant4+5 = 1 : $> 1.3(-1.6)$
- ant4 : ant3 = 1 : ≈ 1.3
- ant5 : ant3 = 1 : ≈ 3
- ant5 : ant4 = 1 : ≥ 2
- hlo : lo = 1 : 3-4

ant: 7-segmented

ant1-3 : m = 1 : ≈ 1.5

f1 : fw : 1 : > 2.1

o : dwm = 1 : ≈ 1.9

m : cg = 1 : $>> 2$

palpal comb : 3-4+5 teeth

comb- w : l = 1 : ≈ 1.8

smw : m = 1 : > 5

lateral border of m bearing many longspiny setulae
cercoids blunt, triangular

ES 2-4 short PS 3 (-4)

> *P. sublacteum mortoni*

- > ant1 : ant4 = 1 : ≈ 0.8
- ant2 : ant3 = 1 : ≈ 1
- ant5 : ant3 = 1 : ≤ 2.5
- ant5 : ant4 = 1 : ≈ 1.5
- hlo : lo = 1 : < 3

> *P. syriacum*

? (not available) > *P. torridum hulae*

> ant7 : ant2 = 1 : ≈ 2

m with lateral border strongspiny setulated

PS 4 MS 1-6

(not available) > *P. decorum*

> *wcg* : *cg* = 1 : ≈ 6

> ant1 : ant4 = 1 : ≈ 1.35
ant4: ant3 = 1 : ≈ 1.1
cercoids bluntly curved
palpal comb - teeth: 4-5 + 2
comb- w : l = 1 : ≈ 1.5
(after Dumont)

? (not available) > *Ps.niloticum*

> PS 4 MS 1 (+4 microsetae)

(not available) > *Ps.laidlawi*

> ABDOMEN WITH A FINELY HAIRY TO
HAIRSPINY SETULATED CUTICULA
OR THICKLY SPINY SETULATED
ONLY ON ABDOMINAL ENDSEGMENTS

> - *cg* WITHOUT A NODE
- VERY WIDASET LONG SPINY SETULAE (bs)
ON LATERAL BORDERS OF *cg* , REACHING THE
TIP OF *cg*

ant2 : ant3 = 1 : ≈ 1.2
abdomen lateral with dark stripes
arch erected
bwm : m = 1 : > 4
cg pale, long and (very) slender or lanceolate,
bs widely set between a hairy seam
dwm : m = 1 : 1.2
ES 3-6 short
f1 dorsal with 6 - 8 strong spiny setulae in the median row

MS angle $\approx 80^\circ$
MS (4)5 (6)
PS (5) 6
smw : m = 1 : 5.5-6
te 2-4 with fine to medium hairspiny setulae

> C.hylas
gen. COENAGRION

> - cg WITH NODE
- LATERAL BORDER SPINY SETULAE NEVER
REACH THE TIP OF cg

> - OCCIPUT WITH ANGULAR CORNERS ,
APPEARING APPROX. RECTANGULAR
OR TRAPEZOIDAL
- ABDOMEN SHORT AND BROADLY CONICAL (> 51)
- ant: 7-segmented
- cg short, leaf-like, with an acute tip,
- node weak

> - cg WITH DARK PIGMENTATION AND HAIRY BORDERS
- DISTANCE FROM LATERAL BORDER OF m TO MS1 :
DISTANCE BETWEEN MS1-MS1 = 1 : >> 1
- te 2-4 WEAKLY SHORTHAIRED SETULATED
- abdomen fine and dense haired
- hindborders of te 8 + 9 set with very fine and short MaS
- lateral tracheation in bg and dg about same density
- palpal comb distal angled
- very fine and dense CaS along pale line on segs 4-8
- MS ≈ 4
- node starting at distal half of cg and then strongly
expanding caudally at mid before returning to
basal half of cg

> PYRRRHOSOMA

> ant1 : ant2 = 1 : < 2
ant2 : ant3 = 1 : > 1.5
bg : dg = 2-4.5 : 1
bsr : 1 : 1..5-2
bwm : m = 1 : 1.8-2.1
f1 : m = 1 : ≥ 1.1
f1 : hw = 1 : ≈ 1.4

f1 ≈ ant
hlo : lo = 1 : 3.5-3.7
MS angle: ≈ 75°
m : hw = 1 : ≥ 1.5
smw : m = 1 : ≤ 5
smw : lo = 1 : > 2
w of head : f1 = 1 : ≥ 1
wcg : cg = 1 : 2-3.3

> Pyrrhosoma nymphula

? (unknown) **> P. elisabethae**

**> - cg WITH LESS PIGMENTATION AND WITH SPINY
SETULATED BORDERS**

- DISTANCE FROM LATERAL BORDER OF m - MS1 :

DISTANCE BETWEEN MS1-MS1 = 1 : << 1

- te 2-4 DENSELY LONG HAIRSPINY SETULATED

- **hindborders of te 8- 9 with strong MaS**
- **lateral tracheation much more dense in dg than in bg**
- **palpal comb distally curved**
- **CaS scarcely visible and without pale line on segs.**
- **MS 1 (-3)**
- **node starts in distal half of cg, sometimes running slightly caudally to tracheal crossing before curving back to basal half of cg,**
- **bg with 5-7 fumated marginal patches**
- **endsegments spiny setulated**

ant1 : ant2 = 1 : 2-2.3

ant2 : ant3 = 1 : ≤ 1.5

bg : dg = 1.1-1.7 : 1

bwm : m = 1 : 1.5-1.7

hlo : lo = 1 : ≈ 4

w of head : f1 = 1 : < 0.9

smw: m = 1 : ≈ 3.5

m : ft3 = 1 : 2.3-2.6

m : hw = 1 : 1.2

ant2: ant4 = 1 : ≈ 1.1

bsr = 1 : ≈ 1.5-3.3

> CERIAGRION

- > - te 8-10 with strong MaS densely set, rel. long, less thickened
 - mediodorsal border te10 less erected and incurved
 - mesoinfraepisternum distal small ovoid and with
 - frontal border weakly curved
- frons very broad (≥ 3 times the width of occipital incurve of eye)
 - bsr = 1 : 1.2-1.3
 - m : lg = 1 : ≥ 1.5
 - mh : lg = 1 : 6-8
 - lateral lborder of m with 6-8 spiny setulae
 - palpus- w : l = 1 : < 4
 - smw : m = 1 : ≈ 3.5
 - smw : lo = 1 : ≈ 2

> **C. tenellum**

- > - te 8-10 with few MaS widely set, short, distinctly thickened
 - mediodorsal border te10 erected and strongly incurved
 - mesoinfraepisternum distal about semicircular and with
 - frontal border strongly curved
- frons less broad (≤ 2.5 times the width of occipital incurve of eye)
 - ant4 : bwm = 1 : ≈ 7
 - bsr = 1 : > 1.5
 - bg : m = 1 : ≈ 1.2
 - bg : hw = 1 : ≤ 1.5
 - m : lg = 1 : < 1.4
 - mh : lg = 1 : ≈ 5
 - lateral border of m with 3-4 spiny setulae
 - palpus- w : l = 1 : > 4

> **C. georgifreyi**

- > ant4 : bwm = 1 : 5-6
- bg : m = 1 : ≈ 1.5
- bg : hw = 1 : ≤ 2 (after Dumont)

? (not available) > **C. glabrum**

- > - OCCIPUT WITHOUT DISTINCT CORNERS ,
 APPEARING APPROXIMATELY BOWL SHAPED
- ABDOMEN SLENDER AND SLIGHTLY CONICAL

- > - te 1-3 WITHOUT FIELDS OF LONG AND STRONG
 HAIRSPINY AND SPINY SETULAE , BUT BARE
 OR REGULARLY FINE OR SHORT HAIRY
- OCCIPUT BARE OR SCARCELY TUBERCULATED
- FRONS NARROW: w OF LATERAL INCURVE : w OF FRONS
 (AT SAME TRANSVERSE LEVEL) = 1: ≈ 1.5
- FRONS - h : w = 1 : ≈ 3

(> 56)

- > NODE OF cg BENT STRONGLY BASALWARDS AFTER
 MEDIOTRACHEAL CROSSING : bsr = 1: $\approx 1.5-3$
- ant1-3 : m = 1 : ≈ 1.5
- ant 7-segmented
- bwm : m = 1 : ≥ 3
- cercoids acutetipped
- cg lanceolate with acute to short filiform tip
- dg wider than bg
- lateral tracheae mostly oblique ($\approx 30^\circ$) and densely set in bg+ dg
- distal comb of palpus short and broad with 2-4 well visible teeth
- fields of subsidiary spines in m variably expressed in most of species
- rear head weakly spined
- MS (3)4-5
- MS-angle $\approx 70-100^\circ$
- PS 5-6-(7)
- smw : M1-M1 = 1 : ≤ 1.5
- smw : lo = 1: ≤ 2

(> 56)

> ISCHNURA

- > - te 1-3 bare or slightly finehairy setulated
- MaS on te 7-9 weakly to very weakly expressed

- > - CS minute and multirowed (CS \approx TeS \approx MaS)
- lo : ant2-4 = 1 : 1.1

- *dovi shorttipped*
- *metasternal fork with oblique distal branches and median steem -pststernum separation 1: ≥ 3*
- *palpal endhook : palpus = 1: ≤ 10*
- *m below MS-angle with two well visible mediobasal points (in others absent or scarcely visible)*
 - pronotum slender conical tipped, with inner scar big and irregularly quadrangular to ovoid, and with a deep incurve, integrating about half of the small globular outer scar
 - distal border of pronotum weakly hairspiny setulated
 - ant2-4 : f1 = 1 : ≈ 1.3
ant2-4 : m = 1 : 1.7-2
ant2 < ant3
ant1 < ant4
bwm : dwm = 1 : > 2.7 (others < 2.7)
bs very fine and short ; bsr = 1 : ≈ 1.5
arch highly semicircular
ES ≈ 15 , multirowed, very short and thick
st 2-9 with cuticula densely tubercular

> **Ischnura pumilio**

- > - *CS expressed and one-rowed*
- *lo : ant2-4 = 1 : > 1.2*
- *dovi long and acutetipped*
- *metasternal fork with transverse distal branches and median steem-poststernum separation 1 : < 3*
- *palpal endhook : palpus = 1 : 7-9*
- *MaS on te (8) 9 (10) slightly stronger than TeS*
- > - **lo : ant2-4 = 1 : 1.25-1.3**
- **iwm : bwm = 1: ≤ 1.7**
- **poststernal fork narrow angled $< 100^\circ$, so ratio between lateral poststernal sides and median hight is 1 : > 1.5**
- **arch small, asymmetrical to semicircular**
pronotum conical smalltipped, with inner scar approximately globular and without a deep incurve and so not or scarcely integrating the small globular outer scar
hindborder and distal border distinctly hairspiny setulated

ant1+5 \approx ant2+4
 ant2 : ant3 = 1 : \approx 1.4
 ant2-4 : f1 = 1 : \approx 1.3
 ant2-4 : m = 1 : 1.5-1.7
 bs strong and distinct
 dorsal f1 with 8-10 scattered mediodorsal spiny setulae
 ES > 10 mostly one-rowed
 f1 : hw = 1 : \geq 2.2
 MaS on te 8-9 very weak
 m : hw = 1 : < 2
 st 2-9 with cuticula densely tubercular

> *Ischnura senegalensis*

- > - lo : ant2-4 = 1 : 1.3-1.5
- iwm : bwm = 1: 1.8-1.9 (all others 1: 1.5-1.7)
- poststernal fork wide angled \approx 120-130°
 (all other spec. \approx 90-100) so ratio between lateral
 poststernal sides and median height is 1 : < 1.5
- arch distinctly asymmetrical and rel.flat
 pronotum broadly conical bluntpipped, with inner scar very
 big and irregularly globular and with a slight or absent
 incurve, contacting or weakly integrating the small
 globular outer scar
 hindborder and distal border of pronotum weakly
 hairspiny setulated
 CS small and one-rowed at endsegments
 ant2-4 : f1 = 1 : \approx 1.2
 ant2-4 : m = 1 : \approx 1.5
 ES < 10
 f1 : hw = 1 : \leq 2
 st 2-9 with cuticula mostly loose tuberculated

> *I. graellsii*

- > - te 2-4 short to medium hairy setulated
- smw : m = 1: \geq 5
- MaS on te 7-9 well expressed

- > pronotum with distal border wide, with inner scar big
 and irregular globular with a small incurve ,
 outer scar irregularly globular and contacting the incurve

ant6+7 < 2
ant2-4 : fl = 1: 1.25-1.4
bsr = 1 : 1,4-1,7
ES < 10 short
lateral border of m with fine setulae
st 2-9 cuticula with fine hairspiny setulae

> I. genei

ant4 \approx smw
ant2 \geq ant4
arch small semicircular
CS 6-9 distinct
distance between basolateral borders of m is
narrower than distance between basolateral
tubercles of m
MaS (6) 7-10
st 2-9 cuticula with thick and short hairspiny setulae

> I. saharensis

ant4 : iwm = 1 : \approx 1
iwm : bump = 1 : \leq 1
smw : m = 1 : 5.5-7
median steem-poststernum separation = 1 : \approx 2.5
te1 with mediomarginal protrusion

> I. elegans (+ e. ebneri)

> - te 2-4 densely longhairy setulated
- smw : m = 1 : \leq 5
- MaS on te (6)7-9 strongly expressed

> ant2 > ant4

ant3 \approx smw

ant2-4 : fl = 1 : \approx 1.3

arch approximately semicircular and narrow

iwm : dwm = 1 : 4-4.5

MS angle mostly \leq 90°

- pronotum with distal border wide and with inner scar big,
approximately quadrangular, angled at inner caudal corner
and with a flat incurve
outer scar irregular ovoid and not contacting the incurve

- distance from lateral border of m to MS1 :
distance between MS1–MS1 = 1 : < 2 (others 1 : ≥ 2)
- distance between basolateral borders of m wider
than distance between laterobasal -tubercles
ant1 : ant3 = 1 : ≈ 2
ant2 : ant3 = 1 : ≈ 1.2
CS (3) 5-9 distinct
f1 : hw = 1 : < 2
iwm : m = 1 : ≤ 4.5
iwm : dwm = 1 : < 4
lo : m = 1 : ≈ 2
MaS (6) 7-10 strong
te 2-5 with cuticula hairy setulated
te 6-7 hairspiney setulated

> **I. evansi**

> ant2 ≈ ant4

ant3 > smw

ant2-4 : f1 = 1 : ≈ 1.15

arch long asymmetrical and strongly erected

iwm : dwm = 1 : 3.5- 4 (all others > 4)

MS angle >> 90°

- pronotum with distal border wide, hindborder and distal border distinctly to strongly hairspiny setulated with inner scar big and irregularly globular and with a small incurve

outer scar irregularly globular and contacting the incurve

ant1 < ant5

ant3 : lo = 1 : ≤ 3

ant1 : ant3 = 1 : ≈ 2.5

ant2 : ant3 = 1 : > 1.5

f1 : m = 1 : > 1.3 (-1.5)

iwm : m = 1 : ≈ 5

iwm : dwm = 1 : ≥ 4

lo : m = 1 : > 2

t3 : hw = 1 : ≥ 1.1

te 2-7 with cuticula hairy setulated

> **I. fountainei**

> **NODE OF cg CURVED**

bg : dg = 1.2-1.6 : 1

bsr = 1 : 1.2 -1.4

- cg short and slender with an acute tip ($w : l = 1 : < 3.5$)
- dg wider with distinctly more dense lateral tracheation than in bg
- distance from lateral border of m to MS1 :
distance between MS1 - MS1 = 1 : ≈ 1
- without ES

ant: 6-segmented

ant1-3 : m = 1 : ≤ 2

ant1: ant2 = 1 : > 2

ant1 : smw = 1 : ≈ 2.5

ant2 : ant3 = 1 : 1.2-1.4

ant1 : ant3 = 1 : > 2.5

bwm : m = 1 : = 3-3.5

bwm : lo = 1 : < 2

cercoids ovoid

fr distinctly curved

f1 and cuticula of abdomen nearly bare

hlo : lo = 1: 3-3.2

MS: 1 (-3) PS (5) 6 (7)

- node arises in the apical half , leading to a small mediotracheal incurve and curves then to border in or near to basal half
- palpal comb rectangular with teeth bent inwards
- smw : m = 1 : ≈ 5
- te 8-10 with distinct MaS
- want3 : want2 = 1 : ≈ 2
- very small exuviae (15-18 mm)

> **Nehalennia speciosa**

gen. NEHALENNIA

> - **te 1-3 WITH WEAK TO DENSE TUFTS OF
HAIRSPINY AND SPINY SETULAE**

- **OCCIPUT TUBERCULAR**
- **CERCOIDS BLUNT**
- **WITH ES**

- > - *endsegments of abdomen strongly narrowed (constricted), about half the w of other segments*
- *very small exuviae (< 17 mm)*

- ant: 7-segmented
- ant1 : ant3 = 1 : < 2
- ant1 : smw = 1 : \approx 1.5
- ant1 : ant2 = 1 : \approx 1.2
- bwm : lo = 1 : \geq 2
- bwm: m = 1 : \geq 4
- cercoids approximately globular
- cg pointed, dg wider than bg , with node slightly curved basalwards
- distance from lateral border of m to MS1 :
distance between MS1-MS1 = 1 : \approx 2
- fr about straight
- MS 5-6 PS 4)5 ES 4-5
- small setae on te pigmented
- pale longitudinal tergital line
- palpal comb with \approx 6 short teeth
- smw : m = 1 : 6-7
- te 9/10 with cuticula less spiny setulated
- te 8-9 with weak MaS – only on te 10 distinct
- want3 : want2 = 1 : \approx 3

> *Agriocnemis pygmaea*
gen. AGRIOCNEMIS

? (not available) > *Agriocnemis (p) sania*

> - *endsegments of abdomen less narrowed*
- *small to strong exuviae*

> - *cg with node distinctly curved , oblique,
wavy or bent*
- *dg without sclerotized borders (> 65)*

> - *with a small spine at the base of the first distal setae
of palpus*
- *ant2 \approx ant4*
- *ant. 6-segmented*

- *distance from lateral border of m to MS1 :*
distance between MS1-MS1 = 1 : \approx 2 (< 2.5)
 - *frons : w of lateral incurve : w of frons*
(at same transverse level) = 1 : \leq 2
 - *frons flat: h :w = 1 : \approx 4*
 - MS angle about 80°
 - node of cg mediate to slightly subnodate (bg : dg 1: 1-0.8)
 - cg broad, ovoid, with node slightly curved,
oblique or mediotracheal incurved and often with slightly pigmented vertical lunules along the median tracheae
 - dg and bg with about same density in lateral tracheation
 - endsegments less spiny and mostly hairspiny setulated
 - often with a pale abdominal longitudinal line
 - cuticula mostly transparent (glass-like) exuviae
 - first tooth of comb stronger than others
- smw : m = 1 : 4.5-5
f1 : m = 1 : > 1.25
ant2 : ant4 = 1 : \geq 1
want2 : ant4 = 1 2.5-3 :1
smw : lo = 1 : < 2.5
smw : MS1-MS1 = 1 : < 2

> **Enallagma cyathigerum**
(incl.risi, deserti)
gen. ENALLAGMA

- > - *without any spine at the base of the first distal setae of palpus*
- *occiput tubercular and spiny setulated*
 - *ant2 > ant4*
 - *cg nodate*

> gen. COENAGRION

- > - **cg with node distinctly set caudal**
(bg : dg = > 1.2 (-3):1)
- **m short (bwm : m = 1 : 2.5-3.5) (> 61)**

- > - MS angle $\leq 85^\circ$
 - CS minute, very fine and multirowed
 - ant 6-segmented
 - bg : dg = 2.3 -3 : 1
 - arch high semicircular

- > - te 4 without long hairy or hairspiny setulae
 - adoral border of palpus convex near to endhook
 - MaS of te 6-9 very weak
 - distance from lateral border of m to MS1 :
distance between MS1–MS1 = 1 : ≤ 1.5
 - ant2 : ant3 = 1 : ≥ 1
 - ant2 : ant4 = 1.5-1.8 : 1
 - ant2 : ant5 = ~ 2 : 1
 - ant5 : ant6+7 = 1 : < 1.5
 - ant1 \approx ant4
 - bwm : m = 1 : ≈ 3.5
 - bs : $\approx 60 / \approx 30$
 - cg with tip slender conical, acute
 - dwm : m = 1 : ≈ 1
 - ES: 10–13 very short and thick
 - f3 : m = 1 : ≤ 1.3
 - f1 dorsal with some rows of rel. weak spiny setulae, framed by rows of very fine spiny setulae
 - lo : bwm = 1 : > 2
 - m : t3 = 1 : ≈ 1.2
 - m : hw = 1 : > 1.6
 - MS: 3 (- 4)
 - node almost vertical and slightly wavy
 - PS: 5 (4-6)
 - te 1 spiny setulated
 - wcg : cg = 3.4-4.4 : 1

> **C. ornatum**

? (not available) > **C. vanbrinkae**

- > - MS angle 95-140 °
 - CS distinctly stronger than cuticular (TS) spiny setulae
 - ant 7-segmented
 - bg : dg = 1.2-2.2 : 1
 - ES 4-10 short and very thick

- > - te 4 weakly longhairy setulated
 - adoral border of palpus s t r a i g h t near to endhook
 - MaS on te 6-9 very weak
 - distance from lateral border of m to MS1 :
distance between MS1-MS1 = 1 : ≤ 1.5
 - ant2 : ant3 = 1 : ≈ 1.1
 - arch semicircular
 - ant2 : ant5 = $\geq 2 : 1$
 - ant4 : ant2 = 1 : ≈ 1.5
 - ant5 : ant6+7 = 1 : ≈ 1.5
 - bwm : m = 1 : ≤ 3
 - bwm : dwm = 1.2.5-3
 - bsr = 1 : 1-1.1
 - bs: $\approx 30 / \approx 20$ fine
 - cg with tip slender conical, acute
with lateral tracheae wideset in bg+dg
 - dovi slender, acute tipped
 - f3 : m = 1 : ≤ 1.2
 - f1 dorsal with few strong and scattered spiny setulae
 - m : t3 = 1 : ≈ 1
 - m lateral border with spiny setulae, 3-7 short
 - MaS on te 3-7 short
 - MS: 2-3
 - node vertical to convex, with a
very strong mediobasal incurve
 - PS: 5 (-6)
 - rear side of the occiput slightly angled
 - smw : m = 1 : < 3.5
 - smw : lo = 1 : < 2
 - smw : distance MS1-MS1 = 1 : 1.1-1.2
 - wcg : cg = 1 : 4.5-5

> C. mercuriale

- > - te 4 with long and strong hairspiny and spiny setulae
 - adoral border of palpus c o n v e x near to endhook
 - MaS on te 6-9 strong
 - distance from lateral border of m to MS1 :
distance between MS1-MS1 = 1 : ≤ 2
 - bg : dg = 1.2-1.4 : 1
 - arch flat, elongated

ant2 : ant5 = 1.5-1.7 : 1
 ant2 : ant3 = 1 : 1.1-1.4
 bsr = 1 : 1.3-1.7
 bs strong, straight, $\approx 25 / \approx 12$
 bwm : m = 1 : ≈ 3.5
 bwm : dwm = 1 : ≥ 3
 cg broad, ovoid, broadconical tipped,
 dg strongly dark or dull pigmented
 cg: median tracheae basal strongly thickened
 lateral tracheae set very dense ≈ 45 Grad
 f3 : m = 1 : ≥ 1.3
 hlo : lo = 1 : 3.7-4.1
 lo : bwm = 1 : 1.9-2
 m: t3 = 1 : > 1.25
 MS 3-4-5
 node arises in the distal half ,curves
 mediotracheal strongly convex, then
 running obliquely to the basal half.
 occipital spiny setulae thick, short and dense
 PS 6 smw : wlo = 1 : ≈ 2
 smw: m = 1 : $\approx 4.5 / \approx 4$
 smw : distance MS1-MS1 = 1 : ≈ 1.4
 te 1 w i t h o u t spiny setulae
 wcg : cg = 1: 2.5-3

> **C. caerulescens**

> - **cg with node set more mediad or basad**

(bg : dg = 1 : ≈ 1)

- **ant: 7-segmented**

> - **distance from lateral border of m to MS1 :**

 distance between MS1-MS1 = 1 : $\gg 2.5 (\approx 3)$

- te 5-7 bare or nearly bare

- smw : m = 1 : ≥ 5

- node curved basalwards, seldom oblique,
 wavy or with slight mediotracheal incurve

- MS angle $> 95^\circ$

- frons wide : w of lateral incurve : w of frons
 (at same transverse level) = 1: > 2

- frons low : h :w = 1 : ≈ 5 (4.5- 5.5)

ant1: ant2 = 1 : ≈ 1.5
 ant2 : ant3 = 1 : > 1.5
 ant2 : lo = 1 : ≥ 3
 ant4 : ant2 = 1 : ≈ 2
 ant6+7 ≥ 2
 bwm : m = 1 : 3.5-4
 bwm : dwm = 1 : ≤ 4
 bsr = 1 : 1.2-1.6
 bg : dg = 1-1.2 : 1
 bg with lateral tracheae loose and angled approximately 50°
 bg often strongly transparent tubercular
 arch flat and elongated
 dg without longhairy setulated borders
 dovi with long and narrow tips
 first tooth of comb similar to others
 ES 3-5
 f3 : m = 1 : ≤ 1.3
 lo : bwm = < 1.8 : 1
 lateral borders of m with 2-6 long spiny setulae
 ligula often with a small vertical groove
 m : hw = 1 : ≈ 1.5
 m : t3 = 1 : ≈ 1.2
 MaS on te 6-10 strong and well expressed
 MS 5-7
 PS 7
 smw : MS1-MS1 = 1 : ≥ 2
 smw : lo = 1 : ≥ 2.5
 te 2-4 with long and strong hairspiny and partly spiny setulae
 te 8-10 with strong MaS and spiny cuticula

> C. scitulum

- > - distance from lateral border of m to MS1 :
 distance between MS1-MS1 = 1 : 2-2.5
- te 5-7 finehairy setulated and pigmented
- smw : m = 1 : < 5
- node normally with mediotracheal
 incurve, seldom straight
- ant1+2 \geq bwm ($<$ in Ischnura)
 - f3 : m = 1 : ≥ 1.3
 - m : hw = 1 : > 1.6
 - m : t3 = 1 : > 1.25

> MS angle wide : > 80 ° (-100°)

> pronotum :

posterior border : pronotum = 1 : < 12

anterior border : pronotum = 1 : < 15

> - node S-like curved or flat bilobed, and
with a flat mediotracheal incurve
about vertical and with endpoints less shifted

- bsr = 1: ≈ 1.1-1.2

- arch less erected and more asymmetrical

> ant 2:3 = 1 : < 1.5

ant 1:2 = 1 : ≤ 2

ant 2: lo = 1: < 3

bwm : m = 1 : ≈ 3.5

bwm : dwm = 1 : ≥ 3.2

bg : dg = 1 : ≥ 1

bg with lateral tracheae angled about 30°

bg tubercles either absent or weak

lateral border of m with 7-9 spiny setulae

bs : > 40 / > 20

dg with longhairy borders

ES 7-12

f1 with fine longspiny setulae

occiput with spiny setulae, ventral long, dorsal short

MS: 5+1-6

PS: 6

smw: m= 1: ≈ 4

smw : lo = 1 : > 2

smw: distance between MS1-MS1 = 1 : < 2

te 1-4 weakly hairspiny setulated

te 10 with long MaS

wcg : cg = 1 : 4-5

> C. intermedium

?(not available) > C. ponticum

> pronotum (lat.view) :
posterior border : pronotum = 1 : > 12
anterior border : pronotum = 1 : > 15

> node vertical or directed slightly
ventrobasal with a narrow mediotracheal
incurve

bsr = 1 : < 1.2

arch erected and more symmetrical to
semicircular curved

ant2 : ant3 = 1 : \leq 1.5

ant1 : ant2 = 1 : \geq 2

ant.2 : ant5 = \sim 1.5 : 1

bwm : m = 1 : \approx 4

bg : dg = 1. \leq 1

bg with median vein often
coiled or twisted

bs = 30 (- 35)

CS 2 strong to distinct

ES 3-5 short

MS: 3-4

PS: 5 (6)

wmg : mg = 1 : 3.5

> C. pulchellum

> node wavy bilobed ,with distinct mediotracheal
incurve and second lobe curved strongly
basalwards to border

node with endpoints distinctly shifted

bsr = 1 : 1.25-1.4

arch flat asymmetrical

ant2 : ant3 = 1 : 1.1-1.2

ant4 : ant2 = 1 : \leq 1.5

bg : dg = 1 : > 1

MS 5 (4) PS 6

smw : lo = 1 : \approx 2.5

te 2-4 laterally spiny setulated and dorsally
tufted with hairspiny and spiny setules

wmg : mg = 1 : 4-5

> C. syriacum

> MS angle narrow : 60-80°

> pronotum (lat.view) :

posterior border : pronotum = 1 : ≤ 10

anterior border : pronotum = 1 : < 15

> node wavy bilobed and with a narrow
mediotracheal incurve

node with endpoints slightly shifted

bsr = 1 : 1-1.3

bwm : m = 1 : ≈ 3.5

bwm : dwm = 1 : 1.05-1.4

> C. puella

? (unknown) > C. australocaspicum

> - *cg with node normally vertical straight
or very slightly convex, concave, oblique*

- *bsr = 1 : $\approx 1-1.1$*

- *ant: 6- segmented*

- *dg with sclerotized borders*

> - **node set far at distal half of cg**

- **bg : dg = 1 : 0.3-0.8**

- **ant4 : ant2 = 1 : 1.4-1.5**

- **ant2 : ant3 = 1 : ≤ 1.2**

- **ant5 : ant3 = 1 : ≥ 2**

- **bwm : m = 1 : < 3.5**

- **dg less constricted near node**

- **MS 3-4 PS 6**

- **m : hw = 1 : ≤ 2**

> - *MS angle $\approx 90^\circ$*

- *node vertical straight or minimally waved or bent,*

- *te 1-4 densely longhairy setulated*

- *smw : m = 1 : ≈ 6*

- *arch more symmetrically curved*

bg tracheal angle $\geq 45^\circ$
bs = $> 30 / > 10$ (lat) $> 20 / > 7$ (med)
CS 6-9 few strong ones
dwm : m = 1 : ≈ 1.2
dg blunt ovoid-tipped
ES 2-4 very short
f1 dorsal with with 3-5 very short,
but distinct mediodorsal spiny setulae
occiput dense set with shortspiny setulae
m: t3 = 1 : ≤ 1.2
m : f3 = 1 : ≤ 1.3
m : cg = 1 : < 2.5
MaS 8-9 wide set
smw : lo = 1 : ≈ 2
TeS fine short
wcg : cg = 1 : 4.5-5.5

> C. johanssoni
(=concinnum)

- > - *MS angle 70-80°***
- *node vertical slightly convex with incurve at mediotracheal crossing***
- *te 2-3 weakly hairspiny setulated***
- *smw : m = 1 : ≤ 5.5***
- *arch asymmetrically curved***

bwm : lo = 1 : ≈ 1.6
CS 7-9 strong, long
m : f3 = 1 : 1.3-1.45
m : t3 = 1 : > 1.2
m : cg = 1 : $\approx 2..5$
smw : lo = 1 : ≈ 1.8
TeS on 7-9 thickspiny setulated
wcg : cg = 1 : (4)-5

> C.ecornutum

- > - node set near or at the mid of cg**
- bg : dg $\approx 1 : 0.8 - 1.2$**

> MS angle $\geq 90^\circ$ (> 69)

> - distance from lateral border of m to MS1 :
distance between MS1-MS1 = 1 : < 2.5
- MS angle 90° - 110°

> - *lateral tracheal angle* $> 45^\circ$
- *lateral tracheation in bg and dg wide set and
without pigmentation*

- *dg near node constricted*

- *smw : m = 1 : > 4.5 (-5)*

- *wcg : cg = 1 : 6-7*

- *m : cg = 1 : ≈ 3*

ant2 : ant3 = 1 : < 1.2

ant4 : ant2 = 1 : ≈ 1.5

bwm : m = 1 : ≈ 3.5

bg : dg = 1.05-1.25 : 1

bwm : m = 1 : < 3.5

arch flat

CS 6-8 few ones

f3 : m = 1 : ≤ 1.3

m : hw = 1 : ≈ 1.5

m : t3 = 1 : 1.3-1.4

MS 4

PS 6

te 2-4 fine hairspiny setulated

> *C. glaciale*

> - *lateral tracheal angle* $\approx 30^\circ$

- *lateral tracheation in dg more dense
than in bg*

- *dg dull pigmented, less constricted near node*

- *smw : m = 1 : 4-4.5*

- *wcg : cg = 1 : 4-6*

- *m : cg = 1 : < 2.8*

ant1 : ant2 = 1 : ≈ 2

ant2 : ant4 = $\approx 1 : 1$

ant2 : ant5 = $\approx 1.5 : 1$

ant 2 : m = 1 : < 5

ant2 : ant3 = 1 : ≥ 1.2
 ant5 : ant6 = ~ 1.4 : 1
 arch small, erected
 bg : dg = 1-1.25 : 1
 bs $\approx 30 - 40 / \approx 20$
 cg tip broad blunt
 dwm : m = 1 : 1.2-1.3
 ES 3 - 5
 f1 dorsal with some rows of strong spiny setulae
 lo : bwm = 1 : 1.55-1.65
 MaS on te 8 / 9 strong
 node vertical straight , slightly concave or with
 very weak mediotracheal incurve
 occiput with narrow set, short to mediad spiny setulae
 smw : ant3+4 = 1 : ≤ 2.5
 smw : wlo = 1 : ≤ 2.5
 t3 ventral : basal half spiny setulated,
 distal half less spiny (1 - 3) setulae
 te 2 - 4 with hairspiny and spiny setulae

> **C. armatum**

- > - distance from lateral border of m to MS1 :
 distance between MS1-MS1 = 1 : ≤ 3
- MS angle 100° - 130°

- > *laterotracheal angle $\approx 45^\circ$*
- *lateral tracheae at most widely set in bg and dg*
- *smw : m = 1 : > 5*
- *arch big and elongated*

ant2 : ant3 = 1 : ≥ 1.5
 ant2 : m = 1 : 5-6
 ant3 : m = 1 : 3.5-4
 bwm : m = 1 : ≈ 4
 cg pale yellowish white, distal end blunt or circular
 ES: 6-8, strong
 node vertical straight or slightly bent convex
 smw : wlo = 1 : ≥ 2.5
 smw : ant3+4 = 1 : 2-2.5
 st 1+2+3 \approx f3
 spiny setulae on ventral occiput long and widely set
 t3 ventral distinctly spiny setulated in the distal half (4-9)

> **C. lunulatum**

> **MS angle < 90° (70°-85°)**

- > - distance from lateral border of m to MS1 :
distance between MS1-MS1 = 1 : ≤ 2.5
- lateral tracheation about same density in bg and dg
- bg : dg = ≤ 1.3 : 1
- bsr ≈ 1-1.1
- bs : ≈ 30-40 / ≈ 20
- m : hw = 1 : > 1.6
- st 1+2+3 > f3
- wcg : cg = 1 : 4-6.5
- PS: 6-7 MS 4-5
- ES : 2-5 +minute

> - *bg with lateral tracheation angled > 45°*
dg 30°- 45°

- *smw : m = 1 : < 5.5 (-4.5)*
- *fl : m = 1 : < 1.3*
- *m : hw = 1 : ≈ 2*
- *smw : ant3+4 = 1 : ≈ 2*
- *ant 3 ≈ bwm*

ant4 : ant2 = 1 : < 1.3

ant2 : ant3 = 1 : ≤ 1.2

ant2 : m = 1 : ≤ 4

bwm : m = 1 : < 3.5

cg tinged or pale with

tip narrow ovoid to conical

CS distinct, widely set

m : f3 = 1 : ≈ 1.5

male cercoids elongated

node verical straight or weakly waved

smw : lo = 1 : ≈ 2.5

st 6-8 with scattered spiny setulae

te 2-3 strongly hairspiny and spiny setulated

te 4-9 spiny setulated

> **C. lanceolatum**

> - *cg (bg+dg) with lateral tracheae angled about 30°*

- *smw : m = 1 : ≥ 5.5 (-7)*

- *fl : m = 1 : ≥ 1.3*

- *m : hw = 1 : ≈ 1.5*

- *smw : ant3+4 = 1 : 2.5-3*

- *ant3 >> bwm*

ant2 : ant3 = 1 : ≥ 1.3

ant2 : m = 1 : > 5

ant4 : ant2 = 1 : ≈ 1.1

bwm : m = 1 : > 3.5(-4.3)

cg often orange yellow tinged

with tip broadly ovoid to small circular

CS weak to minute and densely set

m : f3 = 1 : < 1.4

males cercoids short

node vertical straight or

slightly bent to concave

smw: lo = 1 : ≤ 3

spiny setulae on ventral occiput short, densely set

te 2-3 with long and fine

hairspiny or rarely with spiny setulae

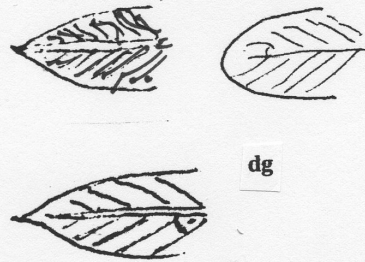
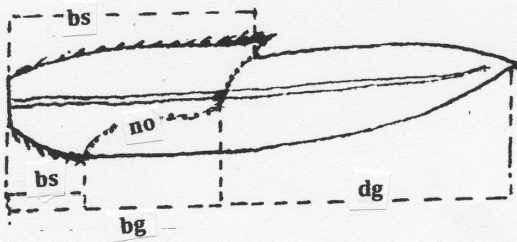
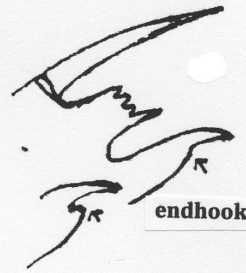
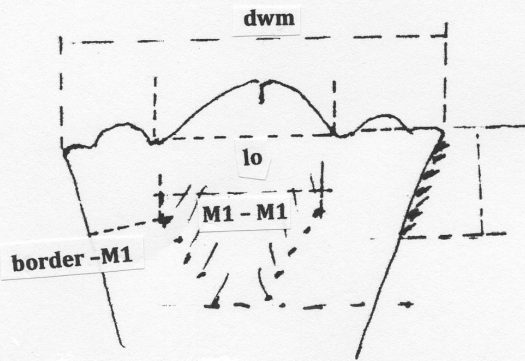
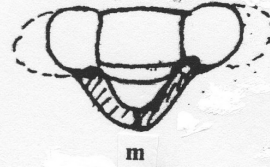
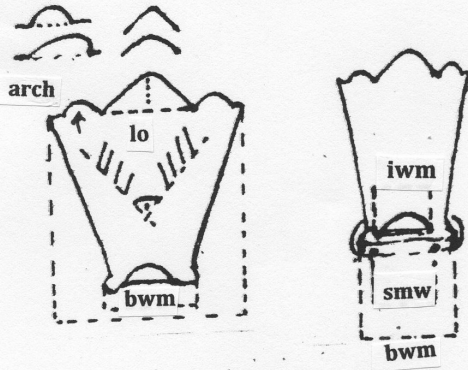
te (8) 9-10 shortspiny setulated

t3: ventral distinctly spiny setulated

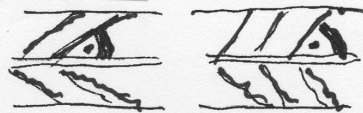
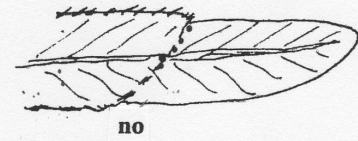
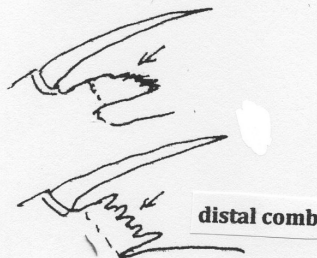
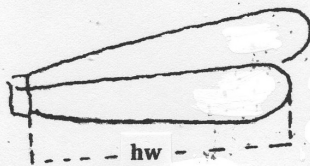
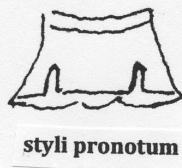
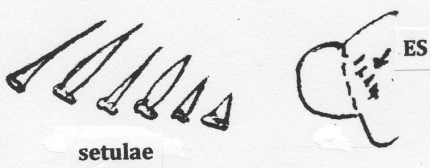
in the distal half (4-9)

> **C. hastulatum**

Coenagrionidae



mediotracheal crossing



laterotracheal angle

ANISOPTERA

Fam :

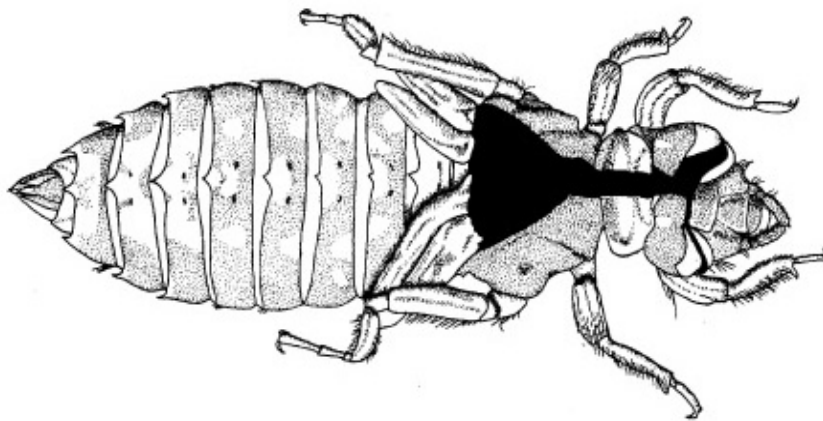
- m flat shaped in frontal view
- ligula without a cleft
- antennae (3)4 segmented with ant3 longest
- pro- and mesotarsi two-segmented
- females without ovipositor, but with paired processes

> GOMPHIDAE

(= DESMOPROCTIDA)

> LINDENIIDA

> OLIGOPHLEBIATA



- > - ABDOMEN EXTREMELY FLATTENED. LEAF-LIKE
- ant3 BROADLY FLATTENED

> *Sieboldius spec.*

(OLIGOPHLEBIATA:HAGENIIDAE)

- > - ABDOMEN IN DORSAL VIEW CIRCULAR OR VERY BROAD OVOIDE
- ant3 VERY LONG AND CYLINDRICAL (w : l = 1 : > 5)
- METATARSI TWOSEGMENTED (> 75)

- > - m **DISTINCTLY LONGER THAN WIDE**
- **ABDOMEN WITH ENDSEGMENTS CONICAL ELONGATED**

> *Sinictinogomphus clavatus*
 (E-palaeartic)
 (OLIGOPHLEBIATA: GOMPHIDAE)

- > - m **ABOUT QUADRANGULAR OR WIDER THAN LONG**
- **ABDOMEN ENDSEGMENTS NOT ELONGATED**
- **ant4 : ant3 = 1 : ≥ 9 (- 15)**

- > - *lateroscapal lobes (between antennal socket and eyes border) flat*
- *tip of py surpasses level of tip of LS 9 by far*
- *dp with an acutely shaped tip*
- *lateral eyes border at mid without a protruding process*

interscapal protrusion weakly notched at base

LS 7-9 short and not diverging

DS 2-9

genital processes (valves) in female widely separated
 te 10 not separated medially by the rim of DS 9

ant3 : m = 1 : ≈ 1.9

bwm : dwm = 1 : ≈ 1.65

bwm : m = 1 : ≈ 1.4

dwm : m = 1 : ≈ 0.85

LS 9 : pp = 1 : ≈ 2

pp : hw = 1 : ≈ 4

pp : m = 1 : ≈ 2

wlo : dwm = 1 : ≈ 2.35

> *Lindenia tetraphylla* (LINDENIIDA)

- > - *lateroscapal lobes slightly protruding and set with a fine and dense hair d brush*
- *tip of anal pyramid surpasses mostly level of tip of LS 9*
- *dp strongly narrowing to tip*
- *lateral eyes border at mid with a protruding process*
- **te 9 hindborder incurves directed lateralwards**
 (distance between outer borders of incurves is
 wider than distance between tips of LS9)

- abdomen very broad and more circular
- interscapal protrusion less expressed and basal widely notched
- LS 7/8 mostly converging or straight
- sulcus of m (inside) fenced domeshaped by a dense field of hairspiny setulae
- lo : distance lo - lateral border of m = 1 : > 1
- lo with short, slender, thick and truncate spiny setulae and lateral tufts of hairs
 - (l of spiny setulae : wlo = 1 : ≥ 12)
 - bwm : dwm = 1 : ≈ 1.4
 - bwm : m = 1 : ≈ 1.5
 - dwm : m = 1 : ≥ 1
 - wlo : dwm = 1 : ≈ 2.8

> *Ictinogomphus spec.*
(palaeotropic)
 (OLIGOPHLEBIATA: GOMPHIDAE)

I. fraseri, ferox, rapax, pertinax
 differring by LS, DS,
 structure of pronotum, procoxae,
 and occipital tubercles)

- > similar to *Ictinogomphus* but smaller
 abdomen circular shaped
 LS converging
 thorax elongated (wingcases surpassing half of the abdomen)
 (after Chelmick)

(not available) > *Diastatomma spec.*
(afrotropic)
 (OLIGOPHLEBIATA: GOMPHIDAE)

- > - lateroscapal lobes broadly angled forwards and set with an upwards erected hairy and spine hooked brush
- tip of anal pyramid reaches about level of tip of LS 9
- dp nearly straight and slightly narrowed to a blunt or curved tip
- lateral eyes border at mid with a blunt process

> LS 4-6 absent or weakly developed and not diverging,
 when compared with LS 7-9

- te 9 hindborder incurves directed apicad (distance between outer borders of incurve is not wider than distance between tips of LS 9)
- interscapal protrusion well expressed and basally deeply notched
- genital processes in females tubercleshaped, doublehollowed and

- sulcus of m (inside) parallel fenced by fine and short hairspiny setulae **not separated**
- lo with long and slightly fanshaped setulae surpassing level of hairy seam (l of spines : wlo = 1: ≤ 8)
- wlo : distance from lo - lateral border of m = 1 : ≤ 1
- LS 7/8 mostly strong and diverging
- DS (2)3-(8)9
- bwm : m = 1 : ≥ 1.6

> *Gomphidia spec.*
(palaeotropic/E-palaeartic)
(OLIGOPHLEBIATA: GOMPHIDAE)

G. bredoi, quarrei, gamblesi, t-nigrum,
confluens, kruegeri, kellogi
differing by DS, LS, structures of
pronotum, procoxae, occipital tubercles)

> **LS 3-9 strongly developed and diverging**

- lateroscapal lobe with brush with strongly erected, spinehooked borders
- DS 2-10
- interscapal protrusion strong and deeply splitted

> *Gomphidictinus perakiensis*
(asiatic)
(OLIGOPHLEBIATA: GOMPHIDAE)

- > - **ABDOMEN ELONGATED, SLENDER FLATTENED TO CYLINDRICAL**
- ant3 **CYLINDRICAL OR FLATTENED, REL. SHORT**
(w: l = 1 : ≤ 5)
- **METATARSI 3- SEGMENTED**

- > - **PALPUS WITH A STRONGLY OR SLIGHTLY INCURVED PALPAL HOOK AND WITH A DISTINCT ENTHOOK**
- **ABDOMEN MORE OR LESS DEPPRESSED AND ELONGATED (> 83)**

> GOMPHIDAE
(OLIGOPHLEBIATA: GOMPHIDAE)

> LOBE OF m HIGHLY ERECTED AND WITH A DEEP
MEDIAN INCURVE („BILOBED“)

gen. ANORMOGOMPHUS
(GOMPHINAE)

LS 5-9 fine and converging

palpal hook broad and softly curved

m elongated, approx. rectangular shaped

lateroscapal lobe small with knob downwards

ant3 : f 1 = 1 : \approx 2

ant3 : m = 1 : \approx 3

bwm : dwm = 1 : $<$ 1.8

bwm : m = 1 : \geq 2.2

bpm : dpm = 1 : \approx 2

dwm : m = 1 : \approx 1.25

f1 : m = 1 : \approx 1.4

lo : dwm = 1 : \approx 3

lo : m = 1 : $>$ 3.3

m : hw = 1 : \approx 1.3

pp : m = 1 : \leq 4

pp : hw = 1 : \approx 5

st10 : m = 1 : \approx 4

> Anormogomphus kiritchenkoi

> LOBE OF m FLAT OR SLIGHTLY CONVEX

> - m DISTINCTLY LONGER THAN dwm, LOOKING APPROX.
RECTANGULAR SHAPED

- NO DISTINCT TIBIAL BORROWING HOOKS

- dwm : m = 1 : $>$ 1.2

- lo : m = 1 : $>$ 3.5

gen. STYLURUS (GOMPHINAE)

- inner knee of palpus (at begin of incurve) flatcurved to nearly absent,
- ibp (inner basal palpus) : obp (outer basal palpus) = 1 : \approx 4
- dp (= outer distal palpus) : obp = 1 : $>$ 3.5
- ibp : ph (palpal hook / incurve) = 1 : 3-3.5
- dp : dwp (incl endhook) = 1 : \approx 3
 - lateral borders st 8/9 not serrate
 - lateroscapal lobe flat, scarcely visible
 - smw : m = 1 : \geq 3
 - m : distal border of te10 = 1 : \ll 1
 - pp : st9+10 = 1 : \leq 4
 - LS 6-9

> *pp : bw of st10 = 1 : ≈ 1.5*
want4 : ant4 = 1 : ≈ 2
ant4 : ant3 = 1 : ≥ 9

m : hw = 1 : ≈ 1.5
pp : m = 1 : ≈ 4
st9 : bw of st9 = 1 : > 1.6
short mediodorsal spine on te9
palpal teeth deeply serrated
length of abd > 23 mm

> **Stylurus flavipes**

> *pp : bw of st10 = 1 : ≈ 2*
want4 : ant4 = 1 : ≈ 4
ant4 : ant3 = 1 : ≤ 7

m : hw = 1 : ≈ 1.25
pp : m = 1 : ≈ 5
st9 : bw of st9 = 1 : < 1.5
mediodorsal spine on te9 rudimentary
palpal teeth weakly serrated
length of abdomen : ≤ 20 mm

> **Stylurus ubadschii**
(= *St. f. lineatus*)

- > **m NOT OR SCARCELY LONGER THAN *dwm***
LOOKING ABOUT QUADRANGULAR SHAPED
 - **WITH DISTINCT TO STRONG TIBIAL BORROWING HOOKS**
 - ***dwm* : m = 1 : < 1.15**
 - **lo : m = 1 : ≈ 3**

- > - ***palpal hook very weakly incurved and nearly straight at inside***
 - ***inner border of palpal hook deeply serrated and with a strong end-tooth at tip***

- > ***without DS***
endsegments short and wide
st10 : dw of st9 = 1 : ≈ 2.5
lateroscapal lobe with tip (knob) downwards

ant4 : ant3 = 1 : ≈ 10
ant2 : ant3 = 1 : ≈ 5
bwm : *dwm* = 1 : ≤ 2
bwm : m = 1 : ≈ 2
***dwm* : m = 1 : ≈ 1**
lo of m flat

lo : dwm = 1 : \approx 2.55
st10 : hw = 1 : $>$ 5
st10 : m = 1 : \approx 3.2
st10 : st 9 = 1 : \approx 2
smw : m = 1 : \approx 2.5

> *Anisogomphus maacki*
(E-palaeartic)
gen. ANISOGOMPHUS
(GOMPHINAE: ANISOGOMPHINI)

> with distinct DS (5)7-9
endsegments narrowed, elongated
st10 : dw of st9 = 1 : \leq 1

occiput corners with tubercles
lateroscapal lobe flat
palpal hook wide and flatcurved
st10 about quadrangular or elongated

> *Trigomphus nigripes*
(E-palaeartic)
gen. TRIGOMPHUS
(OCTOGOMPHINAE: TRIGOMPHINI)

> - palpal hook wide or narrow incurved and with
a weak or strong endhook

- st10 : dw of st9 = 1 $>$ 1.5
 - smw : m = 1 : $<$ 2.4
 - m : dw of te10 = 1 : \geq 1
 - dp : dwp (incl endhook) = 1 : $<$ 2.5
 - ibp : palpal hook = 1 : $<$ 3
 - ibp : obp = 1 : \leq 2.5
- lateroscapal lobe flat

> gen. GOMPHUS / SHAOGOMPHUS
(GOMPHINAE: GOMPHINI)

- > - endsegments of abdomen wide
 - st10 : hw = 1 : \geq 5.5
 - st10 : m = 1 : $>$ 3.5
 - te10 : dw of st9 = 1 : $>$ 1.5

> LS 7-9

- want3 : ant3 = 1 : \approx 3.5
- median sclerite of st7 - l : w = 1 : \leq 1.4

LS 9 : st 9 = 1 : 4-5

LS 8 : LS 9 = 1 : $<$ 1.7

st9 : m = 1 : \geq 1.5

st10 : bw of st10 = 1 : \geq 1.8

te9 : hw = 1 \geq 3

l of exuv.: 26 mm (\pm 3);

- m - distance of the basal tubercles (submental joints) :
distance of the distal tubercles (palpal joints)
= 1 : \approx 1.7
- palpal incurve - depth : w (between knee and tip
of endhook) = 1 : \geq 4
- palpal hook with 6-7 flat teeth
- dp from its beginning (at base of movable hook) with
continuously narrowing borders softly curved
downwards to endhook
- female genital processes : long and narrow valves with
outer borders nearly vertical and with a
rectangular incision between both valves,
contacting inside only at basal third.

> G. schneideri

> - LS 6-9

- want3 : ant3 = 1 : \approx 4
- median sclerite of st7- l : w = 1 : \geq 1.45

> te8 without a mediocarinal spiny tubercle
palpal hook with 8-11 flat teeth

LS 9 : st9 = 1 : 5-6

LS 6 : st6 = 1 : $>$ 8

LS 9 reaching not more than half the length of st10

st10 : bw of st10 = 1 : $<$ 1.75

l of exuv: 28 mm (\pm 3)

- m - distance of the basal tubercles (submental joints) :
distance of the distal tubercles (palpal joints) = 1 : \approx 1.8

> G.vulgatissimus

> te8+9 with a distinct mediocarinal spiny tubercle
palpal hook with 8 -13 distinctly serrated teeth,
with incurve slightly elongated

gen.SHAOGOMPHUS

LS 9 : st9 = 1 : \approx 3.5
LS 6 : st6 = 1 : \approx 5
LS 9 reaching at least 2/3 of the length of st10
st10 : bw of st10 = 1 : \leq 2
l of exuv : 31 mm (\pm 3)
- m- distance of the basal tubercles (submental joints) :
distance of the distal tubercles (palpal joints) = 1 : \approx 1.9

> Shaogomphus postocularis epophthalmus

>- *endsegments of abdomen slender to narrow*

- st10 : hw = 1 : \leq 5
- st10 : m = 1 : \leq 3
- st10 : dw of st9 = 1 : $<$ 1.5
- LS 7-9

> palpus with knee distinctly angled

palpal hook - depth : w = 1 : \leq 3
ibp : palpal hook = 1 : \leq 2

> ep : st9+10 = 1 : 2.5-3

pp : st9+10 = 1 : $>$ 3

st10 : pp = 1 : \leq 1

LS 9 : st9 = 1 : 5-7

- mediocarinal spine on te9 distinct, on te8 rudimentary
- female genital processes: valves short, triangular shaped, with outer borders oblique and with a triangular, notchlike incision between valves
- dp at basal third approx. parallel bordered and then strongly curved downwards
- genital print on st2 (anterior lamina) in males with two elongated beanshaped tubercles

ant4 : ant3 = 1 : $>$ 14

ant4 : want4 = 1 : \approx 1

LS 8 : LS 9 = 1 : \geq 2

m : hw = 1 : \approx 1.65

pp : m = 1 : \leq 3

pp : bw of st10 = 1 : \approx 1.5

st9 : m = 1 : $<$ 1.4

st9 : bw of st9 = 1 : \approx 1.1

st10 : dw of st9 = 1 : \approx 4

te9 : hw = 1 : $<$ 2.8

te10 : smw = 1 : $>$ 1.5

l of exuv : 29 mm (\pm 3)

> G. davidi

- > ep : st9+10 = 1 : < 2.4
- pp : st9+10 = 1 : \approx 2
- st10 : pp = 1 : \geq 1.2

ant4 : ant3 = 1 : \approx 11
 dw of st10 : dw of st9 = 1 : > 2.2
 LS 9 : st9 = 1 : < 2
 LS 8 : LS 9 = 1 : < 1.5
 pp : m = 1 : > 2.5
 pp : bw of st10 = 1 : \leq 1.5
 st9 : bw of st9 = 1 : > 1
 genital print st2 in males (anterior lamina) with two
 small and shortoval tubercles
 gen.processes in females with valves shorttriangular
 and narrow set

> G. graslini

- > - palpus with knee blunt to flat curved
- palpal hook - depth : w = 1 : \geq 3.5
- pp : st9+10 = 1 : < 2.5

- > -- ibp : palpal hook = 1 : \approx 2
- palpal hook - depth : w = 1 : \approx 4.5
- dp > ibp
- lateral borders of endsegments narrowing concave
to anal pyramid

dw of st10 : dw of st9 = 1 : \leq 2
 st9 : bw of st9 = 1 : < 1
 st9 : st10+pp = 1 : \approx 1.1
 st10 : pp = 1 : \leq 1
 st10 : m = 1 : \approx 2.2 (\leq 2.5)
 st10 : hw = 1 : \approx 3.5
 st9 : st10 = 1 : \ll 2
 gen.processes in female with valves very short,
 semicircular and widely set
 - mediocarinal spine on te9 distinct, on te8 rudimentary

> G. pulchellus

- > - **ibp : palpal hook = 1 : > 2**
- **dp \approx ibp**
- **lateral borders of endsegments narrowing conical to anal pyramid**

dw of st10 : dw of st9 = 1 : > 2.2
st9 : st10+pp = 1 : < 1
st10 : m = 1 : \geq 3
st9 : bw of st9 = 1 : > 1
st10 : pp = 1 : > 1.1
st9 : st10 = 1 : \approx 2

- > **st10 : hw = 1 : \approx 4.5**
- st10 : pp = 1 : \approx 1.5**
- LS 9 reaching about 1/3 of st10**
- lo about straight with transverse row of hairs in same length**
- pp : ft3 = 1 : \approx 2.5**
- gen. processes in females with valves long, constricted and with diverging tips**
- palpal hook- depth : w = 1 : \approx 3.5**
- mediocarinal spine on te9 absent**

> **G.lucasi**

- > **st10 : hw = 1 : \approx 5.7**
- st10 : pp = 1 : \approx 1.2**
- LS 9 surpassing 1/2 of st10**
- lo slightly convex with a curved row of hairs decreasing in length lateralwards**
- pp : ft3 = 1 : < 2.5**
- gen. processes in females with valves long, straight and narrow set**
- palpal hook - .depth : w = 1 : \approx 4.5**
- mediocarinal spine on te9 very weak or absent**

> **G.simillimus**

- > - PALPUS WITHOUT A PALPAL HOOK AND WITHOUT AN ENTHOOK
- dp STRAIGHT, PARALLELSIDED OR CONICAL NARROWED AND WITH A BLUNT, SEMICIRCULAR DISTAL TIP
- ABDOMEN LESS DEPRESSED AND LOOKING MORE CYLINDRICAL
- ant3 MORE OR LESS FLATTENED
- LATEROSCAPAL LOBES WITH PROTRUDING OR SWOLLEN TIPS (KNOBS)

> ONYCHOGOMPHINAE

- > - LOBE OF m HIGHLY ERECTED, LOOKING SEMICIRCULAR OR DOMESHAPED
- ANAL PYRAMID LONG AND SLENDER
 - LS 2/3/4 - 9
 - lateroscapal knobs small and directed downwards
 - ant4 long and fine
 - smw : m = 1 : ≥ 3
 - smw : dwm = 1 : ≥ 2.3
 - l of exuv : $\approx 22-28$ mm (> 86)

> gen. PARAGOMPHUS

- > *ep* << *ce*
 - *bw of te10 : ep* = 1 : ≥ 1.5
 - *bw of ant4 : ant4* = 1 : ≈ 3
 - *te10 : pp* = 1 : ≥ 3.9

ant4 : m = 1 : ≈ 3.2
 ant4 : ant3 = 1 : > 3.5
 ant4 : wep = 1 : > 3
 ep : py = 1 : ≈ 1.2
 hlo : lo = 1 : ≈ 4
 hairs : lo = 1 : > 12
 lo : dwm = 1 : ≈ 2.5
 LS (2) 4 -9
 wep : ep = 1 : < 2.5

> P.sinaiticus

> $ep \geq ce$

- $bw\ of\ te10 : ep = 1 : < 1.4$
- $bw\ of\ ant4 : ant4 = 1 : 4-6$
- $ep : py = 1 : \approx 1$

- > $te10 : pp = 1 : < 3.5$
- $hlo : lo = 1 : > 3$

> LS : (4) 6-9

hairs of lo : lo = 1 : ≤ 12

ant4 : m = 1 : ≈ 2.8
ant4 : ant3 = 1 : ≈ 3
ant4 : bwep = 1 : $<< 3$
bw of ant4 : ant4 = 1 : ≈ 6
hlo : ant4 = 1 : ≈ 3.5
lo : dwm = 1 : ≈ 2
wep : ep = 1 : > 2.5

> P. pumilio

> LS ((2) 4-9

hairs of lo : lo = 1 : ≈ 15

ant4 : m = 1 : < 3
ant4 : lo = 1 : > 2.5
bw of ant4 : ant4 = 1 : ≈ 5
dwm : m = 1 : < 1.3
ep : hw = 1 : ≤ 2
hairs of lo : hlo = 1 : ≈ 5
lo : m = 1 : ≈ 2.5
LS 9 : st9 = 1 : < 5
smw : m = 1 : ≈ 3
smw : dwm = 1 : ≥ 2.5
st10 : pp = 1 : ≥ 1.5
te10 : ep = 1 : ≈ 3
te10 : wep = 1 : ≥ 1.25

> P. genei

- > $te10 : pp = 1 : \leq 3$
- $hlo : lo = 1 : \leq 3$

> LS 2(3) -9

hairs of lo : lo = 1 : ≤ 10

> lo domeshaped
ep : m = 1 : \approx 1.2
ant4 : ant3 = 1 : \leq 3.5
ant4 : m = 1 : 7-8

ant4 : lo = 1 : \approx 2
bw of ant4 : ant4 = 1 : \approx 4
bwm : dwm = 1 : \geq 2
dwm : m = 1 : \geq 1.35
ep : hw = 1 : $>$ 2.15
hairs of lo : hlo = 1 : \approx 3
lo : m = 1 : $>$ 3
lo : ep = 1 : $<$ 3
lo : dwm = 1 : \approx 2.5
LS 9 : st9 = 1 : $>$ 5
smw : m = 1 : $>$ 3.2
smw : dwm = 1 : \leq 2.4
st10 : pp = 1 : $<$ 1.45
te10 : wep = 1 : \approx 1
te10 : ep = 1 : \leq 2.6
wep : ep = 1 : \approx 2.3

> P. lineatus

> lo semicircular
ep \approx m
ant4 : ant3 = 1 : 5-6
ant4 : m = 1 : 11-12

ant4 : lo = 1 : \approx 3
bwm : dwm = 1 : \approx 1.5
ce : ep = 1 : \approx 1.25
hairs of lo : hlo = 1 : \approx 2.5
lo : dwm = 1 : \geq 3
lo : ep = 1 : \approx 4
lo : m = 1 : $>$ 4
LS 3-9
st10 : pp = 1 : \geq 1.6
te10 : ep = 1 : $>$ 2.6
wep : ep = 1 : \approx 3

> *P. nyasicus*
(afrotropic)

- > - LOBE OF m SLIGHTLY TO DISTINCTLY CURVED CONVEX
- ANAL PYRAMID SHORT TO MEDIAD

- > - $st10 : st9 = 1 : \geq 1.7$
- m WITH BASAL BORDER WIDE MID - ANGLED (ABOUT 160°)
- LATEROSCAPAL LOBES SLIGHTLY PROTRUDING DOWNWARDS
- WITH MEDIODORSAL ABDOMINAL TUBERCLES

- > - $ep : hw = 1 : < 2.5$
- $want3 : ant3 = 1 : > 4$
- $dwm : m = 1 : \geq 1.3$
- $bwm : m = 1 : > 2.2$

ant4 short and thick
 bpm : dpm = 1 : ≈ 2.3
 LS 6-9
 lo : dwm = 1 : ≤ 2.4
 lo : m = 1 : ≥ 3.2
 m : hw = 1 : ≈ 1.35
 st10 : st9 = 1 : ≈ 1.8

> *Nihonogomphus ruptus*
 (E-palaeartic)
 gen. NIHONOGOMPHUS

- > - $ep : hw = 1 : \geq 3$
- $want3 : ant3 = 1 : \leq 3.8$
- $dwm : m = 1 : \approx 1.1$
- $bwm : m = 1 : < 2 (1.7-1.8)$
- *pronotum with a short eggshaped scar*
 - $bwm : dwm = 1 : \approx 1.55$
 - $lo : dwm = 1 : \approx 2.55$
 - LS 5/6/7/8 - 9
 - $st8 < st9$
 - $st10 : st9 = 1 : \approx 2$

> gen. OPHIOGOMPHUS

>- LS 5-9

- LS 9 : st9 = 1 : $\ll 3$
- ce : ep = 1 : < 1.2

> *O. reductus*

>- LS 7-9
- LS 9 : st9 = 1 : ≥ 4

> ce : ep = 1 : < 1.2
ce : m = 1 : < 2

want3 : ant3 = 1 : ≥ 3.5
LS 9 : st9 = 1 : ≈ 4
median sulcus of m wide

> *O. spinicornis*

> ce : ep = 1 : ≥ 1.25
ce : m = 1 : ≈ 2.5

> want3 : ant3 = 1 : ≥ 3
lo of m flat- hlo : lo = 1 : ≈ 5.5
LS 9 : st9 = 1 : ≈ 5

ant4 slender
pp > st 10
pp : st7 = 1 : < 1.3
st8 : st9 = 1 : ≥ 1.15

> *O. cecilia*

> want3 : ant3 = 1 : ≤ 2.8
lo of m erected- hlo : lo = 1 : ≈ 4
LS 9 : st9 = 1 : > 8

ant4 broad triangular
pp < st10
pp : st7 = 1 : ≥ 1.3
st8 : st9 = 1 : < 1.1

> *O. obscurus*
(*E-palaeartic*)

> - st10 : st9 = 1 : ≈ 1.5
m WITH BASAL BORDER NARROW MID-ANGLED (ABOUT 120°)
LATEROSCAPAL LOBES STRONGLY PROTRUDING FORWARDS
LS (6)- 7 - (8) - 9
PRONOTUM WITH AN ELONGATED CONICAL SCAR

> gen. ONYCHOGOMPHUS

> *dwm : m = 1 : ≥ 1.3*
bpm elongated (bpm: dpm = 1: < 1.5)
lo : m = 1 : > 3.1
ant: 3-segmented (4 melted with 3)

abdomen long conical and cylindrical
ant1+2 : ant3 = 1 : ≈ 3
bwm : dwm = 1 : ≥ 1.5
bpm : dwm = 1 : ≤ 2
ep : f1 = 1 : ≤ 1.2
ep : m = 1 : ≈ 1.66
ep : hw = 1 : < 3
f1 : m = 1 : ≈ 1.25
lo with 30 (±4) teeth
lo : dwm = 1 : ≥ 2.5
lo : bpm = 1 : ≈ 1.3-1.4
LS 7- 9 blunt or tubercular
m : hw = 1 : ≈ 1.7
mediodorsal tubercles of abdomen weak and flat
smw : m = 1 : > 3 (-3.5)
smw : dwm = 1 : ≈ 2.5
st10 : pp = 1 : ≈ 1.8
te10 : ep = 1 : ≤ 3
want3 : ant3 = 1 : ≤ 3

> *O. assimilis*
(in larval view it could belong
to a gen.nov)

> *dwm : m = 1 : < 1.2*
bpm short (bpm : dpm = 1 : > 1.5)
lo : m = 1 : < 3
ant: 4-segmented

> *ant3 conical diverging apicad*
at distal end about 1.5-2 times the width of the bw

hair of lo : lo = 1 : ≈ 5
lo : pp = 1 : ≥ 1.25

lo : dwm = 1 : > 2.1
smw: lo = 1 : ≥ 1.1
st10 hindborder waved
lateroscapal lobe distal flattubercular
less narrowed near scapal socket border

ant1+2 : 3 = 1 : ≤ 3
 ant1: ant3 = 1 : 5.5-6
 ant3 : hw = 1 : ≤ 3.2
 ant3 : m = 1.: < 2.2
 ant4 : ant3 = 1 : 9-10
 bpm : dwm = 1 : > 2.2
 bw of ant3 : dw of ant3 = 1 : > 1.7
 bwm : m = 1 : < 2.5 (> 2.1)
 bwm : dwm = 1: ≈ 1.7 ($\ll 2$)
 ce : hw = 1 : ≈ 3
 ep : m = 1 : < 2
 ep : hw = 1 : 2.4- 2.8
 ep : f1 = 1 : > 1.25
 f1 : m = 1 : > 1.4
 lo : bpm = 1 : ≈ 1
 lo with $\approx 24(\pm 2)$:teeth
 LS 7-9 strong
 m : hw = 1 : ≤ 1.5
 m weakly necked
 mediodorsal abdominal tubercles weak
 pp : m = 1 : ≈ 2
 pp : hw = 1 : ≤ 3
 st10 : pp = 1 : > 1.8
 te10 : ep = 1 : ≥ 3.5 (-4.5)

> O. flexuosus

> *ant3 about same width at basal
 and distal end (1: < 1.4)*

> *want3 : ant3 = 1 : ≈ 3.5*

hair of lo : lo = 1 : ≈ 5
 lo < pp

lo : dwm = 1 : ≥ 2.5
 st10 : pp = 1 : > 1.6
 smw : lo = 1 : < 1
 bwm : dwm = 1 : ≈ 1.7 ($\ll 2$)
 lateroscapal lobe distal curved,
 not narrowed near scapal socket border
 st10 hindborder narrowcurved at mid
 ant1 : ant3 = 1 : 3.5-4
 ant4 : ant3 = 1 : ≥ 10
 ant3 : m = 1 : ≥ 2.2

ant3 : hw = 1 : > 3.5
bwm : m = 1 : ≤ 2
ce : hw = 1 : ≤ 3.7
ep : m = 1 : ≈ 2
ep : hw = 1 : > 3.2
f1 : m = 1 : ≤ 1.3
iwm : m = 1 : < 2.9
mediodorsal abdominal tubercles
weak to distinct
m necked
LS 7-9 short
pp : m = 1 : ≤ 2.4
smw : m = 1 : ≤ 2.5
te10 : ep = 1 : ≤ 2.5
wlo : bwm = 1 : ≥ 1.5

> O. costae

> want3 : ant3 = 1 : ≈ 2.5-3.3 (> 93)

> hair of lo : lo = 1 : ≥ 10
lo ≈ pp

> want3 : ant3 = 1 : ≈ 3
ant1 : ant3 = 1 : ≤ 5
bwm : m = 1 : > 2
bm flatcurved
lateroscapal protrusion waisted
with neck distinctly constricted near
scapal socket border
st10 hindborder wavy
ant1+2 : ant3 = 1 : < 2.7
ant3 : hw = 1 : ≥ 3.5
ant3 : m = 1 : ≈ 2.5
ant4 : ant3 = 1 : ≈ 10
ce : hw = 1 : > 3.8
bwm : dwm = 1 : ≤ 2
ep : m = 1 : ≥ 2
ep : hw = 1 : ≈ 3.5
f1 : m = 1 : > 1.3
iwm : m = 1 : ≥ 2.9
lo : ant3 = 1 : ≤ 1.2
lo : dwm = 1 : < 2.5
lo flat circular curved
m slightly necked

pp : m = 1 : \geq 2.5
st 10 : pp = 1 : \leq 1.5

smw : lo = 1 : \geq 1
smw : m = 1 : $>$ 2.6
te 10 : ep = 1 : $<$ 3
st3 ham print narrow domeshaped
with distal tips narrowed.
lam ant. st2 ovoide shaped
gon fem : valves flat triangular with lateral elongations
and mid cavation flat bowlshaped
or wide angled (h:w = 1: \approx 4)

> O. forcipatus

> LS 6 present, sometimes small or blunt tubercular
dorsal tubercles distinct and well visible on te 4-7

> O.f.forcipatus

> LS 6 absent or seldom with minuite rudimentary tubercle

> dorsal tubercles erected especially on te 4-7
LS 7-9 strong, about 1/3 -1/6 of st

> O.f.unguiculatus

> dorsal tubercles flat or very weakly expressed
and on te 4-7 nearly absent
LS 7-9 weak, about 1/5-1/9 of st

> O.f.albotibialis

> want3 : ant3 = 1 : \approx 2.5

ant1 : ant3 = 1 : $>$ 6

bwm : dwm = 1 : $>$ 2.1

bm with small or big median incision,
looking flat trianguar

lateroscapal protrusion flattened and distal curved,
not constricted near scapal socket border
st10 hindborder flat and wide triangular

ant1 : ant4 = 1 : \approx 0.7

ant1+2 : ant3 = 1 : $<$ 3

bwm : m = 1 : $>$ 2

bwm : hw = 1 : $>$ 4 (-4.4)

ce : m = 1 : \approx 2.4
ce : hw = 1 : \approx 4
ep : f1 = 1 : \geq 1.5

ep : hw = 1 : $>$ 3.5
LS 7-9 short acute
LS 9 : st9 = 1 : 6-7
LS 8 : st8 = 1 : \approx 8
lo : dwm = 1 : \leq 2.5
lo flatcurved to flattriangular,
lo with 28-30 small teeth, lateralwards decreasing
m : hw = 1 : \approx 1.75
m conical
mediodorsal abdominal tubercles weak to very weak
pp : m = 1 : \approx 2.5
pp : hw = 1 : $>$ 4
st10 : pp = 1 : \leq 1.3
te10 : ep = 1 : $<$ 2.8
wlo : bwm = 1 : $>$ 1 (1.1-1.3)
gon fem: valves triangular without distinct lateral
 elongations and with mid cavation acute
 triangularely incised (h: w = 1 : \approx 2-3)
st3 ham print broad domeshaped with distal tips blunt and
 well separated , lam.ant st2 trapeziode shaped

> O. lefebvrei

> hair of lo : lo = 1 : 4-6
lo : pp = 1 : \leq 1.5

> want3 : ant3 = 1 : \leq 2.5
ant1 : ant3 = 1 : $<$ 4.5
ce : hw = 1 : $<$ 3.5
ep : hw = 1 : $<$ 3
pp : hw = 1 : \leq 3.5
lateroscapal protrusion distal about straight
only weakly narrowed at scapal socket border,
st10 hindborder widecurved
mediodorsal abdominal tubercles weak, flat,
ant4 : ant3 = 1 : $>$ 11
ant1+2 : ant3 = 1 : \geq 3
ant4 short, narrow
bwm : hw = 1 : \leq 3
bwm : m = 1 : $<$ 1.9
bwm : dwm = 1 : $<$ 2

ep : m = 1 : \approx 1.75
ep : f1 = 1 : < 1.3

lo with < 28 teeth
lo : dwm = 1 : > 2.5
m : hw = 1 : \approx 1.55
pp : m = 1 : \leq 2.1
st10 : pp = 1 : > 1.5
te10 : ep = 1 : \geq 3

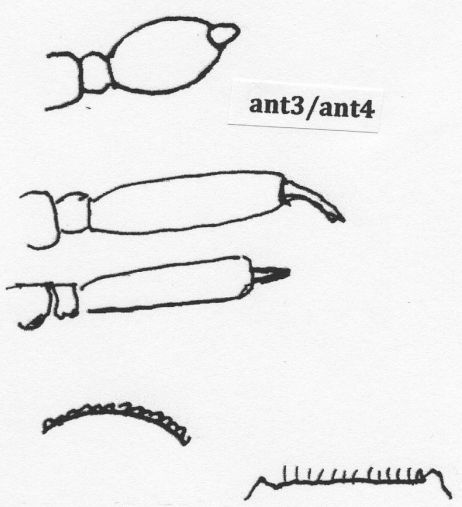
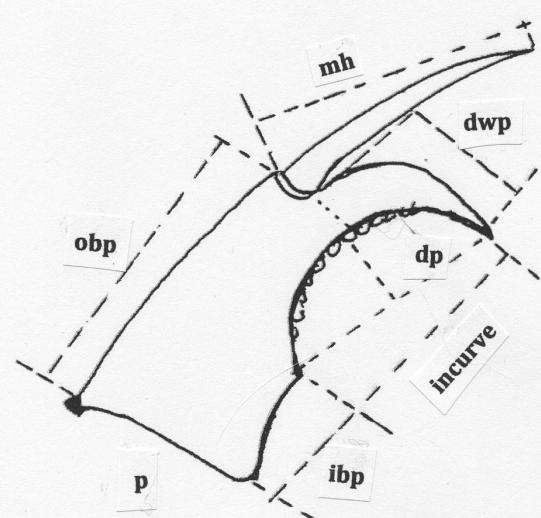
> **O. macrodon**

> *want3 : ant3 = 1 : \leq 2.2*

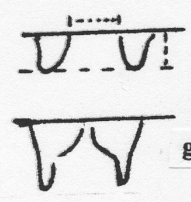
ant1+2 : ant3 = 1 : \approx 2
pp : hw = 1 : \approx 4
lo : pp = 1 : \approx 1
hair of lo : lo = 1 : 7-8
mediodorsal abdominal tubercles
strong and erected

ant4 broad, flat
bwm : dwm = 1 : \leq 2
bwm : m = 1 : \leq 2
ce : hw = 1 : > 3.4
ep : f1 = 1 : \geq 1.3
ep : m = 1 : \approx 2
ep : hw = 1 : \geq 3
LS 8-9 blunt
lo with 22-24 teeth
pp : m = 1 : > 2.3
st10 : pp = 1 : \leq 1.5
te10 : ep = 1 : \leq 3.2

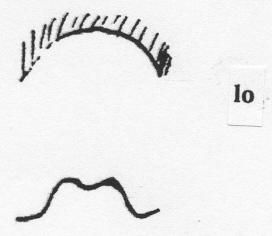
> **O. uncatus**



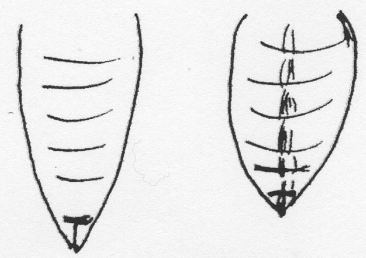
Gomphidae



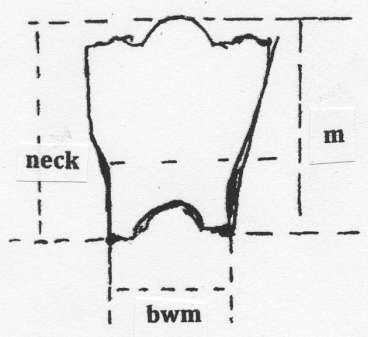
gon valves



lo



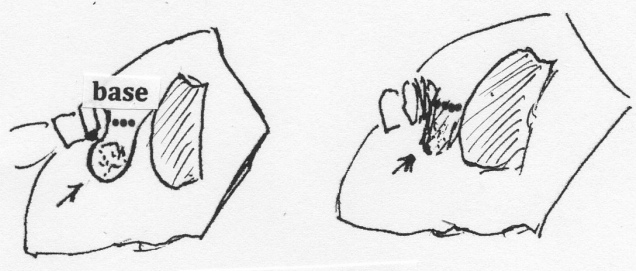
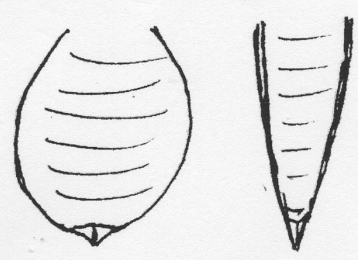
abdomen



neck

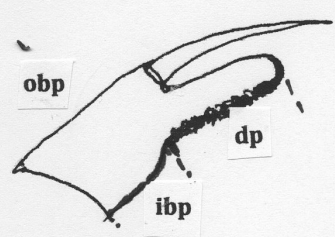
m

bwm



base

lateroscapal lobe



obp

dp

ibp

Fam.

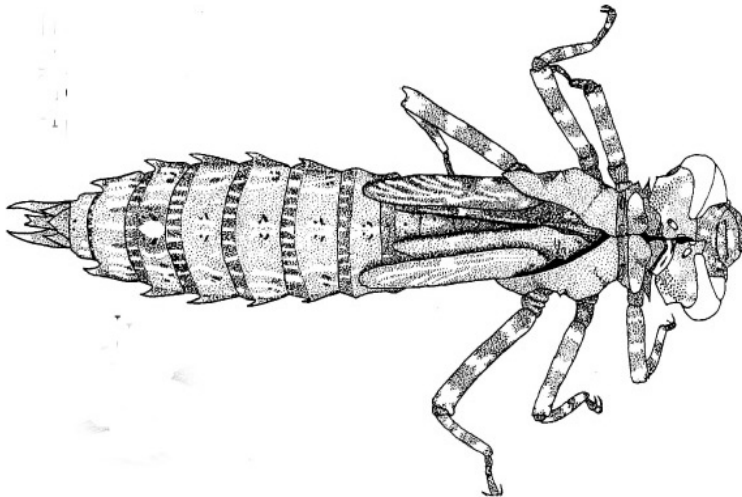
- m flat shaped in frontal view
- lo of m with a median cleft
- antennae 5-7 segmented
- females with a strong ovipositor
- mh inside with a row of hairy or hairspined setulae

> AESHNIDAE

(= EUSAESHNODEA)

> BRACHYTRONIDAE

> AESHNOIDEA



- > - EYE 2/3 -3/4 THE LENGTH OF HEAD
- HINDBORDER OF EYES AND OCCIPUT NEARLY STRAIGHT OR ONLY WEAKLY INCURVED
- LEVEL OF MEDIOFRONTAL OCCIPITAL BORDER SURPASSES LEVEL OF LATEROFRONTAL OCCIPITAL BORDER BY FAR
- RP2 CURVED DOWN NOT BEFORE DISTAL HALF OF PT
- RSPL BENT DISTINCLTY U P W A R D S (> 103)

> ANACINI

- > - EYES ABOUT 3/4 THE LENGTH OF HEAD
- LENGTH OF LATERAL OCCIPUT : LENGTH OF EYE
= 1 : > 2.5
- EYES LESS PROTRUBERENT LATERALLY
- WINGCASE : RP2 - TOP DISTAD pt WITH A
SMALL TUBERCULAR EXTENSION (> 100)

> ANAX

- > m LONG (bwm : m = 1: 3-4 / bwm : dwm = 1 : > 2)
hw WITH 2 ROWS OF CELLS IN ANAL LOOP NORMALLY
FRONTAL BORDER OF OCCIPUT SLIGHTLY INCURVED (> 100)

> ANAX

> *lo of m bilobed (wide and deep clefted)*

> LS 6-9

- > dp (distal palpus) slender, with borders narrowing
to tip acute, endhook strongly curved
- anal pyramid strongly elongated
- occiput more elongated than in other species
- ovi \approx 4/5 of segments length

> *Anax congoliath*
(afrotropical)

> dp with borders not narrowing, approximately
parallel, wide tip with endhook angled
downwards

- ovi reaches 3/4 the length of st.9
- ce slender \approx 1/4 wep
- su approximately as long as wide, distally gently
and roundly curved
- LS 9 reaches approx. 3/4 th of st10
- pterothorax not raised above
- bwm : m = 1 : > 3
- ce : ep = 1 : \approx 3
- iwm : m = 1 : \approx 6
- hw: m = 1 : > 1.1

ovid : ovi = 1 : > 3
ovid : iwm = 1 : ≈ 3
st10 : pp = 1 : > 4
wep : ovi = 1 : ≈ 1

> *Anax immaculifrons* (oriental)

> **LS 7-9**

> **dp with slightly conical narrowed borders**

> *Anax speratus* (afrotropical)

> *lo of m convex curved and with a narrow cleft*

> **LS 6-9**

> **dp broad, slightly conical converging,
endhook angled downwards**

> *Anax nigrolineatus* (Himalayas)

> **LS 7-9**

> **dp very shallow and conical, acute tip,
not bent downwards (only weakly curved)**

bwm : m = 1 : > 3.2
st10 : pp = 1 : < 4

> *Anax tristis* (afrotropical)

> **dp slender and conical narrowed to a slender,
blunt or approx. acute tip, slightly bent downwards**

> st10 : pp = 1 : < 4
su : ep = 1 : > 4
wep : ovi = 1 : ≥ 1.2
iwm : m = 1 : ≤ 5
bwm : m = 1 : < 4
ce : ep = 1 : ≈ 2

dwsu : bwsu = 1 : \approx 2
 ep : m = 1 : \approx 1.65
 gon in male with valves globular
 and gonopore ovoide shaped
 hlo : lo = 1 : \approx 3
 iwm : lo = 1 : \approx 1.1
 lo : dwm = 1 : \leq 3
 ovi : st9 = 1 : \approx 1.2
 ovid: ovi = 1 : $>$ 3
 ovid : iwm = 1 : \approx 3
 pp : m = 1 : \leq 1.5
 seam of hairs at lo very short
 su trapezoide shaped, longer than dw
 whw : wpp = 1 : \approx 1.2

> *Anax junius (nearctic)*

> st10 : pp = 1 : $>$ 4.(-4.4)
 su : ep = 1 : $<$ 4
 wep : ovi = 1 : \approx 1
 iwm : m = 1 : \approx 6.5-7
 bwm : m = 1 : \geq 4
 ce : ep = 1 : $<$ 2
 dwsu : bwsu = 1 : \approx 3
 ep : hw = 1 : \approx 1.7
 ep : m = 1 : 1.8-1.9
 gon in male- with valves slender,
 elongated,
 and gonopore rectangular shaped
 hlo : lo = 1 : \approx 3.5
 hw : m = 1 : $>$ 1.1
 iwm : lo = 1 : \approx 1.2
 lo : dwm = 1 : \approx 2.5
 ovi : st9 = 1 : \approx 1.25
 ovid : ovi = 1 : \leq 3
 ovid : iwm = 1 : \leq 2.5
 pp : m = 1 : \geq 1.6
 whw : wpp = 1 : \approx 1.1

> *Anax guttatus (oriental)*

> **dp broad, slightly conical converging,
endhook angled downwards**

- > - su long-conical, distal angulate
- dwsu : su = 1 : ≈ 1.5
- gon in male- with lateral valves ovoide,
elongated and gonopore dropshaped (*tearshaped*)
(w of gonopore : w of valve = 1 : ≤ 1.3)
- ovi long and pearshaped reaching more than 2/3 of st 9
- wep : ovi = 1 : > 1 (-1.2)
- frontal border of occiput with elongated slight incurve
- mediofrontal protrusion with wide lobes laterodistal curved
- basal corners of m about right angled

iwm : pp = 1 : $\approx 3.5-4$
iwm : m = 1 : ≈ 5
lo : dwm = 1 : ≥ 3
ovi : f1 = 1 : < 2.5
ovid : ovi = 1 : ≥ 3
ovid : iwm = 1 : > 2.5
su : ep = 1 : ≤ 4
su : f1 = 1 : < 5

> **Anax imperator**

- > - su short and quadrangular, distal angulate
- dwsu : su = 1 : ≈ 1
- gon in male- with lateral valves small globular shaped
and gonopore slender rectangular
(w of gonopore : w of valve = 1 : ≈ 1.5)
- ovi short and appleshaped reaching less than 2/3 of st.9
- wep : ovi = 1 : ≤ 1
- frontal border of occiput with less elongated slight incurve
- mediofrontal protrusion with slender
lobes laterodistal about straight and kinked
- basal cornes of m oblique, narrow angled

iwm : pp = 1 : $\approx 3-3.6$
iwm : m = 1 : 5-6
lo : dwm = 1 : < 3
ovi : f1 = 1 : > 2.6
ovid : ovi = 1 : ≈ 2.5
ovid : iwm = 1 : ≤ 2
su : ep = 1 : $\gg 4$
su : f1 = 1 : ≥ 5.5

> **Anax parthenope**

- > -m **SHORT** (bwm : m = 1 : ≤ 3)
 - hw **WITH 3 ROWS OF CELLS IN THE ANAL LOOP NORMALLY**
 - **FRONTAL BORDER OF OCCIPUT NOT INCURVED**

> (HEMI) ANAX

- dp about parallel, **not converging to tip**
endhook very weak (in papuensis more distinct)
- su flat trapezoidal, shorter than dwsu
- lo : dwm = 1 : ≈ 2.3
- mh : lo = 1 : ≈ 2 (>2 papuensis)

> (Hemi-)Anax ephippiger

- > - **EYES ABOUT 2/3 THE LENGTH OF HEAD**
- **LENGTH OF LATERAL OCCIPUT : LENGTH OF EYE**
= 1 : ≈ 2

- **EYES SLIGHTLY PROTUBERENT Laterally**

LO WITHOUT GLOSSAE
PP WITHOUT DORSAL SPINES
EP BIFID
HW WITH 2 ROWS OF CELLS IN THE
ANAL LOOP NORMALLY
WINGBUD VENATION MOSTLY CLEAR
ANT 7-SEGMENTED

- > - *fw: RP2 arising towards pt and curving*
then abruptly down at level of distal pt

- *without IR2 fork*
- *cubitoanal interspace (CuA-MP) in hw with one row*
- *coxae long acute, diverging*
- *basal corner of m about right angled*

- ep fork bifid, with spines bent inwards
- lo flatcurved and deepened
- te densely finehairy setulated
- ant2 : ant3 = 1 : ≈ 2.5
- bwm : dwm = 1 : ≥ 2.05
- bwm : m = 1: 2.5-3
- ced : su = 1 : ≈ 1
- dwm : m = 1 : ≤ 1.25
- dp short (w : l = 1 : ≈ 1.5)

ep : m = 1 : ≈ 1.7
 hairs of lo : l of cleft = 1 : ≈ 3
 iwm : lo = 1 : ≤ 0.8
 iwm : dwm = 1 : ≈ 5
 iwm : pp = 1 : $> 2(-2.5)$
 lo : pp = 1 : ≤ 3
 lo : m = 1 : ≥ 4
 LS 6-9
 m : hw = 1 : ≈ 1.3
 su : ep = 1 : > 2.3
 su : m = 1 : < 4.5
 w arch \gg dps
 wgonopore : wvalve = 1 : ≥ 1

> *Anaciaeschna isosceles (+antehumeralis)*
 (ANACINI: ANACIAESHNA)

- > - *fw : RP2 curves downwards at level of distal half of pt*
 - *with R2 fork*
 - *cubital interspace (CuA-MP) in hw with 2 rows normally*
 - *coxae short to very short and blunt*
 - *iwm : lo = 1 : ≤ 1.5*
 - *basal corner of m acute angled*

- > - *bm slender, slightly conical widening*
 and with strong necked head
 - *iwm : m = 1 : ≥ 5*
 - *lo : m = 1 : $> 4 (-4.4)$*
 - *dp slightly conical, long (w : l = 1 : ≥ 1.8) distal*
 curved and with a strong endhook
 - *ovi slightly surpassing hindborder of st9*
 - laterosternal scars on st 6-8 not or scarcely incised or waved
 - laterotergital scars on te 7/8 basally quadrangular
and distally globular, touching, and without seams
 - pronotal scars long, dropshaped to clubshaped
 - pronotum distally less tubercular
 - gon in male with lateral valves quadrangular to
trapezoidal and wider than the gonopore
bw of mh \approx w of dp (at same vertical level)
bwm : m = 1 : ≥ 2.7
ced : su = 1 : 4-5

dwm : m = 1 : ≈ 1.5
 ep longforked
 iwm : pp = 1 : > 3
 iwm : dwm = 1 : > 5
 lo : pp = 1 : 2.2-2.5
 lo curved- hlo : lo = 1. > 4
 LS 6 distinct
 LS 9 reaches the end of st10
 m with basal corner straight
 ovi : pp = 1 : > 1.5
 su : ep = 1 : < 2.3
 su longtriangular
 w arch \approx dp
 wgonopore : wvalve = 1 : ≈ 1
 wce : bwep = 1 : ≈ 4

> *Simaeshna mixta*
 (ANACINI: AMPHIAESHNINA)

- > - *bm distinctly conical widening and with well necked head*
- *iwm : m = 1 : ≤ 4.5*
- *lo : m = 1 : 3-3.3*
- *dp short, parallel bordered w : l = 1 : ≤ 1.5*
- *ovi very long, reaching nearly the hindborder of st 10*

bwm narrow (bwm : dwm = 1 : ≥ 2)
 ced : su = 1 : 5-7
 dwm : m = 1 : < 1.4
 ep fork short
 gon male- with lateral valves small and ovoid
 iwm : pp = 1 : ≈ 3
 LS 6 distinct
 LS 9 reaches the end of st10
 lo triangular shaped
 lo : pp = 1 : 2-2.2
 m : hw = 1 : 1.2-1.35
 ovi : pp = 1 : ≈ 1.2
 pp : m = 1 : 1.3-1.4
 w arch \gg dp
 w of dp : m = 1 : $\ll 3.5$
 wgonopore : wvalve = 1 : ≥ 1.5

> *Simaeshna affinis*
 (ANACINI : AMPHIAESHNINA)

- > - **EYE APPROX. 1/3 THE THE LENGTH OF HEAD**
- **LENGTH OF LATERAL OCCIPUT : LENGTH OF EYE**
= 1 : \approx 0.5
- **OCCIPUT WITH CONICAL LATERAL BORDERS**
STRONGLY EXPANDED FORWARDS
- **fw- RP2 TOP WITHOUT A TUBERCULAR**
EXTENSION
- **fw WITH INTERRADIAL (IR2) FORK**
- **MEDIAN INTERSPACE (MA - RP3-4) AND**
CUBITOANAL INTERSPACE (MP-CuA)
WITH ONE ROW OF CELLS NORMALLY

> **BRACHYTONIDAE**

- > **LS 6-9**
m short and dwm wide (dwm : m = 1 : \approx 1.2)
ovi reaching approximately hindborder of st9
corner of occipital lobe blunt angled
wing-case with long pt
fw- RP2 curved softly downwards at midlevel of pt
mh inside with a basal scattered field of shortspiny
setulae
bwm : dwm = 1 : \leq 2
bwm : m = 1 : \approx 2.25
ce \approx 2/3 of pp
te9 with a toothlike mediotergital spine

> **Brachytron pratense**
gen. BRACHYTRON

- > **LS (4) 5-9**
m longconical to longheaded
bwm : dwm = 1 : > 2
bwm : m = 1 : \geq 2.5
ovi reaching or surpassing hindborder of st 10
corner of occipital lobe gently curved

> *gen. CEPHALAESCHNA*
(C.klapperichi)
(and EP -gen. PLANAESCHNA)

- > **EYES LENGTH \geq 1/2 THE LENGTH OF HEAD**
- LENGTH OF LATERAL OCCIPUT : LENGTH OF EYES**
= 1 : 1-2
- **LEVEL OF MEDIOFRONTAL OCCIPITAL BORDER**
ABOUT AT LEVEL OF LATEROFRONTAL
OCCIPITAL BORDER

> **LO WITH GLOSSAE**
LS 5-9

> **TELEPHLEBINAE**

- > - **OCCIPUT WITH ACUTE ANGLED CORNERS**
- **WINGCASE WITHOUT INTERRADIAL (IR2) –FORK**
- **RP2 CURVED DOWNWARDS B E F O R E pt**
- **MEDIAN INTERSPACE (MA--RP3-4) MULTIROWED**
- **mh INSIDE WITH SCATTERED SHORTSPINY SETULAE**
- **ep TIP DEEPLY BIFURCATE**

> gen. **BOYERIA**

- > - **hairs of lo : length of median cleft = 1 : \approx 3**
- **glossae : distance between glossae = 1 : \approx 4-6**
- **pp with inner borders strongly tubercular ("crenulated")**
 - **glossae distinct and approximately globular**
 - **palpal teeth well defined**
 - **basoscapal socket of antennae cylindrical and less waisted**
 - **cavation of sternital surface (below ovi) begins well distad to the hindborder of st9**
 - **pronotum distal distinctly narrowed and strongly curved upwards**
 - **males gon wider than long, with valves thick beanshaped and gonopore short**
ant1 : ant3 = 1 : \approx 2
bwm : m = 1 : < 3
bwm : dwm = 1 : \leq 2
dwm : m = 1 : 1.4-1.5
pp : ovi = 1 : \approx 1
female- ce : ep = 1 : \approx 2.5 /
1 : < 1.5 (females with long appendages)
male ce : ep = 1 : \approx 1.5

> **Boyeria Irene**

- > - **hairs of lo : length of median cleft = 1 : \approx 5**
- **glossae : distance between glossae = 1 : \approx 10**
- **pp with inner borders weakly and flat tubercular**
 - glossae small, more triangular
 - palpal teeth weakly expressed
 - basoscapal socket of antennae distinctly waisted
 - cavation of sternital surface (below ovi) begins near to hindborder of st.9
 - pronotum distally blunt, less narrowed and weakly curved upwards
 - males gon. approximately quadrangular, with valves slender, beanshaped and gonopore elongated
 - ant1 : ant3 = 1 : < 2
 - bwm : m = 1 : > 3
 - bwm : dwm = 1 : \leq 2
 - dwm : m = 1 : 1.4-1.7
 - pp : ovi = 1 : 1.1
 - female- ce : ep = 1 : \approx 2.5
 - male- cerci : ep = 1 : \approx 1.6

> **Boyeria cretensis**

- > - **OCCIPUT WITHOUT ANGLED CORNERS - APPROXIMATELY BOWLSHAPED**
- **pp WITH A DORSAL ROW OF TEETH**
- **ep WITH A DORSAL TOOTH AND AN ACUTE TIP**

> gen. **CALIAESCHNA**

- > antennae 5-6 segmented
 - bw : dw = 1 : \approx 1.5-1.7
 - bwm : m = 1 : 2.2-2.4
 - ce \approx su
 - ce in male \approx 3/4 - in fem \approx 1/3 of py
 - ce : ep = 1 : \approx 1.25 (male) \approx 3 (fem)
 - distance between glossae : smw = 1 : \leq 1
 - dwm : m = 1 : \approx 1.45
 - ep in female with a small dorsal tooth
 - male with strongly erected tooth of su
 - m : hw = 1 : \approx 1.3
 - ovi : pp = 1 : \approx 0.7
 - ovi very long, surpassing end of st 10
 - smw : m = 1 : > 3
 - su : ep = 1 : \approx 1.35

> **Caliaeschna microstigma**

> LO WITHOUT GLOSSAE

- pp WITHOUT DORSAL TEETH
- ep WITHOUT A DORSAL TOOTH AND WITH BIFID OR TRIFID TIP
- mh INSIDE WITH A ROW OF HAIRY OR HAIRSPINED SETULAE

> AESHNINAE

- > - m LONG , SLENDER , WITH d_{wm} WIDE
- bpm NARROW AND NARROWBASED
- $i_{wm} : m = 1 : \geq 5$
- $b_{wm} : m = 1 : \geq 2.7$

> *fw* : RP2 curves downwards a t pt -level

- ant (5) 6 segmented (6+7 fused)
- eyes hindborder (= frontal border of occipital lobe) wavy
- ep bifid, shortforked
- coxae long and slender
- wingcase- cubitoanal interspace (CuA-MP) with more than two rows
- dense and mostly dull wing-venation
- anal loop in hw with more than 2 rows of cells
 - RP2 in fw curved downwards at level of proximal (inner) third of pt
 - dp broad parallel sided and short ($w : l = 1 : \leq 1.5$) , angled distally and with a small endhook
 - laterosternal scars on st 6-9 scarcely incised at mid
 - scars of pronotum with inner half broad and distal half abruptly narrowed
 - bw of mh < w of dp (at same vertical level)
 - ced : su = 1 : ≈ 3
 - $i_{wm} : lo = 1 : < 1.4$
 - $i_{wm} : pp = 1 : < 3$
 - lo : pp = 1 : 2.8-2.9
 - lo : m = 1 : 3.3-3.9
 - LS 6 rudimentary
 - LS 9 reaches approximately half of st10
 - ovi : pp = 1 : > 1.5
 - ovi reaching the end of st 9
 - su : ep = 1 : < 2.3
 - su conical with a blunt broadly circular tip
 - wgonopore : wvalve = 1 : ≈ 2

> Aeshna caerulea

> *fw: RP2 curving downwards far before level of pt, dull ventation*

- antennae 7-segmented
- eyes hindborder (= frontal border of occipital lobe) strongly waved
- ep shortforked, trifold
- coxae short and blunt
- wce : wep = 1 : \approx 3
- anal loop in hw with more than 2 rows of cells normally
 - laterosternal scars on ste 6-9 deeply incised
 - lo approximately triangular shaped- hlo : lo = 1 : \approx 1.5
 - dp broad, parallel bordered and short (w : l = 1 : \leq 1.5) distal angled and with a small endhook
 - ovi slightly surpassing the hindborder of st9
 - pronotal scar pipebowl-shaped and almost continuously narrowing outwards
 - m with basal corners diverging outwards
 - gon in male with slender elongated lateral valves, not wider than the gonopore
 - laterotergital scars on te 7/8 basal trapezoidal distal small and irregularly formed, separate, and with brownish seams
 - bw of mh < w of dp (at same vertical level)
 - ced : su = 1 : \leq 2
 - iwm : lo = 1 : > 1.4
 - iwm : pp = 1 : > 3.8
 - lo : pp = 1 : \geq 2.5
 - lo : m = 1 : > 4
 - LS 6 strong and distinct
 - LS 9 reaches approximately half of st10
 - ovi : pp = 1 : > 1.5 (1.8)
 - su : ep = 1 : \geq 2.3
 - su acute triangular
 - wgonopore : wvalve = 1 : < 1.5

> *Aeshna cyanea*

- > - m SHORT TO LONG, WITH DISTINCT TO WEAK HEAD
- bpm AND bwm MEDIATE TO WIDE
- iwm : m = 1 : < 4.8

> - *fw: RP2 curving gently downwards shortly before level of pt*

- *pp : m = 1 : < 1.1*

- *bwm : m = 1 : < 2.5*
- *LS (4)- 5 - 9*
 - coxae very long and acute
 - ep fork long, trifold, with a blunt and small midspine
 - gon male with lateral valves triangular and gonopore ovoid and totally divided
 - laterotergital scars on te 7/8 circular and longovoid to quadrangular
 - pronotum with scar distally straight, inwardly kinked posteriorly, basally concave
 - dp with parallel borders and short ($w : l = 1 : \leq 1.5$)
 - ced : su = 1 : > 3 (-4.5)
 - iwm : lo = 1 : ≥ 1
 - iwm : pp = 1 : 3.4-3.8
 - iw : m = 1 : 3.5-4
 - lo : pp = 1 : ≥ 3
 - lo : m = 1 : 3-3.5
 - m : hw = 1 : > 1.2
 - pp : hw = 1 : < 1.4
 - wgonopore : wvalve = 1 : ≤ 1.5

> *Aeshna crenata*

- > - *fw: RP2 curved gently downwards at level of beginning to ending of pt*
- *pp : m = 1 : > 1.1*
- *bwm : m = 1 : ≤ 2.5*
- *LS (6)7-9*

> *LS 6-9*

- *coxae with long and diverging branches*
- *dp long with parallel borders ($w : l = 1 : \geq 1.7$)*
 - *m less widening towards dm (narrowheaded)*
 - *ovi approximately reaching hindborder of st*
 - *iwm : lo = 1: ≈ 1 (> 111)*

- > - *mediodorsal abdominal dark markings nearly absent or reduced to points*
- *lo triangular shaped*

- no distinct whitish markings on body, uniformly coloured
 - dp with distal corner curved and with a short (weak) endhook
 - ep fork bifid, approximately straight between teeth
 - RP2 in fw curving downwards at midlevel of pt
 - laterotergital scars on te 7/8 circular and ovoid, well separated
 - pronotum with a pipe shaped scar with head orientated posteriorly
- bwm : hw = 1 : < 3
 bwm : m = 1 : < 2.4
 ce : pp = 1 : ≈ 2.2
 ce : ep = 1 : ≈ 1.9
 ced : su = 1 : 5-7
 fl : m = 1 : ≤ 1.3
 iwm : pp = 1 : < 3
 iwm : m = 1 : 3.5-4.2
 iw ≥ lo
 lo : pp = 1 : 2.6-2.8
 lo : m = 1 : ≤ 3.4
 ovi : pp = 1 : ≤ 2
 pp : m = 1 : ≥ 1.2
 su : hw = 1 : < 4
 wgonopore : wvalve = 1 : ≤ 1.5

> *Aeshna viridis*

> **mediodorsal abdominal dark drawings and patches slightly to strongly marked**

- > - occiput corners , dorsal abdomen and pyramid with strong to distinct whitish markings
 - occipital lobes looking „blunt“ angled with narrow curved corners
 - bwm : m = 1 : ≥ 2.4
 - iwm : m = 1 : ≈ 4.5
 - iwm < lo
 - RP2 in fw curving downwards shortly before or at level of beginning of pt
 - venation mostly clear and brownish
- tips of ep and pp are mostly darkened blackish
 - IR2-Rspl space and IR2 fork space with 3-4 rows normally
 - cubitoanal interspace in hw 2-3 rows

- fw triangle wider ($w : l = 1 : \approx 1.5$)
- dp with distal corner curved and endhook distinct,
- pronotal scar nailshaped with head (head: stem = $1 : \approx 2$)
- laterotergital scars on te 7/8 large, circular to quadrangular and long rectangular , separate and resembling an exclamation mark with brownish seams
- m on laterobasal corners (submental joint) with small protruding tubercles
- mediate dp – $w : lo = 1 : > 5$
- gon in male with lateral valves oval to rectangular and gonopore oval to conical with furrow
 - ant2 : ant3 = $1 : \approx 2$
 - arch before lo connection slender
 - bwm : hw = $1 : > 3$
 - ced : su = $1 : 3-5$
 - f1: m = $1 : \geq 1.4$
 - hairs of lo : arch = $1 : \approx 10$
 - iwm : pp = $1 : \geq 3$
 - lo : pp = $1 : 2.5-3$
 - lo : m = $1 : \geq 3.5$
 - lo curved
 - ovi : pp = $1 : \geq 2$
 - su approximately acutetipped
 - su : ep = $1 : \leq 2$
 - su : hw = $1 : \approx 4.5$
 - wgonopore : wvalve = $1 : \leq 1.5$

> *Aeshna grandis*

- > - no distinct whitish markings on body; more unicoloured
 - occipital lobes with well curved corners
 - bwm : m = $1 : \leq 2.2$
 - iwm : m = $1 : 3.5 - 4$
 - iwm \geq lo
 - RP2 in fw curved downwards at level of proximal half of pt
 - hw venation dark, often diffuse and dull
 - pronotal scar pipeshaped and with head orientated anteriorly (head : stem = $1 : \approx 1.5$)
 - ep fork bifid and mediad shallow concave
 - tips of ep and pp are slightly darkened brownish
 - IR2-Rspl space and IR2 fork space with 3-4 rows
 - cubitoanal interspace with 2-3 rows
 - fw triangle slender ($w : l = 1 : \approx 2$) (if visible)
- dp with distal corner almost angled and with endhook weak
 - su rather bluntpointed, lo slightly deepened

- laterotergital scars on te^{7/8} small circular and long ovoid to quadrangular, separated, no brownish seams
 - m on laterobasal corners (submental joint) without small protruding tubercles
 - gon in male with lateral valves narrow elongated and gonopore rectangular with a deep furrow arch before lo-connection widened
- bwm : hw = 1 : < 3
 ce : pp = 1 : ≈ 2
 ce : ep = 1 : ≈ 1.6
 hairs of lo : arch = 1 : ≈ 15
 iwm : pp = 1 : < 3
 lo : pp = 1 : ≤ 3
 lo : m = 1 : ≥ 3.3
 m : hw = 1 : < 1.2
 pp : m = 1 : > 1.1 (-1.3)
 pp : hw = 1 : > 1.6
 su : ep = 1 : > 2
 w of dp : m = 1 : > 3.5

> *Aeshna serrata* (= *osiliensis*)

> LS 7-9

- *coxae deeply incised but with less diverging tips*
- *dp long and with parallel borders (w : l = 1 : ≥ 1.7)*
- *ovi short, scarcely reaching hindborder of st. 9*
- *m short, bwm wide (bwm : dwm = 1 : < 1.8)*
looking narrowheaded
- *iwm : lo = 1 : ≈ 1*
- *iwm : m = 1 : 3-4*
- *lo : m = 1 : ≈ 4*
- *wgonopore : wvalve = 1 : ≈ 1.5*

> m ≥ f3

ce : pp = 1 : ≈ 1.6

gon in male with gonopore partly divided
(horseshoe-like)

pronotum very weakly tubercular

ce : f3 = 1 : < 2.7
 ce : f1 = 1 : ≈ 1.5
 ce : m = 1 : < 2.5
 ced : su = 1 : ≈ 2

lo : pp = 1 : < 2.5
 m : f1 = 1 : ≤ 1.5

> *Aeshna subarctica (elisabethae)*

> $m < f3$

$ce : pp = 1 : \approx 1.9$

gon in male with gonopore divided completely
pronotum distinctly tubercled

$ce : f3 = 1 : \geq 2.9$

$ce : f1 = 1 : \geq 1.8$

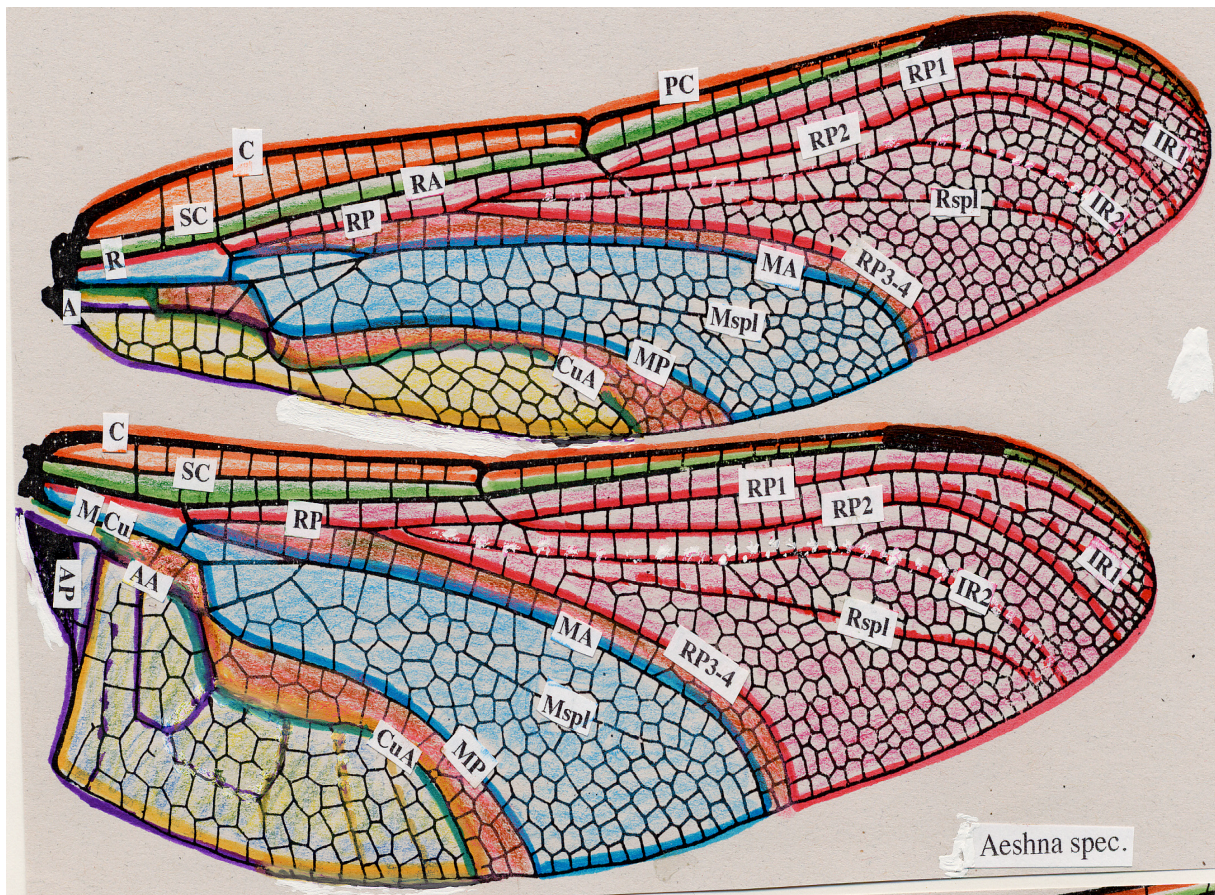
$ce : m = 1 : > 2.5$

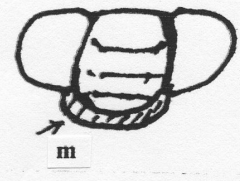
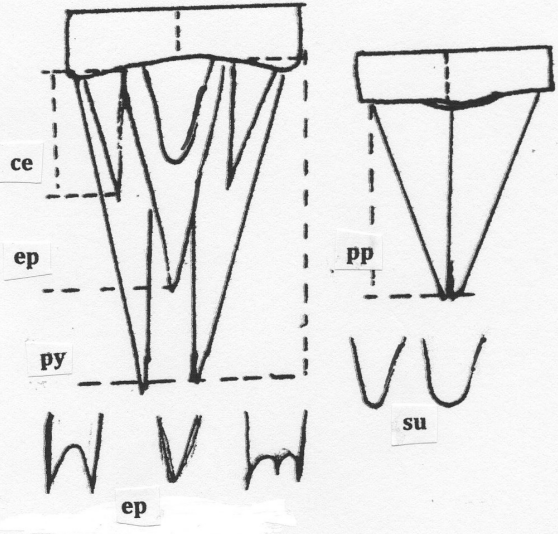
$ced : su = 1 : \geq 2.5 (-4)$

$lo : pp = 1 : \geq 2.5$

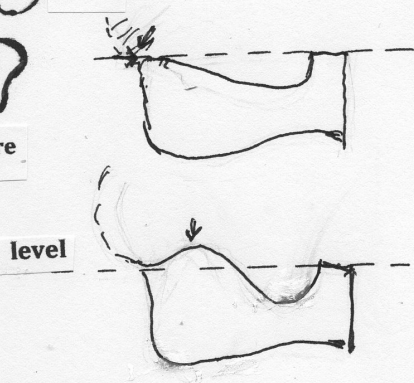
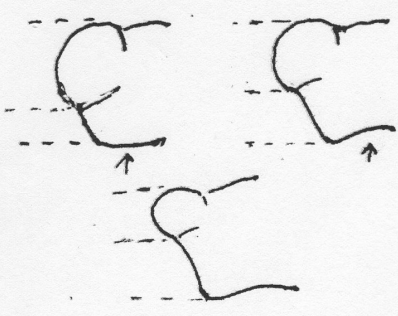
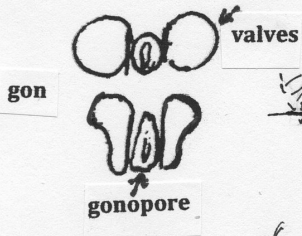
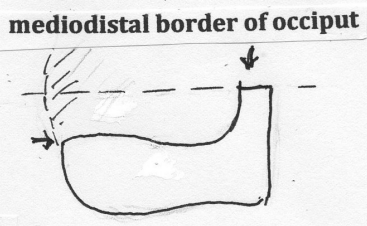
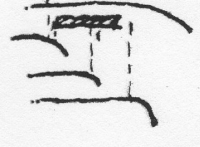
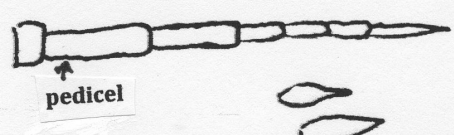
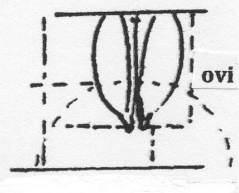
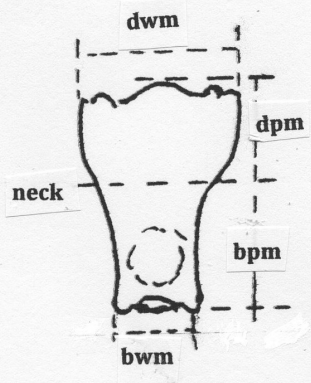
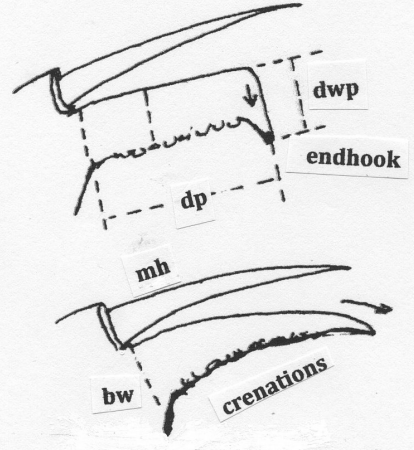
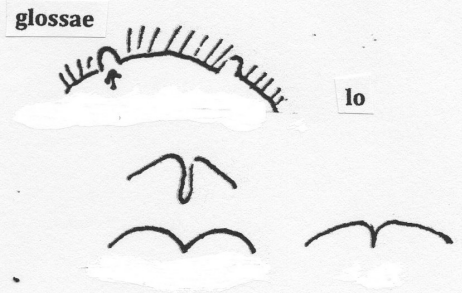
$m : f1 = 1 : > 2.5 (-2.8)$

> *Aeshna juncea*





Aeshnidae

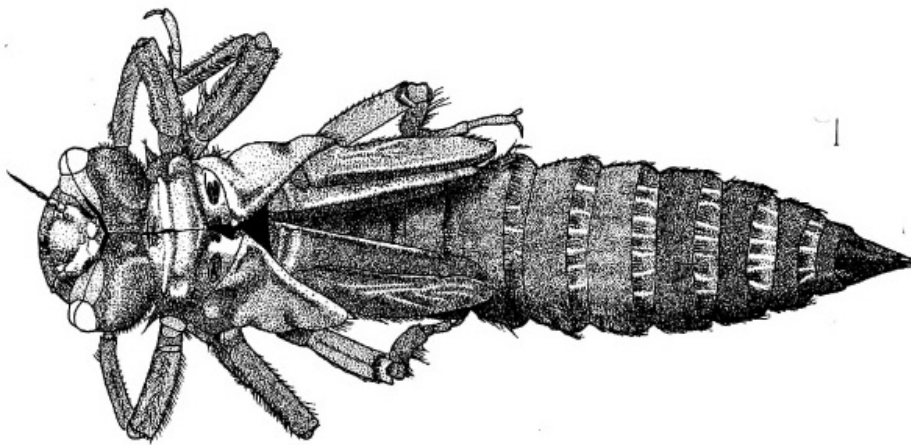


Fam.

- m with helmet (= spoonshaped) mask in frontal view
- distal border of palpus irregularly indented
- lo with a protruding and bifid ligula
- females with a large „ovipositor“

> CORDULEGASTRIDAE

> CORDULEGASTRINAE



> WITH LS 8-9

(> 118)

> CORDULEGASTER

- > - ANAL PYRAMID WITH PARAPROCTS (pp) SHORT
(pp : w PRONOTUM = 1 : \approx 1.25)
- PRONOTUM WIDE, TIP SURPASSES HALF THE w OF EYES (VERTICAL LEVEL)
- FRONTAL BORDER OF OCCIPUT WITH TRUNCATE AND FANSHAPED SETULAE
- LIGULA OF lo WITH A BROAD , TRANSVERSE TIPPED FORK AND A WIDE BASAL PROTRUSION
- ovi BROADBASED
- LS 8/9 SHORT TO VERY SHORT
- EYES WITH DORSOLATERAL INCURVE WIDE
- w of ARCH (PALPAL SOCKET) : w HAIRY INCURVE OF LATERAL lo = 1 : 1.1-1.2
- PS 4-5 (\pm 1)

bwovi : ovi = 1 : < 1.2
ep : hw = 1 : ≥ 2.3
m : hw = 1 : ≤ 1.1
ovi : pp = 1 : < 1.2
pp : hw = 1 : ≥ 2.5
st10 : pp = 1 : < 1.6
wpp : pp = 1 : < 4

> C. picta-heros group (East-group)

> LS distinct (about 1/4-1/6 of st)

MS (4) 5 + 3

bwm : hw = 1 : > 3.3

su : ep = 1 : ≥ 4

sgd : sg = 1 : 2-3

dwsu : bwsu = 1 : < 2

ep : m = 1 : 2.1-2.4

gon in male- valves ovoide ,

with gonopore elongated and less smaller

m : hw = 1 : 1-1.1

ovi : pp = 1 : ≈ 1.05

ovi : hw = 1 : < 3

ovi : ep = 1 : 1.1-1.15

pp : m = 1 : 2.2-2.5

su : ep = 1 : ≈ 4

> C.heros

> st10 + pp thickspiny setulated

pronotum- distal lobe : basal part = 1 : > 2

- 1 : w = 1 : < 3

mediofrontal field of pronotum spiny setulated

> C.h.eros heros

> st 10 +pp hairy setulated

pronotum- distal lobe : basal part = 1 : < 2

mediofrontal field of pronotum hairspiny setulated

> C.h.pelionensis

> *LS very small, on 8 sometimes rudimentary*
(about 1/ 8-1/10)

MS 6(5) + 3- 4
bwm : hw = 1 : ≤ 3.1
su : ep = 1 : ≤ 4
sgd : sg = 1 : 2-2.5

- st10 + pp hairy setulated
- w of basal protrusion of ligula fork : pp = 1 : 2.8-3.4
- pronotum- distal lobe : basal part = 1 : < 2
- mediofrontal field of pronotum weakly hairspiny setulated
- gon in male on st.8 with circular valves , gonopore distinctly smaller and ovoide

dwsu : bwsu = 1 : > 2
ep : m = 1 : < 3
ovi : pp = 1 : ≈ 1
ovi : hw = 1 : ≈ 2.6
ovi : ep = 1 : ≈ 1
pp : m = 1 : > 2.5
st10 : pp = 1 : ≤ 1.55

> *C.picta*

(unknown) > *C. vanbrinkae*

- > - ANAL PYRAMID WITH pp SLENDER AND ELONGATED
(pp : w PRONOTUM = 1 : ≤ 1)
- PRONOTUM LESS BROAD, TIP REACHES LESS THAN
HALF THE w OF EYES (VERTICAL LEVEL)
- FRONTAL BORDER OF OCCIPUT WITH HAIRY SETULAE
- LIGULA OF l₆ WITH A SHORT OR MEDIUM
TRANSVERSE TIPPED FORK AND A SLENDER
BASAL PROTRUSION

- ovi SLENDER
- PS 4-5 (± 1)
bwovi : ovi = 1 : > 1.2
ep : hw = 1 : < 2.3
m : hw = 1 : < 1.25
ovi : pp = 1 : > 1.2
pp : hw = 1 : < 2.5
st10 : pp = 1 : ≥ 1.6
wpp : pp = 1 : ≥ 4

> *C. boltoni-trinacria-princeps* group (West-group)

> *eyes dorsomedian incurve narrow and deep*

LS mediad (1/3-1/6 of st)

ovi : mh = 1 : 1.1-1.4

sgd : sg = 1 : < 3 (> 2.2)

su : ep = 1 : > 3

w of arch : hairy incurve of lateral lo = 1 : 1.4-1.6

> *dwsu : bwsu = 1 : < 3*

dwsu : su = 1 : ≈ 1.3

dsg : sg = 1 : > 2.2

ovi : pp = 1 : < 1.5

st9 marginal setae long

w of basal protrusion of ligula fork : pp = 1 : > 4.5

> *C. boltoni boltoni / b.immaculifrons*

> *dwsu : bwsu = 1 : ≤ 2*

dwsu : su = 1 : < 1

dsg : sg = 1 : < 1.5

ovi : pp = 1 : > 1.5

st9 marginal setae short

w of eyes : (dw) fr = 1 : ≤ 3

> *C. b. algerica / iberica*

> *eyes dorsomedian incurve wide /flat*

> *LS about one third to one half of st*

ovi : mh = 1 : ≈ 1.55

sgd : sg = 1 : > 5 (-7)

su : ep = 1 : > 4.2

w of arch : hairy incurve of lo = 1 : 1.4-1.6

dwsu : bwsu = 1 : ≤ 1.5

dwsu : su = 1 : ≥ 1

distal border of occiput with long hairspiny setae

ep : hw = 1 : ≥ 2

ovi : pp = 1 : ≤ 1.2

PS 4 (5) +1(-5)

w of basal protrusion of ligula fork : pp = 1 : ≥ 4

> *C. trinacriae*

> *LS 9 very short (1/5- 1/10 of st) , on LS 8
often rudimentary*

ovi : mh = 1 : < 1.1

sgd : sg = 1 : ≤ 2.1

su : ep = 1 : ≤ 4

w of arch : hairy incurve of lateral lo = 1 : 1.2-1.3

dwsu : bwsu = 1 : ≈ 2

dwsu : su = 1 : ≥ 1.2

distal border of occiput with very long hairspiny setae

ep : hw = 1 : ≤ 2

ovi : pp = 1 : ≤ 1.5

pp : m = 1 : ≤ 2

PS: 5+ 3 (-5) MS: 3 (4-5) + 1

**pronotum short - tip of pronotum reaching scarcely first
third of eye (vertical level)**

w of eyes : (dw) fr = 1 : ≤ 2.5

w of basal protrusion of ligula fork : pp = 1 : < 4

> C princeps

> WITHOUT LS

> THECAGASTRINAE

> THECAGASTRINI

> KULDANAGASTER

> THECAGASTER

- > - SUBGONAPOPHYSEIS (sg) IN FEMALES REACHING THE
END OF st (sgd ≈ 0)
- EYES DORSOLATERAL INCURVE NARROW TO MEDIUM,
IN LAT. VIEW WAVY
- su NARROW WITH LATERAL BORDERS OF ep WELL VISIBLE
- PRONOTUM WIDE, TIP REACHING ABOUT VERTICAL LEVEL
OF EYES MID
- LIGULA OF lo WITH A SLENDER ERECTED FORK (TIPS
ORIENTATED OBLIQUE)
- BASAL PROTRUSION OF FORK SLENDER, ABOUT DOUBLE
THE VERTICAL LENGTH OF FORK

- TIPS OF FORK NOT TANGENTING THE LEGS OF THE
ANGLE of lo
- ANAL PYRAMID WITH pp SLENDER AND ELONGATED
- FRONTAL BORDER OF OCCIPUT WITH VERY SHORT
AND DENSE SET FANSHAPED SETULAE

ant6+7 < 3
 bwovi: ovi = 1 : 1.5-1.6
 bwpp : pp = 1 : >1.2
 dwsu : su = 1 : > 1
 dwsu : bwsu = 1 : ≈ 2
 ep : hw = 1 : ≤ 2.1
 iwm : ovi = 1 : ≥ 1.1
 iwm : pp = 1 : > 2.1
 lo : pp = 1 : ≥ 1.5
 ovi : hw = 1 : < 3
 pronotum : pp = 1 : ≈ 3
 pp : wpronotum = 1 : > 1
 sg : wst 10 = 1 : < 2.5
 sg : lo = 1 : ≤ 3.2
 sg : pp = 1 : ≤ 2.8
 st10 : pp = 1 : ≥ 1.8
 st 8/9 with long and medium hairspiny setulae
 su : wst 10 = 1 : < 3.6
 su distal smalltubercular
 wpp: ovi = 1 : ≈ 1
 wpp : pronotum = 1 : > 1.2
 w of eye : w of distal occiput = 1 : ≈ 3
 PS : 4 + 1

>T. bidentata- helladica group
 (THECAGASTER:Thecagaster-group)

> eyes dorsomedian incurve very narrow and deep
pronotum- distal lobe : basal part = 1 : ≥ 3
bwm : pp = 1 : > 1.3
bwm : wpronotum = 1 : ≥ 1.4
w of arch : hairy incurve of lateral lo = 1 : 1.2- 1.3

ant7 : ant2 = 1 : ≥ 1.5
 ant6 : ant2 = 1 : ≥ 1.5
 dwsu : su = 1 : ≈ 2
 dwsu : bwsu = 1 : > 2
 gon in male- with gonopore distinctly smaller
 than lateral globular valves
 ovi : pp = 1 : > 1.2
 pronotum : wpronotum = 1 : ≥ 3
 pp+st10 : st 8+9 = 1 : ≈ 1
 su : hw = 1 : ≈ 8

> T. bidentata

- > *eyes dorsomedian incurve medium and less deep*
- pronotum- distal lobe : basal part = 1 : \approx 2.5*
- bwm : pp = 1 : \leq 1.2*
- bwm : wpronotum = 1 : \leq 1.3*
- w of arch : hairy incurve of lateral lo = 1 : 1-1.1*
- dwsu : su = 1 : \approx 1.5*
- dwsu : bwsu = 1 : \leq 2*
- gon in male- with gonopore slightly smaller than lateral valves*
- ovi : pp = 1 : < 1.15*
- pronotum : wpronotum = 1 : \leq 3*
- pp+st 10 : st 8+9 = 1 : \geq 1.2*
- su : hw = 1 : \approx 10*

> *T. helladica*

? (not available) > *T. mzymtae*

- > - **SUBGONAPOPHYSEIS (sg) IN FEMALES NOT REACHING THE END OF st**
- **EYES INCURVE WIDE, IN LATERAL VIEW LENSE-SHAPED**
- **su WIDE, REACHING ABOUT LATERAL BORDERS OF ep**
- **PRONOTUM SHORT, TIP REACHING ABOUT VERTICAL LEVEL OF EYES FIRST THIRD**
- **LIGULA OF lo WITH A MEDIUM TO BROAD TRANSVERSE TIPPED FORK**
- **BASAL PROTRUSION OF LIGULA-FORK WIDE, ABOUT THREETIMES THE VERTICAL LENGTH OF THE FORK**
- **TIPS OF FORK TANGENTING ABOUT LEGS OF ANGLE OF lo**
- **ANAL PYRAMID WITH pp SHORT TO MEDIUM**
- **FRONTAL BORDER OF OCCIPUT WITH LONGER FANSHAPED SETULAE, LESS DENSE SET AND MIXED WITH HAIRSPINY SETULAE AND TRUNCATE SETULAE**
- **w OF ARCH : HAIRY INCURVE OF LATERAL lo = 1 : 1.1 - 1.2**

ant7: ant 2 = 1 : \leq 1.4
dwsu : bwsu = 1 : \leq 1.5
iwm : ovi = 1 : \leq 1
ovi : hw = 1 : > 3 (-3.5)
pp : dwm = 1 : \geq 2 (-2.5)
pronotum : pp = 1 : > 2.6(-3)
st 8/9 with thick and short marginal hairspines

sg : wst 10 = 1 : ≥ 3
 sg : lo = 1 : > 3.5
 sg : pp = 1 : ≥ 3
 su : wte 10 = 1 : > 3.6 (-4.3)
 su : dwsu = 1 : > 1
 su distal big tubercular
 wpp : pp = 1 : < 1.2
 wpp : ovi = 1 : 1.2-1.3
 wovi : ovi : l = 1 : ≈ 1.3
 w of eye : w of distal occiput = 1 : ≈ 2.5
 PS: 3 (4) +1

> **T. insignis - group**
 (THECAGASTER: Sonjagaster -group)
 (= C. insignis group)

> *sgd : sg = 1 : > 2*
sg : pp = 1 : ≈ 3.5
ep : hw = 1 : ≈ 2.5
pronotum : wpronotum = 1 : > 3
pp : wpronotum = 1 : ≥ 1.1
pp : wpp = 1 : ≥ 1
ant6 : ant 2 = 1 : < 1.5

> **T. insignis**

> **bwm : pp = 1 : 1.2-1.3**
 gon in male- with gonopore small and about
 samesized than lateral valves
iwm : wovi = 1 : ≈ 1
iwm : pp = 1 : ≤ 2
pp : dwm = 1 : ≤ 1.5
pronotum : bwm = 1 : > 3
sgd : sg = 1 : 2.2-3.2
su : ep = 1 : < 3.3
wep : pp = 1 : ≥ 2

> **T. insignis („amasina“)**

> **bwm : pp = 1 : ≤ 1.1**
iwm : wovi = 1 : < 1
iwm : pp = 1 : ≤ 1.8
pronotum : bwm = 1 : ≈ 2.5
pp : dwm = 1 : > 2
sgd : sg = 1 : ≈ 3
su : ep = 1 : ≈ 4
wep : pp = 1 : ≤ 2

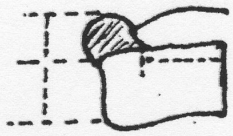
> **T. insignis („montandoni“)**

? (not available) > T. charpentieri
> T .nobilis

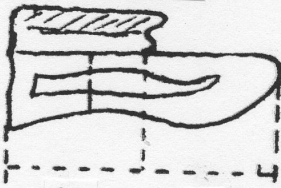
> *sgd* : *sg* = 1 : < 1.5
sg : *pp* = 1 : ≈ 4.5
sg : *wst10* = 1 : ≥ 4
ep : *hw* = 1 : < 2
pronotum : *wpronotum* = 1 : < 3
pp : *wpronotum* = 1 : < 1
pp : *wpp* = 1 : < 1

> *bwm* : *pp* = 1 : ≈ 1.5
iwm : *wovi* = 1 : ≈ 1.2
iwm : *pp* = 1 : ≤ 2.5
ligula with a small and blunt fork
and a rel small basal protrusion
su : *ep* = 1 : > 3.5
sg : *lo* = 1 : ≈ 5

> T . coronata

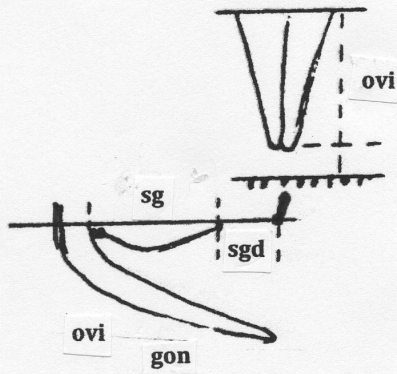


pronotum



bp

dp



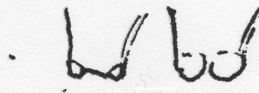
sg

sgd

ovi

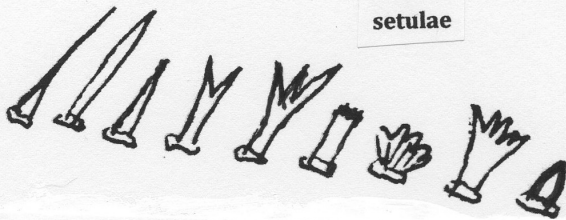
ovi

gon



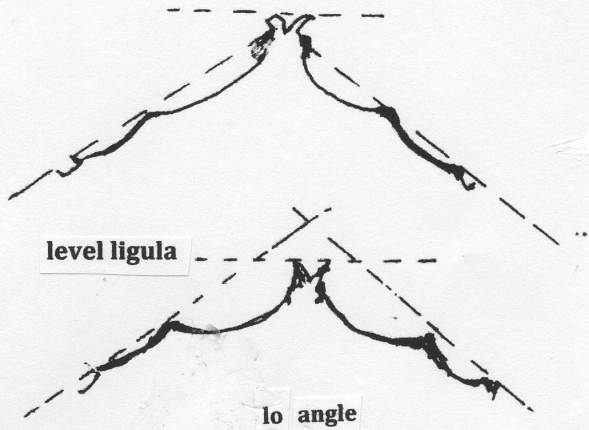
su

setulae



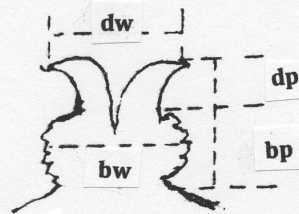
Cordulegastridae

hairy-long spiny- short spiny-bifid-trifid-truncate-short fanshaped-long fanshaped- thick spiny



level ligula

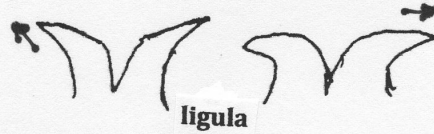
lo angle



dw

dp

bp



ligula



su

ep

Fam.

- m spoonshaped (helmet mask in frontal view)
- ligula without a cleft
- distal border of palpus straight or regularly waved (crenated)

> MCL-COMPLEX

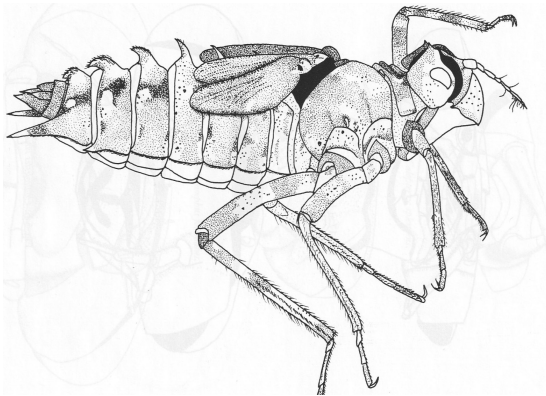
(MACROMIIDAE-CORDULIIDAE-LIBELLULIDAE)

(= syn LIBELLULOIDEA)

(= TRICHODOPALPIDA)

> MACROMIIDAE

> LATEROCARINIDA



> ep : f3 = 1 : < 4 (-2.3)

ant1+2 : ep = 1 : > 2.5 (-6)

pp : t1 = 1 : < 3

median sulcus flat, very weak and seldom reaching base of m
distal border of palpus normally straight or slightly wavy,
(in few genera strongly wavy or crenated)

> L - COMPLEX

(= ANAURICULIDA)

> UROTHEMISTIDAE

> EULIBELLULIDA (> 137)

(next part)

> ep : f3 = 1 : > 4 (-6)

ant1+2 : ep = 1 : ≤ 2 (-1.2)

pp : t1 = 1 : > 3

median sulcus well expressed, deepened and reaching base of m
distal border of palpus always strongly crenated

> MC - COMPLEX

MACROMIIDAE

CORDULIIDAE

OXYGASTRIDAE

- > - WITH A DISTINCT FRONTAL „NOSE“ („HORN“)
- POSTSTERNUM WITH A PROMINENT TRANSVERSE SWELLING AND STRONG MEDIAN TUBERCLE
- ABDOMEN BROADOVOIDE AND FLATTENED
- VERY LONG SPIDERY LEGS
- HEAD RECTANGULAR SHAPED WITH PROTRUDING TUBERCLES AT THE CORNERS OF OCCIPUT AND AT THE TIPS OF PRONOTUM
- dbp WITH LESS AND BIG CRENATIONS (< 8)
- ARCH-lo WAVED
- EYES VERY SMALL : w OF EYE : w OF OCCIPUT = 1 : 3-4
- ant 1+2 : w ARCH = 1 : ≈ 1.1
 - hw : ft3 = 1 : ≥ 3
 - hw : t3 = 1 : ≈ 1.5
 - m : ft3 = 1 : > 4

> MACROMIIDAE

- > - nose in anteroventral view broader (equilateral)
 - arch flattened
 - lateral borders of dpm more abruptly narrowing to bpm
 - eyes forwards and outwards orientated
 - smw : m = 1 : ≥ 4.5
 - smw : pp = 1 : > 1.5

> *Macromia splendens*

- > - nose in anteroventral view more slender at base
 - arch protruding
 - lateral borders of dpm narrowing more softly to bpm
 - eyes narrow and upwards orientated
 - smw : m = 1 : ≈ 4
 - smw : pp = 1 : ≤ 1.2

> *Macromia amphigena fraenata*
(= „sibirica“)

- > - WITHOUT A FRONTAL „NOSE“
- dbp WITH MORE AND NARROWED CRENATIONS (≥ 8)
- ce LONGER THAN HALF THE LENGTH OF py
- HEAD MOSTLY TRAPEZOIDE SHAPED AND WITHOUT TUBERCLES AT CORNERS
- LEGS SHORTER THAN IN MACROMIINAE
- w OF EYE : w OF CAPUT = 1 : < 3
 - hw : t3 = 1 : ≤ 1.5
 - hw : ft3 = 1 : ≤ 3

- > - DORSAL MEDIAN OCCIPUT WITH TWO DISTINCT AND ACUTE EPICRANIAL SPINES
- LS 9 REACHES ABOUT THE LEVEL OF THE END OF py

- > - *m e d i o -sternal short -setulated fields on st 7- 9*
- *ant1+2 : w arch = 1 : ≈ 1.1*

- DS (2-9) highly erected and flattened
- interscapal lobe flat curved in anteroventral view
- dwfr widely convex in anterodorsal view
- arch-lo angled
 - ep : ft3 = 1 : ≈ 9-10
 - hw : ft3 = 1 : ≈ 2.7
 - m : ft3 = 1 : ≈ 4

> *Epitheca bimaculata*
(CORDULIIDAE)

- > - DORSAL MEDIAN OCCIPUT WITH ABSENT, FLAT, SMALL, OR BLUNT EPICRANIAL TUBERCLES
- LS 9 NOT REACHING THE LEVEL OF THE END OF py BY FAR

- > - *m e d i o -sternal hairtufts on st 9/10*
- *ce and pp with outwards curved tips*
- *ant 1+2 : w arch = 1 : ≈ 1.4*

- no DS, but dense hairtufts on te 5-7 (4-9)
- obp set with very long and dense hairy setulae
- with short LS
- dbp with 7-8 crenations, each one with 8-10 setulae
- interscapal lobe of fr narrow and highly convex in anteroventral view, distinctly narrower (0.7-0.8) in w than distance between antennal sockets
- hind border of pronotum wavy with distal tubercle strong and hairy tufted
- (distal border) fr strongly convex and with distinct acute lateral corners set below borders level
- su bitubercular (similar to Cordulia and Epitheca)
- arch-lo waved
- male ep : dp : bp = 1 : ≈ 1.5

ce : ep = 1 : ≤ 1.45 (≈ 1.3 fem)
 ep : hw = 1 : ≤ 4
 ep : me = 1 : ≥ 3
 ep : t3 = 1 : ≈ 5
 ep : ft3 = 1 : $\approx 9-10$
 hw : t3 = 1 : < 1.35
 hw : ft3 = 1 : < 2.5
 m : t3 = 1 : ≈ 1.5
 m : ft3 = 1 : ≥ 2.5

> *Oxygastra curtisi*
(OXYGASTRIDAE)

> - *l a t e r o - sternital hairtufts on st 9/10*
- *ce and pp with straight or converging tips*

> - „wide frons“-
 - *dwfr (w of distal border of frontal shield) :*
 distance between scapal sockets = 1 : ≤ 1.1
 - *dwfr : vfr (distance from fr to scapal socket) = 1 : 0.8-0.9*
 - *su in males distinctly bilobed*
 - „longlegged“-
 - *hw : ft3 = 1 : 2.65-3*
 - *w of pronotum : ft3 = 1 : > 8 (-9.5)*
 - *ep separation- (base to supraanal tubercles : tubercles*
 to tip) male dp : bp = 1 : < 2.5 (-1.5)
 female = dp : bp = 1 : > 1.5 (> 130)

> - *DS small, flat, or rudimentary*
 - *lateral thorax with a dark oblique banding*
 - *obp with short spiny setules*
 - *ant2 : ant3 = 1 : > 1.5 (-1.8)*
 - *interommatidial angle nearly symmetric conical narrowed*
 with a less convex tip
 - *frontal occiput border very weak S-shaped*
 with interommatidial angle incurve well distad of
 mid separation
 (incurve to separation : incurve - eye = 1 : < 1.3)

- female gon- with valves flat triangular , with a
weak tubercular median tip

- ant1+2 : w arch = 1 : \approx 1.1

- arch-lo waved

> gen.CORDULIA (CORDULIIDAE)

- > - LS short (reaching scarcely end of seg.10)
- distal border of palpus with 7-9 crenations
- epicranial tubercle absent
- borders and surface of wingcase mixed with short spiny
and long hairy setulae
- male gon- flat ovoid valves and with gonopore midpoint
- DS distinct at least until to te 7 (8)
- spiny setulae on outer border of palpus strong and short
- ep : m = 1 : \approx 3.3-3.5
- m : hw = 1 : < 1.2
- mh : outer border of palpus = 1 : \approx 2.5
- PS 7-9 MS 10-13

> *Cordulia aenea*

- > - DS weaker than in *C.aenea*
- te7/8 with long mediodorsal hairs instead of tubercles
- te4 with a mediodorsal tubercle; te.5/6 with blunt spines
- with 2-3 setulae on each crenation of the distal border of palpus
- spiny setulae on outer border of palpus weak
- ant.3 longest one
 - ce : ep = 1 : > 1,1
 - ce : pp = 1 : \approx 1,35
 - ep : hw = 1 : \geq 4
 - f1 : hw = 1 : 1.45-1.5
 - f1 . m = 1 : \leq 1.3
 - LS 8 : st 8 = 1 : 4.5-5
 - LS 9 : st 9 = 1 : 3.5-4
 - te10 : py = 1 : \approx 4,8
 - PS: 9 MS: 8+ 6-7

> *Cordulia (a.) amurensis*
(E-palaeartic)

- > DS mostly absent and only tufted tubercles
- spiny setulae on outer border of palpus very short and weak
- f1 : hw = 1 : 1.3-1,4
- f1 : m = 1 : \geq 1.3

> *Cordulia shurtleffi*
(nearctic)

- > - *DS (3-9) strong and highly erected*
- *no black band across lateral side of thorax*
- *outer border of palpus with hairspiny setulae*
- *interommatidial angle of eye slightly asymmetric narrowed, with a curved leg*
- *frontal border of occiput S-shaped with interommatidial angle incurve well distad from mid- separation (incurve to separation : incurve - eye = 1 : < 1.3)*
- *female gon - valves flat triangular, with a fingershaped and well erected median branch (triquedra)*
- *ant1+2 : w arch = 1 : ≈ 0.8*

> gen. CORDULIOCHLORA (CORDULIIDAE)

- > - **first crenation of distal palpus near mh broad and simply curved**
- **DS 9 slightly surpassing te10**
- **pronotum with laterodistal corner flattubercular, less erected or protruding and set with long hairspiny setulae**
- **epicranial tubercle acute and small triangular**
- **ant 2/3 very hairy**
- **borders of wingcase seamed with mixed long hairy setae and short hairspiny setulae**
- **male gon- with valves beanshaped and a small gonopore midpoint**
- **hamules in male small and narrow bitubercled , bordered by beanshaped, basally narrowed and curved protrusions**
- **m with lateral fields of strong setulae**
- **arch flat**
- **arch-lo waved**

ep : ft3 = 1 : > 12.5

ep : m = 1: 3.5-3.7

hw : ft3 = 1 : 2.8-2.9

LS slender : w : l = 1 : > 2.5

MS 7-9

m : hw = 1 : 1.1-1.25

m : ft3 = 1 : ≈ 3.4

mh : obp = 1 : ≈ 3

PS 6

> **Corduliochlora borisi**

- > - „narrow“ frons
 - $dwfr$: distance between antennal sockets = 1 : ≥ 1.15
 - $dwfr$: vfr (distance between fr and scapal socket)
 - = 1 : > 1 (-1.3)
 - su with unitubercular tip (seldom with trifold or cutted tip in nearctic spec)
 - ep separation- (base to supraanal tubercles : tubercles to tip) male $dp:bp = 1 : \geq 2.5$ (-3.5)
female $dp: bp = 1: \approx 1$
 - female- valves flat triangular shaped and without distinctly erected branch
 - „shortlegged“ $hw : ft3 = 1: \leq 2.7$
 - w of pronotum : $ft3 = 1 : < 8$
 - interommatidial angle of eye with legs asymmetric narrowed with basal leg distinctly convex curved to tip
 - frontal occiput border well S-shaped with interommatidial angle incurve narrow set to median separation
(incurve to separation : incurve - eye = 1 : > 1.4)
 - $ant1+2$: w arch = 1 : ≈ 1 (0.9-1.2)
 - arch-lo angled

> gen SOMATOCHLORA (CORDULIIDAE)

> without DS and without LS
palpus with 7-9 crenations, each one
with 3-6 setulae

- > - st 5+8 rimmed with a row of dense set, fine and short hairspiny setulae
 - cuticula of te densely set with a mix of short spiny and hairspiny setulae
 - hairy setae at lateral border of seg.9 shorter than length of segment

- surface of te10 hairy
- te9 longer than py
- legs densely hairy
- dorsal occiput behind eyes shorthairy bordered
- py about 3.5 times the length of te10
- lateral border of te9 \geq py
 - ep : m = 1 : > 3.3 (-4)
 - hw : ft3 = 1 : < 2.5
 - m : ft3 = 1 : < 2.5
 - te9 : te8 = 1 : > 1.7

> Somatochlora arctica

- > - st 5+8 with a few long and wideset hairy setae
- cuticula of te set with loose shortspiny setulae only
- hairy setae at lateral border of seg 9 same length or longer than its segment length
- cuticula of te10 not hairy setulated and with a shorthairy border only
- te9 shorter than py
- legs less hairy
- py about 4 times the l of te10
- lateral border of te9 $<$ py
- dorsal occiput behind eyes bordered with long hairy setae to
 - ep : m = 1 : ≤ 3.3
 - hw : t3 = 1 : 1.1-1.2
 - hw : ft3 = 1 : ≤ 2.2
 - m : ft3 = 1 : > 2.5
 - te9 : te8 = 1 : < 1.7

> Somatochlora alpestris

> *without DS but with LS*

- > - mediotergites less tufted, with some long hairs only
- palpus with 8-9 crenations, each one with 2-3 setulae
- fr rel. wide and slightly convex
 - hw : ft3 = 1 : ≈ 2.5
 - LS9 : st9 = 1 : ≈ 2
 - LS9: ft3 = 1 : ≈ 19
 - m : ft3 = 1 : ≈ 2.5
 - smw : fr = 1 : ≈ 1
 - smw : m = 1 : > 4.5
 - smw : wpronotum = 1 : $\approx 1,5$
 - wpronotum : m = 1 : > 3

> Somatochlora sahlbergi

> *with DS and with LS*

> **LS 8 : LS 9 = 1 : 3-5**

> - LS 9 : st9 = 1 : < 2

DS on te 4-9, on te 4-6 short and strongly reduced
epicranial tubercles absent

ce : ep = 1 : < 1.1

LS 8 : ce = 1 : > 5

hw : ft3 = 1 : < 2.5

PS 7 MS 11(12)

> **Somatochlora flavomaculata**

> **LS 8 : LS 9 = 1 : << 3**

> *LS 8 : LS 9 = 1 : ≈ 2*

- *ant3 >> ant7*

- *ant1+2 : arch = 1 : < 1*

- *ep : m = 1 : ≈ 3- 3.5*

- *m : ft3 = 1 : ≈ 3*

- *ce : ep = 1 : ≈ 1.1*

- *arch : lo = 1 : ≈ 3*

> - *ant6 > ant7*

- *ant7 : smw = 1 : ≤ 2*

- *arch : smw = ! : ≥ 1*

- *smw : pronotum = 1 : >1.6 (-1.9)*

- *smw : lo = 1 : ≥2.7 (-3.2)*

- *obp spiny*

- *interscapal lo medium hairspiny setulated*

- DS 9 reaching or surpassing end of te10

- (basal part) bp of DS 9 ≤ dp of DS 9 (lat.view)

- DS on te3-9, on 3-6 long and erected

- LS 9 with length at least half of its sternal length,
surpassing st10 by far

- seg.9 in laterotergital view with LS bigger shaped than DS

- palpus with 8-9 crenations, each one set with 4-5 setulae

- first crenation of distal palpus near mh strongly
incurved (doubled)

- borders of wingcase seamed with short hairs only
- pronotum with a distinctly erected and protruding laterodistal fingershaped corner, set with short hairspiny setulae
- male gon - with long ovoide valves
- hamules in male bitubercled with small and distant tubercles and with a circular or bowlshaped bordering
- ant1 with distinct distal knob
 - ep : fl = 1 : << 3
 - ep : ft3 = 1 : ≈ 11
 - ep sep - dp : bp = 1 : 3.5-4 (male) 1: 4-5 (female)
 - LS thick (w : l = 1 : ≈ 2)
 - LS 9 : st9 = 1 : ≈ 2
 - LS8 :st8 = 1 : 4-5
 - m : hw = 1 : 1.2-1.4
 - m with lateral fields of short setulae
 - smw : fr = 1 : ≈ 1
 - st9 hairy setulae reaching about 2/3 of pp
 - te10 : py = 1 : < 4.5
 - te10 : ce = 1 : ≈ 3,5
 - wpronotum : ft3 = 1 : ≤ 8

> **Somatochlora meridionalis**

- > - *ant6 < ant7*
- *ant7 : smw = 1 : > 1.5*
- *arch : smw = 1 : > 1.2*
- *smw: wpronotum = 1 : ≈ 1.5*
- *smw : lo = 1 : < 2.5*
- *obp hairspiny*
- *interscapal lo short hairspiny setulated*

- ant1 with weakly thickened knob
- DS erected on te 3-9
- DS 3-5 very small and acute. on te 5-7 narrowbased and more than double the hight of its bw
- LS 9 reaches about half of st 10 (lat.view)
 - ep : ft3 = 1 : ≤ 10
 - hw : ft3 = 1 : > 2.5 (-2.7)
 - LS 8 : ce = 1 : ≈ 4
 - tip of ligula with few spines
 - smw : m = 1 : ≈ 3.5
 - smw : fr = 1 : << 1
 - st9 hairy setulae reaching about half of pp

te10 : ce = 1 : < 3.5
te10 : py = 1 : < 4.5
wprnotum : ft3 = 1 : > 6

> *S. (japonica) exuberata*

> *LS 8 : LS 9 = 1 : ≈ 1.5*
wprnotum : ft3 = 1 : < 8

- > - *ant7 : smw = 1 : < 1.5*
- *ant3 ≈ ant7*
- *arch : smw = 1 : < 1*
- *ep : ft3 = 1 : ≈ 12*
- *ep : m = 1 : ≈ 3.5*
- *interscapal lobe longhairy setulated*
- *m : ft3 = 1 : ≈ 3.5*
- *smw : wprnotum = 1 : ≤ 2*
 - arch : lo = 1 : ≥ 3*
 - DS very broadbased on te (4) 5-9
on te 5-7 as broad as high
 - DS 8 strong and erected, DS 9 distinct
 - hw : ft3 = 1 : > 2.5 (-2.8)*
 - LS 8/9 broadbased
 - LS 8 : ce = 1 : ≈ 3
 - LS9 : st9 = 1 : < 3
 - LS8 : st8 = 1 : > 4
 - ligula without spinulated tip
 - MS 13-16
 - obp hairspiny setulated
 - palpus with 9-10 crenations, each one set with 3-4 setulae
 - PS 9-10
 - smw : ft3 = 1 : > 15 (others < 14)*
 - smw : fr = 1 : ≈ 1.2*
 - smw : m = 1 : ≈ 4.5*
 - st9 hairy setulae reaching about tip of pps

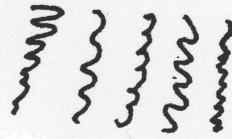
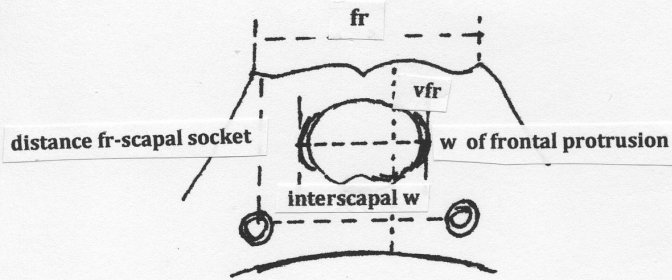
> *Somatochlora graeseri*

- > - *ant7 : smw = 1 : > 1.5*
- *ant3 > ant7*
- *arch : smw = 1 : > 1*
- *ep : ft3 = 1 : ≤ 10*
- *ep .ö- : m = 1 : ≈ 3*
- *interscapal lo short hairspiny setulated*
- *m : ft3 = 1 : ≈ 3*
- *smw : wprnotum = 1 : ≈ 1.5*

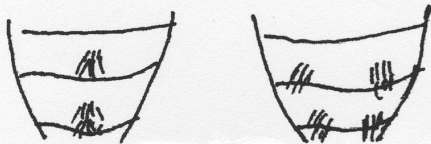
- arch : lo = 1 : ≥ 3.3
- DS erected on te 3-9
 - DS9 max.reaching end of te10
 - bp of DS 9 > dp of DS 9 (lat.view)
 - seg 9 in laterotergital view (both spines are visible in transverse) with DS 9 looking stronger shaped than LS 9
 - LS 9 with length less than half of its st
 - each crenation of palpal distal border set with 5-8 setulae
 - LS 9 reaches about end of te 10 (in lat.view)
 - ce : ep = 1 : > 1.1
 - hw : ft3 = 1 : ≤ 2.5
 - LS 9 : st 9 = 1 : ≈ 3.5
 - LS 8 : ce = 1 : ≈ 4
 - ligula with tip spinulated
 - obp spiny setulated
 - st10 : pp = 1 : < 3,5
 - te10 : py = 1 : 4.5-5
 - te 10 : ce = 1 : ≥ 3

> *Somatochlora metallica*

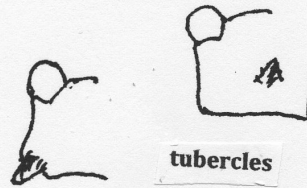
Corduliidae



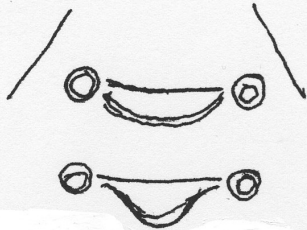
dbp



endsternites



tubercles



interscapal lobe

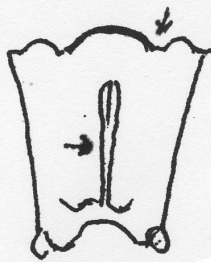


interommatidial angle

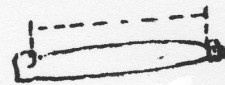


tubercles

ep



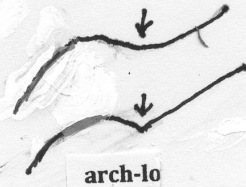
median sulcus



legs f1/f3



gon



arch-lo

Fam.

- **m** spoon-shaped (helmet mask in frontal view)
- **m** without a cleft at median lobe
- **dbp** normally straight, seldom crenated
- **ant1+2 : ep = 1 : > 2.5 (-6)**
- **ep : f3 = 1 : < 4 (-2.3)**
- **pp : t1 = 1 : < 3**
- **m** without a distinct mediovertical groove
- **hw** anal loop footshaped (if venation visible)



> LIBELLULIDAE -COMPLEX

- > TETRATHEMISTINAE
- > LIBELLULINAE
- > TRITHEMISTINAE
- > SYMPETRINAE
- > PALOPLEURINAE
- > ONYCHOTHEMISTINAE
- > ONYCHOTHEMISTINA
- > ZYGONYCHINA
- > ZYXOMMATINAE
- > PANTALINAE

> - HEAD WITH SMALL TO VERY SMALL EYES (L OF EYE << L OF VERTICAL OCCIPUT) AND RECTANGULAR OR TRAPEZOIDE SHAPED (> 151)

> - EYES VERY SMALL, PROTRUDING FORWARDS AND UPWARDS

- **W OF EYE : OCCIPUT- L = 1 : 2-3**
- **EYE-L : L OF LATERAL OCCIPUT = 1 : ≥ 2**
- **EYES DORSAL HINDBORDER WITH A NARROW LATERAL INCURVE (> 147)**

- > - ant1+2 : w ARCH = 1 : ≥ 1.5
- ARCH WITH CURVED BORDER
- dwfr : vfr (- EPISTOMAL SUTURE) = 1 : < 2 (1.7-1.9)
- dbp CRENATED
- ep NOT /OR WEAKLY EDGED (CARINATED)
- hw \approx t3 (> 140)

> *with DS*

- > - *DS 3-8 small and flat*
- *dbp distinctly crenated*
- *PS ≥ 10*
- base of sm narrowly incurved
- eyes directed forwards and strongly upwards
- fr (border) straight
- radial vein (Rs) distinctly waved
- outer border of fw triangle and lower vein of trigonal space (= MP of cubitoanal interspace) form an angle of $> 70^\circ$
- dwfr : vfr (- scapal socket) = 1 : 1.1-1.3
- poststernal triangle with top narrow semicircular
- scar-stripe near eyes hindborder wide (in lateral view)
 - arch-lo distinctly notched
 - bwm : m = 1 : ≈ 3
 - ce : hw = 1 : > 6
 - ce : m = 1 : ≥ 5
 - ep : hw = 1 : ≈ 3
 - ep : f3 = 1 : < 3
 - f3 : hw = 1 : ≈ 1.2
 - ligula $\leq 90^\circ$
 - lo serrate
 - m : t3 = 1 : < 1.3
 - pp : hw = 1 : ≥ 4
 - smw : m = 1 : ≥ 4
 - st10 : pp = 1 : < 2.5

> *Platetrum depressum*
(gen.PLA TETRUM / LIBELLULINAE)

> - *DS 4-9 (10) strong, slightly erected, setulated
and with mediotergital hair tufts*

- *dbp weakly crenated*

- *PS < 5*

- *fr slightly wavy and bilobed*

- *eyes directed forwards and less upwards*

- *dwfr : vfr (- scapal socket) = 1 : 1.3- 1.4*

bwm : m = 1 : ≈ 2

bwm : dwm = 1 : < 2.4

ep : f3 = 1 : > 3

eye-w : occiput-w = 1 : >> 2.5

f3 : t3 = 1 : ≤ 1.05

ligula < 90°

MS 4

smw : m = 1 : < 3

arch-lo weakly notched

> gen LADONA (LIBELLULINAE)
(syn. EUROTHEMIS)

> **PS 3**

pp ≤ smw

st10 : pp = 1 : ≈ 2

- **palpus-** distance distal setae - base of mh :
distance basal setae - base of palpus = 1 : < 2.5
distance distal setae - base of mh : mh = 1 : < 2

ant6 < ant7

DS 4-5 erected

ep : hw = 1 : ≤ 4

ep : m = 1 : ≈ 3

LS 1/3-1/4 the length of st

LS9 : ep = 1 : ≥ 6

LS9 : hw = 1 : ≈ 20

LS8 : m = 1 : ≥ 13

mh : smw = 1 : ≈ 2

te10 : ep = 1 : < 3

wep : ep = 1 : < 1.4

want1 > ant1

l of exuv : ≤ 20 mm

> **L. pontica**

> PS 4

pp >> smw

st10 : pp = 1 : >> 2.5 (-3.5)

- palpus- distance distal setae- base of mh :
distance basal setae - base of palpus = 1 : > 2.5
distance distal setae - base of mh : mh = 1 : > 2
- ant6 ≥ ant7
- ep : hw = 1 : ≤ 3.5
- ep : m = 1 : < 2.5
- LS 9 : ep = 1 : 5
- LS 8 : m = 1 : ≈ 10
- LS 9 : hw = 1 : ≈ 15
- mh : smw = 1 : < 2
- te10 : ep = 1 : > 3 (-4)
- wep : ep = 1 : ≥ 1.5
- l of exuv : ≥ 19 mm

> L. fulva

> *without DS*

- *dbp deeply crenated*

- *PS 9-10*

body hairy
without mesosternal setae
ant1+2 : w arch = 1 : ≈ 1.4
arch-lo angled
arch small triangularely shaped
ce : py = 1 : ≈ 3
ep distal weak carinated
fr : vfr (- scapal socket) = 1 : ≈ 1
hw : t3 = 1 : ≤ 1
MS 13-14
te 4-8 with dark mediotergital hairtufts

> *Potamarcha congener*
(*asiatropic*)

> - ant1+2 : w ARCH = 1 : ≤ 1.2

- ARCH NARROW WITH A STRAIGHT TO WEAKLY
CONCAVE LATERAL BORDER

- dwfr : vfr - EPISTERNAL SUTURE = 1 : > 2

- dbp STRAIGHT TO SLIGHTLY WAVY

- fr GENUSTYPICALLY NARROW WAVED AND
WITH A NARROW MEDIAN NOTCH

- dwfr : vfr (- SCAPAL SOCKET) = 1 : 1.3-1.5
- ep PARTLY EDGED (CARINATED)
- OUTER BORDER OF fw- TRIANGLE AND LOWER VEIN OF TRIGONAL SPACE (= MP OF CUBITOANAL INTERSPACE) FORM AN ANGLE OF $\approx 50^\circ$ (IF VISIBLE)
- ABDOMEN OFTEN WITH REDDISHBROWN ENDSEGS
- bwm : m = 1 : 2.1 - 2.7
- arch-lo notched

> gen. ORTHETRUM (LIBELLULINAE)

> *with well visible DS and with LS 8/9 (> 143)*

> *ep : m = 1 : < 1.2*

> - *DS 4+5*

- *ce \approx smw*

- *PS 5*

ce : py = 1 : ≈ 2

ce : dw of te10 = 1 : < 1.5

dwfr < tw

LS 1/4-1/5 of st

m : hw = 1 : ≤ 1.5

pp : hw = 1 : ≤ 1.7

pp : m = 1 : ≈ 1.1

st10 : pp = 1 : ≥ 4

te10 : py = 1 : 6-7

wep : ep = 1 : ≈ 2.3

wep : ce = 1 : $\gg 1$

> *O. trinacria*

> *ep : m = 1 : > 1.25*

> *DS 4+5+6*

ce \ll smw

PS 7 (± 1)

ep : m = 1 : ≈ 1.5
ep : t3 = 1 : > 1.55
fr \geq tw
t3 : hw = 1 : < 1
wep : ep = 1 : ≤ 2
w ep (at level of ce tip) : ce = 1 : < 5

> **O. cancellatum**

> **DS 4+5+6+7**

> **PS 8 (± 1)**

DS medium

dbp slightly waved

ce : py = 1 : ≈ 2.5
ce : pp = 1 : ≈ 4.5
ce : m = 1 : ≈ 2.5
ce \leq smw
ce : dw of te10 = 1 : > 1.5
ep : m = 1 : ≥ 1.2 (-1.6)
ep : t3 = 1 : > 2.5
st10 : pp = 1 : ≥ 4.5
t3 : hw = 1 : ≈ 1
wep : ep = 1 : ≤ 2
wep : ce = 1 : < 1

> **O. sabina**

> **PS 5 (± 1)**

DS very long and strong

wep : ep = 1 : ≈ 2
w ep (at level of ce tip) : ce = 1 : ≥ 6
MS 3 + s

> **O. luzonicum**

(not available) > *O. glaucum*
> *O. melania*
(asiatropic)

> **DS 4+5+6+7+8**

> **PS ≥ 7**

MS 4 + s

DS 4 erected, 5-8 less erected

ep : m = 1 : > 2 (-2.5)
ep : hw = 1 : > 3
pp : m = 1 : ≈ 2.5

> *O. triangulare*
(asiatropic)

- > PS 6
- MS 3 + s
- DS 4 oblique, 5-8 strong, acute
- ep : m = 1 : < 2
- ep : hw = 1 : < 3
- pp : m = 1 : ≥ 2

> *O. pruinosum*
(asiatropic)

> DS 6-7

(not available) > *O. hinzi*
(afrotropic)

> without distinct DS and with LS 8/9 (> 147)
(- only in *O. coerulescens* with minute,
scarcely visible DS)

> PS 2-4
MS : 2 + s

- > - with blunt tubercular to acute tufted minuite DS on 4-5
- maxillae with last lancinia (hook) of internal lobe longer
- basal border of m with a flat incurve (l : w = 1 : ≈ 5)
- pp with tips diverging
- st 9/10 weakly hairy and with short hairs, not reaching mid of pp
- palpus- distance distal setae - base of mh : mh = 1 : ≤ 1.3
- ce: dw of te 10 = 1 : ≥ 2
- ce : py = 1 : ≤ 2
- ep : hw = 1 : ≤ 3
- ligula ≤ 90°
- m: hw = 1 : ≤ 1.4
- te10 : py = 1 : ≈ 6
- wep : ep = 1 : ≈ 1.25
- wep : ce = 1 : < 0.8

> *O. coerulescens*

- > - without any DS
- maxillae with more slender galea (external lobe)
(mediotransverse w : l = 1 : ≈ 4.5)
and internal lobe with last lancinia broader
(w : l = 1 : ≈ 2.5)
- ant7 more slender (w : l = 1 : ≈ 9)
- palpus- distance distal setae - base of mh : mh = 1 : ≈ 1.5

> *O. coerulescens anceps*

> PS 5-8

> wep : ce = 1 : < 1.2

> ce : py = 1 : > 2.2

MS: 3 + s

ce : wep = 1 : \approx 1.25

ce : ep = 1 : > 2

ce : smw = 1 : \approx 1.25

ep : hw = 1 : < 2.7

ep : m = 1 : < 1.8

LS 8+9 \approx 1/3-1/4 of st

m \leq f1

m : t3 = 1 : > 1.5

pp : m = 1 : \leq 1.7

pp : f1 = 1 : < 2

pp : hw = 1 : < 3

st10 longhaired hairs reaching about mid of pp

te10 : py = 1 : \approx 6.5

wep : ep = 1 : \approx 2

PS 5(6)

> O. albistylum

> ant4 : ant3 = 1 : \approx 2

ce : ep = 1 : \approx 2

LS 9 : st 9 = 1 : \approx 5-6

te10 : py = 1 : \approx 5

> *O. albistylum speciosum*
(E-palaeartic)

> ce : py = 1 : < 1.9

MS : 1 + s

ce : ep = 1 : \leq 1.8

ep : hw = 1 : \geq 2.8

ep : m = 1 : > 2

LS 8+9 minute \approx 1/8 - 1/10 of st

m > f1

m : t3 = 1 : < 1.4

pp : f1 = 1 : > 2.2

pp : hw = 1 : > 3.3

te10 : py = 1 : \approx 4

wep : ep = 1 : \approx 1.6

PS 6(7)

> O. nitidinerve

> **wep : ce = 1 : 1.2-1.5**

- basal fourth of ep widened, ep at mid narrower than w of ce
 - w of ep at level tip of ce : $wep = 1 : \geq 6$
 - arch scarcely notched before lo
 - reddish-brownish abdomen with many long hairs on te and mediocarinal tufts ,
 - on te 7-9 bordered with rows of long hairspiny setae
 - st 7+8 bordered with long, hairy setae
 - long hairy setae on lateral borders of endtergites
 - hw with long hairy setae , about 1/5 the length of hw
- ce : ep = 1 : ≈ 2
ce : wep = 1 : ≈ 1.35
ce : smw = 1 : ≥ 1.5
ep : hw = 1 : < 3
ep : fl = 1 : ≤ 2
LS 8 : m = 1 : ≥ 7
LS $\approx 1/8-1/12$ of st
st10 : pp = 1 : ≈ 5
te10 : py = 1 : > 6 (-9)
te10 : ep = 1 : ≥ 6 (-8)
wep : ep = 1 : ≈ 1.5
wep : dw of te 10 = 1 : ≈ 1.8
PS 7(6) MS 3 + 1-3 mediad

> **O. chrysostigma**

> **wep : ce = 1 : 1.5 - 2**

> **PS 6**

MS 2 +1 + s

- ep approximately conical narrowed to tip
- w of ep at level tip of ce : $wep = 1 : \leq 5$
- arch distinctly notched before lo
- basal border of m with a distinct incurve (l : w = 1 : ≈ 4)
- pp with tips converging
- st 9/10 strongly haired with long setae
- endtergites with shorter hairy and longspiny setulae
- st10 with long and dense hairy setae , surpassing half of pp
- st9 with hairy setulae , reaching about end of st10

ce : ep = 1 : < 2
ep : hw = 1 : ≥ 3
ligula > 90
LS 8/9 ≈ 1/5- 1/8 of st
m : hw = 1 : > 1.4
st10 : pp = 1 : ≈ 3
te10 : py = 1 : ≤ 7
te10 : ep = 1 : < 6
wep : ep = 1 : ≈ 1.2
wep : dw of te10 = 1 : ≈ 1.5

> **O. brunneum**

> **PS 7 (8)**

MS 4 +1-2 mediad or nearly continuous

- pale abdomen with less long hairs on te
- te 7-9 bordered with rows of longspiny setulae
- st 7+ 8 bordered with short and dense hairspiny setulae
- st 8 /9 lateral with long and dense hairy setae
- basal third of ep widened , at mid wider than bw of ce
- hairy setae on hw shorter than in chrysostigma
(about 1 / 7 the length of hw)

ce : ep = 1 : > 1.8
ce : wep = 1 : ≈ 1.5
ce : smw = 1 : ≥ 1.5
ep : f1 = 1 : > 2
LS 8 : m = 1 : < 6
LS8/9 ≈ 1/3-1/6 of st
st10 : pp = 1 : ≈ 4

> **O. taeniolatum**

> **without DS and without LS**

PS: 12-13

MS 13-16 continuous (similar to *Hadrothemis*)

IR2 -Rspl with 1 row of cells , RP2 not sinuous (if visible)

ant7 longest

bwm : m = 1 : < 3

ep : hw = 1 : > 2.6

ep : t3 = 1 : ≈ 3

ep : m = 1 : ≥ 2

f3 : hw = 1 : << 1

hw : t3 = 1 : ≈ 1.1

m : t3 = 1 : ≈ 1.4

m : hw = 1 : ≈ 1.25

wf3 : f3 = 1 : ≈ 9 -10 (4-5 in others)

> **O. ransonneti**

(in larval view probably belonging to another genus)

> **O. kollmannspergeri**

? (not available) (afrotropic)

further afrotropic species (not available) (partly after Suhling)

no DS, no LS , Rspl 2 rows - *O.brachiale*

DS weak, with LS, Rspl 1 row - *O.julia*

DS weak, without LS - *O.caffrum*

> - **EYES SMALL**

- **EYE-L : L OF VERTICAL OCCIPUT = 1 : < 1.5**

> - **te 9-10 WITHOUT DS**

> - **DS LESS ERECTED**

- **fr WIDELY BILOBED**

- **dwfr : vfr - SCAPAL SOCKET = 1 : 1-1.1**

- **EYES DORSAL HINDBODER WITH
LATERAL INCURVE WIDE**

- **ep VERY WEAKLY CARINATED**

- **ARCH-lo weakly notched**

> PS ≈ 7 (6-8)
MS 9-10

- base of sm slightly incurved
- dwfr : vfr- epistomal suture = 1 : ≈ 1.5
- eyes protruding frontolaterally
- dbp approx. straight
- poststernal triangle with top wide semicircular
- scar-stripe near eyes hindborder very narrow (in lat.view)
 - bwm : m = 1 : \leq
 - ce : hw = 1 : ≤ 4
 - ce : m = 1 : ≈ 3
 - DS 3-8 flat. blunt
 - ep : hw = 1 : ≤ 2.5
 - f3 : t3 = 1 : ≥ 1.1
 - f3 : hw = 1 : ≈ 1
 - hw : t3 = 1 : ≈ 1.2
 - ligula $< 90^\circ$
 - m : t3 = 1 : > 1.3
 - pp : hw = 1 : ≤ 3
 - smw : m = 1 : > 3
 - st10 : pp = 1 : ≥ 3
 - whw : hw = 1 : ≥ 2
- ant1+2 : w arch = 1 : ≥ 1.5

> *Libellula quadrimaculata* (gen.LIBELLULA)
(LIBELLULINAE)

> PS 3
MS 1 + micros
(convex curved arranged similar to *Neodythemis*)

- dwfr : vfr - epistomal suture = 1 : ≈ 1.7
- ant1 : ant2 = 1 : ≈ 1
- bwm : m = 1 : ≈ 2
- DS short, blunt, increasing from te 4-7
- hw : t3 = 1 : ≈ 2
- LS 8 $> 1/4$ of st
- LS 9 $\approx 1/8$ of st
- m : t3 = 1 : > 1.5
- m : hw = 1 : ≈ 1.3
- st10 : pp = 1 : > 2.5

> *Nesciothemis farinosa* (gen.NESCIOTHEMIS)
(LIBELLULINAE)

further Libellulidae-genera from E- Palearctic and Palaeotropis

- > **Neodythemis** (afrotropic) (no PS)
- > **Cratilla** (asiatic) (deeply crenated palpal border; PS+MS > 12)
- > **Deielia** (E-asiatic) (PS 4-5, MS 8, LS9 reaching end of st 10)
- > **Lyriothemis** (E-asiatic) (PS/MS 8, LS 9 reaching about half of pp, DS 4-9 very strong)

> **te 9-10 WITH DS**

> **DS 4-9 (10)**

ant1+2 : w arch = 1: ≤ 1.4

> **-DS less erected and small**

- **te10 and ep not or less mediocarinated (edged)**
- **hw with closed toe of anal loop (if visible)**
- **arch-lo waved**

- **w i t h very short and d a r k epicranial hairtufts**
- **anal pyramid very short**
- **eyes small globular - w of eye : occiput-1 = 1 : ≥ 2.5**
- **obp set at basal half with strong hairy setulae**
- **dbp slightly crenated**
- **occiput with lateral borders less conical,**
- **ant 6 longest, ant7 abruptly narrowed to tip**
- **LS 8/9 very short and curved inwards**

bwm: dwm = 1: ≤ 1.5

ce : ep = 1 : ≤ 1.3

ep : t3 = 1 : > 5

ep : ft3 = 1 : > 10

hw : t3 = 1 : ≈ 1.25

hw : ft3 = 1 : ≈ 2.5

MS: 5 PS 6/7

m : hw = 1 : ≈ 1.6

smw : m = 1 : ≤ 5

whw : hw = 1 : ≤ 1.7

- > **Rhyothemis semihyalina**
(ONYCHOTHEMISTINAE)

> - **DS broadbased , flatcurved**

- **te10 and ep c o m p l e t e l y carinated**
- **hw with o p e n toe of anal loop (if visible)**

- procoxae less notched, apical branch with a blunt globular knob bent strongly forwards and caudal branch with a minute tubercle
 - eyes small, about 1/3 the l of head, directed posterolateral
 - obp without distinct spiny setulae
 - dbp deeply crenated
 - interommatidial angle blunt, tip looking nearly square and correlating with median incurve of occiput border
 - fr about transverse
- ce : ep = 1 : > 2
hw : t3 = 1 : ≈ 1.2
LS 8/9 straight
LS 9 > LS 8
m : hw = 1 : ≈ 1.4
pp : hw = 1 : ≈ 3.6
PS 7/8 MS 13
smw : m = 1 : ≥ 5
whw : hw = 1 : ≤ 1.8

> *Zyxomma petiolatum*
(ZYXOMMATINAE)
(asiatropic)

> **DS 3-10 , erected and broadbased**

- **ant1+2 : w arch = 1 : ≈ 1**

> - **te 10 and ep c o m p l e t e l y and strongly mediocarinated**

- **hw with o p e n toe of anal loop (if visible)**
 - anal pyramid very long
 - occiput trapezoid shaped with lateral borders strongly conical
 - eyes very small, posterolateral orientated
- ant7 < ant6
arch-lo angled
bwm : m = 1 : ≤ 4
ce : pp = 1 : ≈ 2
ce : ep = 1 : ≥ 3
dbp distinctly crenated

ep : hw = 1 : > 2.2
 ep : t3 = 1 : ≤ 3
 ep : m = 1 : ≈ 1.6
 LS 8 / 9 very short
 LS 8 : LS9 = 1 : ≈ 1.2
 m : hw = 1 : ≈ 1.6
 m : t3 = 1 : ≈ 1.8
 pp: m = 1 : ≤ 1.5
 PS: 4-5 MS (8) 9
 smw : m = 1 : ≤ 5
 st10 : pp = 1 : > 4
 te10 : ep = 1 : ≤ 4
 whw: hw = 1 : ≈ 2

> *Tholymis tillarga*
 (ZYXOMMATINAE)
 (asiatropic)

**> HEAD WITH EYES MEDIAD SIZED TO
 BIGSIZED, DIRECTED OR PROTRUDING
 FORWARDS OR LATERALWARDS OR
 ELONGATED BACKWARDS
 (L OF EYE ≥ L OF LATERAL OCCIPUT)**

> WITHOUT DS (> 163**)**

> WITHOUT LS

- > - eyes big globular, protruding frontolateral
- ce and ep with tips curved downwards
- te 6+7 mediocarinal with very long hairs
- mesosternum with a fine median tuft of hairs
- st9 with very long marginal hairy setae
- obp basally set with long hairy setulae
- vertical eye - l : occiput-l = 1 : ≈ 0.65
- oblique l of eye (frontal to distal corner) :
 vertical l of occiput = 1 : ≈ 0.5
- w of eye : dwfr = 1 : ≈ 1
- arch-lo waved
- ant1+2 : w arch = 1 : ≥ 1.5
- ant: 7-segmented
 bwm : dwm = 1 : ≤ 1.5

ce : ep = 1 : \leq 1.3
hw : t3 = 1 : \leq 1.1
MS: 12-13
PS : 6-7
smw : m = 1 : \geq 3
whw : hw = 1 : \geq 1.85

> **Acisoma panorpoides**
(ssp.ascalaphoides inflata)
(SYMPETRINAE)

- > - eyes protruding forwards
- ce and ep straight
- LS 8/9 absent or rudimentary expressed
- strong hairy body

> **Crocothemis sanguinolenta**
(SYMPETRINAE)
(see below Crocothemis spec)

> **WITH LS 9 ONLY : FINGERSHAPED AND
STRONGLY DIRECTED OUTWARDS**

- abdomen set with long hairy setae preferably on lateral endsegments
- ep with a narrow tip curved downwards
- eyes orientated lateralwards
- ce diverging and pp with narrow and inwards curved tips,
both ones set with spiny setulae
- obp with long hairspiny setulae
- mesosternum with a median field of hairspiny setulae (> 5)
- ant1+2 : w arch = 1 : > 2
- arch-lo waved
 - bwm : m = 1 : \approx 4
 - bwm : w of lo = 1 : \geq 2
 - ce : m = 1 : < 6
 - ep : m = 1 : \geq 4
 - ep : hw = 1 : > 4
 - f1 : m = 1 : \approx 1.5
 - f1 : hw = 1 : \geq 1.5
 - hw : t3 = 1 : > 1.2
 - m : hw = 1 : \approx 1
 - MS : 8 (9) PS 12
 - whw : hw = 1 : \geq 2

> *Rhodothemis rufa (asiatropic)*

> WITH LS 8 + 9

- > - EYES SLIGHTLY TO STRONGLY PROTRUDING OR SLIGHTLY ORIENTATED LATERALWARDS
- LS 9 SHORT, REACHING MAX. TO BASAL PYRAMID (> 162)

- > - *LS 9 distinctly longer than LS 8*
- *LS 8 : LS 9 = 1 : ≥ 2.5*
with a row of MaS on st 8

mesosternal setae: 2 x 1
LS 8 : st8 = 1 : ≥ 4
LS 9 : st9 = 1 : ≈ 1.5
MS 13-14 PS 10-11
st10 : pp = 1 : 3.5-4
whw : hw = 1 : ≈ 2
dbp straight
ant1+2 : w arch = 1 : ≈ 1.9
arch -lo slightly waved

> *Sympetrum sinaiticum*

- > - *LS 8+ 9 about of same length*
- *LS8 : LS9 = 1 : < 2*

> *without a row of spiny setulae (MaS) on st 8*

MS 15-16
PS 13-14
mesosternal setae : 2x1

ant6 : ant3 = 1 : 0.95 (± 0.1)
ce : f1 = 1 : > 3.5
ce : py = 1 : ≈ 2
ce : pp = 1 : ≥ 1.6
dbp straight
eyes less protruding
LS : st = 1 : 5-6
lateral borders of endsegments less curved
m : hw = 1 : ≈ 1.2
m : f1 = 1 : ≈ 1.2

pp : hw = 1 : \approx 3
pp : m = 1 : \approx 2.5
pp : fl = 1 : \leq 2
ant1+2 : w arch = 1 : \approx 1.6
arch -lo about angled

> *Sympetrum fonscolombei*
(syn. *Tarnetrum fonscolombei*)

> *with a row of MaS on st 8*

> - *dbp distinctly crenated*
- *mesosternal setae 2 x 1*
- *eyes slightly orientated backwards*

ce : ep = 1 : \approx 2.1
ce about 2/3 of py
ep : fl = 1 : $>$ 2
ep : ft3 = 1 : \approx 7
ep : hw = 1 : \geq 3
ep : m = 1 : $>$ 3
LS 9 : ep = 1 : $>$ 4
lo of m well crenulated and
with a spiny field below ligula
m \geq hw
m : ft3 = 1 : \approx 2.15
MS 12-13 PS 8 (9)
MaS on st.7-9
occipital spiny setulae very long
pp : hw = 1 : \approx 3.7
pp : m = 1 : \approx 3.5
st10 : pp = 1 : \approx 3
smw : m = 1 : 6.5 -7
te10 : ep = 1 : \approx 5
ants1+2 : w arch = 1 : \approx 1.7
arch-lo waved

> *Indothemis carnatica* ?
(*asiatropic/Thail*))

> - *dbp about straight (or very weakly crenulated)*
- *eyes protruding frontolateral*

> *without any mesosternal setae*

MS ≈ 20

PS ≥ 15

ant 7-segmented

ant3 > ant6

ant1+2 : w arch = 1 : ≈ 1.8

arch-lo angled

arch of m flat

ce : ep = 1 : ≤ 2

ep : m = 1 : ≈ 2

ep : hw = 1 : < 3

hw : ft3 = 1 : ≈ 2

ligula $> 95^\circ$

LS $8/9 \leq$ half the length of st

m : hw = 1 : < 1.5

m : ft3 = 1 : ≥ 2.5

mh at distal part setae-like

smw : m = 1 : > 4

venation often well visible

with trigonal space widened and with fw trigonal 3-rowed

> *Bradynopyga geminata*

(*asiatic*)

(SYMPETRINAE)

> *with mesosternal setae (2 x 3-8)*

MS < 18

PS < 14

whw : hw = 1 : ≤ 2

obp without setulae

ep not or weakly mediocarinated (edged)

> **with dark epicranial hairtufts**

- l of pt : distance pt-node = 1 : ≤ 2

- distal lobe of pronotum with an erected and setulated lip

- fw along median transverse with darkened lunules,
hw same and with subtransverse part darkened

- *without* a distinct longspiny seta on mediobasal
lobe of pronotum

ce : ep = 1 : ≈ 1.5

smw : ep = 1 : ≥ 2

dwfr < ep (1 : 1.1- 1.3)

dwfr : vfr (-scapal base) = 1 : ≤ 1.1

dwfr : distance between scapal sockets = 1 : ≤ 1.1

ant6 : ant3 = 1 : \approx 1
ant5-7 > pp
ant1+2 : w arch = 1 : \approx 1.7
arch-lo waved
ce : ft3 = 1 : 10.5-11
ce : py = 1 : \approx 1.75
dwfr : ant5-7 = 1 : \approx 1.1
dwfr : m = 1 : \leq 3.3 (octo) < 4 (sex)
ep : ft3 = 1 : < 8
ep : m = 1 : \leq 3
ep : hw = 1 : \approx 3.3 (-3.5)
ep : l of dbp (frontal view) = 1 : \approx 1.5
face in frontal view :
vfr (frontal shield) : l of dbp = 1 : \leq 1.3
dwfr : l of dbp = 1 : \leq 1.8
dwfr : distance between scapal sockets = 1 : \leq 1.15
LS 1/4 – 1/5 of st (octomaculata) 1/2-1/3 (s.sex.)
LS 9 : ep = 1 : \approx 4
m : hw = 1 : \approx 1.2
MS 12 -13
PS 8- 9 (-10 s.sex)
pp: m = 1 : \approx 3.5
pp : hw = 1 . > 4 (sex)
smw : m = 1 : \approx 5.5 (octo) \approx 6 (s.sex)
smw : fr = 1 : \approx 1.7
smw : tw = 1 : \leq 1.5
smw : wpronotum = 1 : \approx 2
distal half of ce pale (s.sex)
mediodorsal abdominal pale line
narrow to mediate in width
and also covers epiproct

> *Palpopleura sexmaculata*
octomaculata
(asiatropic)
(PALPOPLEURINAE)

> without any epicranial hairtufts

- > - face in frontal view :
- vfr (frontal shield) : dbp = 1 : 1.6-1.8
- dwfr : dbp = 1 : \geq 2.3
- fw apical and hw mediad weakly tinged
- l of pt : distance pt-node = 1 : \approx 3
- distal tip of pronotum without an erected lip

- frontal occipital border with interommatidial angle incurve more set laterally
(eyes corner - mid of incurve : mid of incurve- vertical separataion = 1 : > 1.2)

> ant5-7 : dbp = 1 : \approx 2

ce : ep = 1 : \approx 1.3

ce ; m = 1 : \approx 5

ce : ft3 = 1 : \approx 11

dwfr : 5-7 = 1 : \approx 1.2

ep : ft3 = 1 : > 9

ep : m = 1 : \approx 4

ep \leq dwfr

dbp : m = 1 : < 1.7

LS \approx 1/4 -1/5 of st

m : hw = 1 : \leq 1.1

MS 11

PS 8

pp : ft3 = 1 : \approx 9

wpronotum: whead = 1 : \approx 2

smw : m = 1 : \approx 5

smw : tw = 1 : \approx 1.2

smw : ep = 1 : \leq 1.4

smw : dwfr = 1 : \leq 1.4

maxillae: galea abruptly narrowed at tip

pale and broad mediodorsal abdominal

line widening caudalwards and covering partly py

Diplacodes nebulosa ?
(SW India)

- > - face in frontal view :
 - vfr (frontal shield) : dbp = 1: \leq 1.5 (-1.1)
 - dwfr : dbp = 1 : \approx 2
 - fw and hw with strong to very weak nodal brownish markings and uniformly tinged or with antitraverse part darkened and subtraverse part (esp.seam) light
 - PS \geq 9 (-11) MS 13 -14
 - l of pt : distance pt -node = 1 : > 2.5
 - basopronotal lobe with a small circular groove

- > - with a single longspiny and genustypical
- mediobasal seta on each lobe of pronotum
- ocellar protrusion of frons circular
 - interommatidial angle short, about 60°
(w : w of eye = 1 : \approx 1.5)
 - w of eye : occiput-1 = 1 : \approx 1.5
 - vertical eye-1 : occiput-1 = 1 : \approx 0.4
 - maxillae: galea constrictedly narrowed to tip
 - pronotum basodistal flat, broadrimmed
and set with few long and strong setulae
 - bwm : dwm = 1 : \approx 2
 - ce : ep = 1 : \leq 1.5
 - ce : py = 1 : $<$ 1.5
 - ant1+2 : w arch = 1 : \approx 1.8
 - arch-lo waved

> gen. DIPLACODES
(SYMPETRINAE)

- > *ce : ep = 1 : \approx 1.1-1.3*
- smw : ep = 1 : \approx 1.5*
- dwfr \approx ep*
- dwfr : vfr (- scapal base) = 1 : \geq 1.15*
- dwfr : distance between scapal sockets = 1 : \geq 1.15*
- vfr (- border of palpus) : dbp = 1 : $<$ 1.4*

- > without or with a weak and narrow
mediotergital abdominal line

dwfr : m = 1 : \leq 4
 LS 9 : ep = 1 : \leq 3
 LS 9 : smw = 1 : $<$ 2
 pp : m = 1 : \geq 4
 pp : hw = 1 : \approx 4.5
 smw : m = 1 : \approx 7 (6.5-7.5)
 te10 : ep = 1 : \approx 5
 ant5-7 > fr
 ant5-7 \geq ep
 ant5-7 : m = 1 : \approx 3.5
 ce : m = 1 : $<$ 5
 ce : ft3 = 1 : \approx 10
 ep : m = 1 : 3.5-4
 ep : ft3 = 1 : \approx 8
 ep : hw = 1 : \leq 4
 m : hw = 1 : \approx 1

$$m : ft3 = 1 : \leq 2$$

> *D. lefebvrei*

> with a weak to distinct broad mediotergital abdominal line

$$dwfr : m = 1 : > 4$$

$$LS9 : ep = 1 : 5-6$$

$$LS 9 : smw = 1 : \geq 3$$

$$pp : m = 1 : \approx 5$$

$$pp : hw = 1 : > 5$$

$$smw : m = 1 : \approx 6 (\leq 6.5)$$

$$te10 : ep = 1 : \approx 6 (5.5-6.5)$$

$$ant5-7 \approx fr$$

$$ant5-7 \leq ep$$

$$ant5-7 : m = 1 : \geq 4$$

$$ce : m = 1 : > 5$$

$$ce : ft3 = 1 : \approx 11.5$$

$$ep : m = 1 : < 4.5$$

$$ep : ft3 = 1 : > 8$$

$$m : hw = 1 : > 1.05$$

$$m : ft3 = 1 : > 2.1 (-2.4)$$

> *D. trivialis*
(asiatropic)

- > - without a longspiny mediobasal seta on lobe of pronotum (only few tubercles or spiny setulae)
- ocellar protrusion of frons slightly elipsoide
- interommatidial angle elongated, about 45°
(w : w of eye = 1 : \leq 1.3)
- frontal border of occiput with interommatidial angle incurve at mid of occiput
eyes corner - mid of incurve : mid of incurve –
vertical mid separation = 1 : \approx 1
- fw and hw pale or tinged with darkened nodal markings
- l of pt : distance pt-node = 1 : \approx 3 (> 2.5)
- vfr : dbp (frontal view) = 1 : \leq 1.4
- pronotum basodistal flat, narrow rimmed and dense set with short to medium hairspiny and spiny setulae
- ce : ep = 1 : \geq 1.5
- ce : py = 1 : \geq 1.7

- ant6 : ant3 = 1 : $\approx 1.2 (\pm 0.1)$
- hw : ft3 = 1 : $> 2 (-2.4)$
- m : hw = 1 : > 1.1
- smw : m = 1 : < 5.8
- smw : fr = 1 : $1.2 - 1.5$
- maxillae: galea regularly narrowed to tip
- MaS on st 6-9
- PS 9-11
- arch-lo waved

> gen CROCOTHEMIS
(SYMPETRINAE)

> with LS 8/9 distinct

- > mediofrontal protrusion between scapal sockets with narrowed distal lobes, because of being flatter and wider and with outer borders more oblique
- proantennal basoscapal socket-cavation (scar) less narrowed and about of same width like lateroscapal rim
- LS fine (bw : l = 1 : $\approx 4-5$) $\approx 1/3$ of sternite
- arch small and elongated (asymetric)
- tips of wings distal of pt-notch narrow and long
(l : w = 1 : ≈ 2)
- without mediotergital pale stripe, sometimes with pale patches from endsegments to ep

ep : ft3 = 1 : < 7

m : ft3 = 1 : ≈ 2.5

ce : ep = 1 : ≥ 1.8

pp : ft3 = 1 : < 9

pp : m = 1 : ≤ 3.2

pp : ep = 1 : ≤ 1.2

smw : ep = 1 : > 2

ant1+2 : w arch = 1 : < 2

ce : hw = 1 : $6-8$

ce : fl = 1 : $3-3.5$

dwfr : hw = 1 : ≈ 4.5

dwfr : ep = 1 : ≤ 1.5

dwfr : m = 1 : ≥ 3.5

ep : m = 1 : < 2.8

ep : fl = 1 : ≤ 2

ep : hw = 1 : ≥ 3

fl : m = 1 : ≈ 1.3

smw : wpronotum = 1 : ≈ 2.3

te10 : ep = 1 : $\geq 7(-10)$

tw : dwfr = 1 : ≈ 1.2

> *C. servilia*

- > mediofrontal protrusion between scapal sockets with wide separated distal lobes because of being smaller and with less oblique outer borders
- proantennal basoscapal socket-cavation (scar) distinctly narrowing upwards and there narrower than the width of the lateroscapal rim
- arch short and approx. semicircular
- tips of wings distal of pt-notch wider and shorter (1 : w = 1 : 2.3)

ep : ft3 = 1 : ≥ 7

m : ft3 = 1 : ≈ 2.7

ce : ep = 1 : ≤ 1.7

pp : ft3 = 1 : ≥ 9

pp : m = 1 : > 3.2 (-4)

pp : ep = 1 : > 1.3

smw : ep = 1 : < 2

ant1+2 : w arch = 1 : ≥ 2

ce : f1 = 1 : ≥ 4

ce : hw = 1 : 5-6

dwfr : hw = 1 : ≤ 4

dwfr : ep = 1 : ≥ 1

dwfr : m = 1 : ≈ 4

ep : f1 = 1 : ≥ 2.1

ep : m = 1 : > 3.2

smw : hw = 1 : ≈ 6 (5.5-6.4)

smw : wpronotum = 1 : ≈ 2

tw : dwfr = 1 : ≥ 1

> *C. erythraea*

> LS 8/9 minuite or absent

bwm : dwm = 1 : ≈ 2.5

bwm : m = 1 : ≈ 2.5 (3.5?)

ce : pp = 1 : ≈ 1.5

m : hw = 1. 1.4

MS 6-7 PS 6-7

pp: f1 = 1 : ≈ 2.1

pp : hw = 1 : > 4

pp : m = 1 : ≈ 3

te 2-9 hairy

> *C. sanguinolenta*

- > - abdomen truncate-shaped
- anal pyramid and te 10 very small and slender
- LS 9 > LS 8

(after Chelmick)

(not available) > *Philonomon luminans*
(afrotropic)

> **EYES STRONGLY ELONGATED BACKWARDS,
LS 9 VERY LONG, REACHING ABOUT LEVEL
OF TIP OF ANAL PYRAMID**

- > - fw/hw RP2/IR2 NOT STRONGLY WAVED
- mh STRAIGHT AND AT LEAST SAME LENGTH
AS LENGTH OF PS
- dbp SHALLOWLY CRENATED
- ep SHORTER THAN pp AND WITH ACUTELY
NARROWED TIP
- MESOSTERNUM WITH LATERAL FIELDS OF
SPINY OR HAIRSPINY SETULAE
- LS 8 : LS 9 = 1 : << 1.5
- ant1+2 : w arch = 1 : < 2
- arch-lo slightly wavy

> TRAMEA
(PANTALINAE)

> *LS 9 > ep*

LS 8 > w of pronotum

te10 : ep = 1 : < 9

ep : m = 1 : ≤ 2.9

ep : t3 = 1 : ≤ 3.3

ep ≈ LS 8

ep : hw = 1 : < 2.5

f1 : m = 1 : < 1.5

f1 : t3 = 1 : < 1.8

hw : t3 = 1 : < 1.5

LS 8 : LS 9 = 1 : ≈ 1.3

m : hw = 1 : < 1

m : t3 = 1 : > 4

pp : m = 1 : < 2.4

pp : t3 = 1 : < 2.9

st 5 (6) -9 spiny setulated

wep : ep = 1 : ≥ 1.8

> *T. basilaris*

> *LS 9 ≈ ep*

LS 8 ≈ w of pronotum

ep : m = 1 : ≥ 2.85 (-3.2)

ep : t3 = 1 : ≥ 3.5

> *te10* : *ep* = 1 : ≥ 10
te10 : *ce* = 1 : > 8
hw : *t3* = 1 : < 1.5

bwep : *ep* = 1 : < 1.8
ep : *hw* = 1 : > 2.6
f1 : *m* = 1 : ≤ 1.5
f1 : *t3* = 1 : < 1.9
pp : *t3* = 1 : ≈ 3
pp : *m* = 1 : ≤ 2.5
st 6 (7)-9 spiny setulated

> *T. transmarina*
(*asiatropic*)

> *te10* : *ep* = 1 : < 9
te10 : *ce* = 1 : < 7
hw : *t3* = 1 : > 1.5

ep : *t3* = 1 : ≥ 3.5
ep : *hw* = 1 : ≈ 2.5
f1 : *m* = 1 : > 1.5
f1 : *t3* = 1 : ≥ 1.9
pp : *t3* = 1 : ≥ 3
pp : *m* = 1 : ≥ 2.5

> *T. virginia*
(*asiatropic*)

> WITH DS - MAX. REACHING TE 8 (> 183)

> EYES STRONGLY ELONGATED
BACKWARDS
(OCCIPUT-HINDEYE -ANGLE $> 150^\circ$)

(> 166)

> *LS* very long (*LS9* $> st9$)

> *DS* 2-4

RP2/IR2 on *fw/hw* strongly wavy and well visible
mh very short, about half the length of *PS*

- ep very long; caudal of basal fourth strongly narrowed and acute
- dbp deeply crenated, depth increasing in direction to mh
- LS 8/9 very long ; LS 8 about half the length of LS 9
- mesosternum with spiny setulae but without fine hairspiny ones
- w of eye : occiput-1 = 1 : \approx 2
- vertical eye-1 : occiput -1 = 1 : \approx 0.4
- oblique l of eye (frontal to distal corner) : occiput-1 = 1 : \approx 0.4

ant1+2 : w arch = 1 : \geq 2

arch-lo about angled

bwm : m = 1 : \approx 3.5

ce : ep = 1 : \leq 1.5

ce : m = 1 : \approx 2.1

ce \approx LS 9

ep : t3 = 1 : \approx 1.75

ep : m = 1 : \approx 1.65

ep : hw = 1 : \approx 1.9

hw > m

LS 8 : LS 9 = 1 : > 1.5

m : t3 = 1 : < 1.1

m : hw = 1 : \approx 1.15

m- bp : dp = 1 : \approx 3

PS 14-15 MS 16-17

st7 border with a dense row of spiny setulae

whw : hw = 1 : < 2

> *Pantala flavescens*
(PANTALINAE)

> *DS 3-8 (6-8 very long)*

eyes extremely elongated backwards and outwards

LS extremely long

LS 9 \approx pp

ep < pp

> *Hydrobasileus croceus*
(asiatropic)

> *LS short, not surpassing tip of pyramid (LS9 < st9)*

- *DS 3(4)-8*

- *mesosternal setae : 2 x 1 + lateral fields of hairspiny setulae (8-10)*

- *w of eye : occiput-1 = 1 : 1.5-2*

- *vertical eye - 1 : occiput-1 = 1 : \approx 0.3*

- *oblique l of eye (frontal to distal corner) : vertical l of*

- lateral occiput* = 1 : \approx 0.3
- bpm* : *dpm* = 1 : \approx 2
- *dbp* distinctly crenated
 - trigonal space in fw not widening (if visible)
 - *obp* with few short setulae
 - bwm* : *m* = 1 : \approx 4
 - ce* : *ep* = 1 : \leq 1.4
 - DS* flat, long and slightly curved
 - DS* 8- height : length = 1 : $>$ 4
 - ep* weakly mediocarinated
 - hw* : *m* = 1 : \geq 1
 - ligula* wideangled or blunt
 - LS* 8 : *st* 8 = 1 : \approx 2.2 (\pm 0.4)
 - LS* 9 : *st* 9 = 1 : $>$ 1
 - MS* 12-15
 - PS* 9 +2 + spiniform setae
 - whw* : *hw* = 1 : $<$ 2
 - ant* 1+2 : *w arch* = 1 : \leq 2
 - arch-lo waved

> gen. SELYSIOTHEMIS / UROTHEMIS
(fam. UROTHEMISTIDAE)

> **surface of st8 bare**
lateral hindborder of st10 without distinct MaS

- f3 with shortspiny setulated borders and spiny setulae on coxa
- f1- spiny setulae w : l = 1 : \approx 5-6
- lo with 2 x 6-7 piliform setae
- dbp with 8 (\pm 1) crenations
 - ce* : *pp* = 1 : \approx 2
 - ce* : *ep* = 1 : $>$ 1.5
 - LS* 9 : *hw* = 1 : \approx 4
 - LS* 9 \approx 1/2 of *st*
 - pp* : *m* = 1 : \approx 3.5
 - pp* : *hw* = 1 : \approx 3.5
 - MaS on *st* 9 longer than on *st*.7/8
 - l of exuviae: $<$ 25 mm

> **Selysiotthemis nigra**

> **surface of st8 with a field of scattered spiny setulae**
lateral border of st10 with distinct MaS

- f3 bordered with long hairspiny setulae
- f1 - spiny setulae- w : l = 1 : \approx 9-12
- lo with 2 x 10 piliform setae
- dbp with 10 (\pm 1) crenations
 - ce* : *pp* = 1 : \approx 1.3

ce : ep = 1 : < 1.5
LS 9 : hw = 1 : ≥ 5
LS9 > 2/3 of st
pp : m = 1 : ≈ 4.5
pp : hw = 1 : ≈ 4.5
row of spiny setulae on st9 , about same
length in st 7/8
l of exuviae > 27 mm

> *Urothemis edwardsi*

(not available) > *U. thomasi*
(afrotropical)

> - distal border of palpus with 14 crenations (after Suhling)

(not available) > *U. assignata*
(afrotropical)

> MS 12 PS 8 (-10)
DS (3)4-8

(not available) > *U. signata*
(asiatropical)

> DS 6-9 broadly flattened and curved

LS 8 : LS 9 = 1 : ≈ 2

LS 9 reaching nearly tip of ep

MS 12 PS 7-8

(not available) > *Macrodiplax cora*
(asiatropic)
(UROTHEMISTIDAE)

**> EYES WIDELY ELONGATED L A T E R A L W A R D S,
SURPASSING VERTICAL LEVEL OF LATERAL
OCCIPUT BY FAR AND FORM AN OCCIPUT-
HINDEYE – ANGLE OF ABOUT 110 °-130°
(PROJECTION ABOUT OF SAME LENGTH LIKE
LENGTH OF MEDIOFRONTAL BORDER OF
OCCIPUT HALF)**

- WITH LONG AND DARK EPICRANIAL HAIRTUFTS
- ANAL PYRAMID VERY LONG
- MESOSTERNAL SETAE : 2 x 1
- w OF EYE : w OF OCCIPUT = 1 : ≤ 1.5
- L OF EYE : OCCIPUT-L = 1 : < 0.6
- obp MINUTE SETULATED

- ce : ep = 1 : \approx 2
- ant1+2 : w arch = 1: < 1.4

> gen.BRACHYDIPLAX
(TETRATHEMISTINAE)

- > bwm : m = 1 : \approx 5
- ep : py = 1 : \approx 2
- ep : pp = 1 : \approx 1.6-1.7
- LS 8 : LS 9 = 1 : \approx 2
- pp : m = 1 : \approx 1.65

> *B.sobrina*
(oriental)

- > bwm : m = 1 : 7-8
- ep : py = 1 : < 1.8
- ep : pp = 1 : \approx 1.5
- LS 8 : LS 9 = 1 : \approx 1.3
- pp : m = 1 : \approx 1.5

> *B.chalybaea*
(asiaoriental)

**> EYES ONLY SLIGHTLY ELONGATED
BACKWARDS
EYES LATERAL PROJECTION IS MUCH
SHORTER THAN LENGTH OF MEDIOFRONTAL
BORDER OF OCCIPUT HALF (> 170)**

- DS : 3-4-5-6-7-8
- EYE- L : OCCIPUT-L = 1 : \geq 0.5
- OBLIQUE L OF EYE (FRONTAL TO DISTAL CORNER) :
L OF LATERAL OCCIPUT = 1 : \approx 0.45
- st MORE OR LESS MARBLED, SELDOM WITHOUT
- bpm (WITH SUBMENTAL HOLE) : dpm (= WHERE LATERAL
BORDER SLIGHTLY WIDENS TO HEAD) = 1 : \approx 2
- ep SCARCELY MEDIOCARINATED (EDGED)
- obp WITHOUT SETULES
- MESOSTERNAL SETAE 2 X 1
- ant1+2 : w arch = 1: \geq 1.6 (-2)
- arch-lo angled; arch: lo = 1 : 3.5-4

> gen.LEUCORRHINIA
(SYMPETRINAE)

> **DS REACHING te 8**

> **LS 9 very long, reaching or surpassing
level of tip of ep**

DS long, slender and curved
DS 3-8, 6+7 strongest ones,
IR2-Rspl with 2 rows (if visible)
ant1+2 : fr = 1 : ≤ 2
ant1+2 : pronotum = 1 : ≥ 3
smw : m = 1 : 6.6-7.6
smw : arch = 1 : ≥ 1.1
LS9 : ep = 1 : ≤ 1
LS9 : m = 1 : < 2.5
LS9 : st9 = 1 : < 1
LS9 : hw = 1 : < 3

> **L. orientalis**

> **LS 9 reaches about level of half the length of
py and has about 1/3 the length of st 9
ant1+2 : m = 1 : ≥ 10**

> **DS thick and strongly curved, DS8 distinct**

smw : m = 1 : 6.5-7
arch : m = 1 : ≈ 6
arch : fr = 1 : ≥ 1.3
f1 : m = 1 : ≤ 1.4
LS9 : st9 = 1 : ≥ 3
LS9 : pp = 1 : ≥ 3
LS9 : hw = 1 : ≈ 10
smw : pronotum = 1 : > 2

> **L pectoralis**

> **DS slender and less curved,
DS8 often weak or rudimentary**

> **smw : m = 1 : 5.5-6.5
f1 : m = 1 : ≥ 1.4
arch : m = 1 : ≈ 5
arch : fr = 1 : < 1.2
LS 9 : st9 = 1 : < 2.4
LS 9 : pp = 1 : ≤ 2
LS 9 : hw = 1 : ≤ 7.5
LS 8 : st8 = 1 : 3-3.5
LS 8 : m = 1 : 10-13
LS 8 : ep = 1 : ≈ 4
LS8 : LS9 = 1 : ≥ 2
smw : pronotum = 1 : < 2
w head : w pronotum = 1 : ≈ 1.9**

abdomen without mediotergital dark stripes
mandibular incisi more acute than in *L.intermedia*

> *L. albifrons*

> smw : m = 1 : ≈ 5

f1 : m = 1 : ≈ 1.3

arch : m = 1 : ≈ 4.5

LS 9 : st9 = 1 : < 2

LS 8 : st8 = 1 : ≤ 3

LS 8 : m = 1 : 6-8

LS 8 : ep = 1 : ≤ 3

LS8 :LS9 = 1 : ≥ 1.5

whw : hw = 1 : ≥ 2

w head : w pronotum = 1 : ≈ 1.7

DS (3) 4- (7) 8

MS 12-13 PS 10

mostly with two mediotergital dark stripes on abdomen
st transparent or very weakly marbled

> *L.intermedia*

(*E-palaeartic*)

> **DS REACHING MAX. te 7**

- > - distance between tip of LS 9- corner of st10 > bwpp
- distance tip LS 9 - st10 lateral border : dw of st10 = 1 : ≈ 2
- distance tip LS 9 - te10 lateral border : wep = 1 : ≈ 1,5
- te5 border without MaS and on te6 with few and weak MaS

ant1+2 : m = 1 : <<10

ant1+2 : fr = 1 : ≤ 2.2

hw : ep = 1 : ≤ 3

LS 8 : st8 = 1 : ≈ 3-4

LS 9 : st9 = 1 : ≤ 3

m : hw = 1 : > 1.2

smw : arch = 1 : ≥ 1.1

smw : fr = 1 : ≥ 1.4

smw : m = 1 : 6-6.5

DS : typical : (3)-4-5-6-(7)

atypical: without any or on 3-4

> *L dubia*

- > - distance between tip of LS 9 - corner of st10 < bwpp
- distance tip LS9 - st10 lateral border : dw of st10 = 1 : ≈ 3
- distance tip LS9 - te10 lateral border : wep = 1 : ≈ 2
- te5 border with reduced MaS , on te6 with strong and distinct MaS
- without mediotergital dark stripe but st mostly dark marbled

ant1+2 : fr = 1 : ≈ 2.4

ant1+2 : pronotum = 1 : ≈ 3.5

m : hw = 1 : ≤ 1.2

LS 8 : st8 = 1 : ≥ 4

LS 9 : st9 = 1 : ≥ 3

smw : m = 1: 5-6
smw : arch = 1 : \approx 1
whw : hw = 1 : < 2
MS 15-16 PS 11-12
DS typical: 3-4
atypical: without any or on 3-4-5-6
> L.rubicunda

> - EYES SLIGHTLY TO DISTINCTLY
P R O T R U D I N G FRONTOLATERALLY

- DS 3-(4-5-6-7)-8
- ep N O T MEDIOCARINATED (EDGED)
- bp : dp = 1 : \ll 2
- MESOSTERNAL SETAE : 2 x 1
- dwfr : vfr (- SCAPAL SOCKET) = 1 : \leq 1.3
- dwfr : vfr (- EPISTOMAL SUTURE) = 1 : \leq 1.8
- ant1+2 : w arch = 1: 1.5-2
- arch- lo angled

> gen. SYMPETRUM

> obp (OUTER BORDER OF PALPUS)
BASALLY SETULATED

- st7 hindborder w i t h o u t a row of spiny setulae (MaS)
- st8 hindborder mostly with only f e w fine spiny setulae (MaS)
 - ce : pp = 1 : \approx 2
 - ep : m = 1 : \approx 3
 - LS 9 : st 9 = 1 : > 1.5 (-2)
 - LS 9 : m = 1 : < 7
 - smw : ep = 1 : \ll 2
 - smw : m = 1 : \leq 5
 - wep : ep = 1 : \leq 1.2
 - ant1+2 : w arch = 1: \approx 1.5

> - obp at basal half distinctly short setulated
- DS thick and erected, on te 6-8 about samesized

bw of DS 8 > 2/3 of te
DS 8 height : length = 1 : \approx 3
fr median wide notched
LS 8 : LS 9 = 1 : \approx 1.5
LS 8 : st 8 = 1 : \geq 2.5
LS 8 : m = 1 : 7.5-8
MS 14 continuous
pp : hw = 1 : \approx 3.5
pp : m = 1 : \approx 3

PS 8(-10)
smw : LS 8+9 = 1 : ≥ 1.2
te10 : LS 8+9 = 1 : 5-6
tw : ep = 1 : ≤ 1.2

> S. pedemontanum

- > - *obp at basal third short setulated*
- *DS (3)4-8 short and less erected, on te 3+4
fine and flat, DS7 longest one*

bwm : m = 1 : > 4.5
bw of DS 8 < 1/3 of te
ce : ep = 1 : 1.5-1.8
fr median narrow notched
LS 8 : LS 9 = 1 : ≈ 3
LS 8 : st 8 = 1 : 3.5 -5
LS 8 : m = 1 : ≥ 12
MS 12 (-13)
pp : m = 1 : ≈ 2
PS 10
smw : LS 8+9 = 1 : ≈ 1
te10 : ep = 1 : 3.5-4.5
te10 : LS 8+9 = 1 : ≈ 4
l of exuv < 14 mm

> S. haritonovi

> **obp WITHOUT ANY SETULATION**

- > *st 7 and 8 without rows of spiny setulae (MaS) on
hindborders (on st 8 max. with only few
scattered long hairspiny or spiny setulae) (> 174)*

- > *LS 9 : st9 = 1 : < 1.4*
- LS 9 : hw = 1 : < 6*
- LS 9 : m = 1 : 4-6*
 - LS 8 : LS 9 = 1 : < 3*
 - LS 8 : st8 = 1 : 1: 2.3*
 - smw : LS 8+9 = 1 : < 2*
 - smw : m = 1 : ≤ 5*
 - smw : ep = 1 : ≥ 1.5*

> *DS 3-8 strong, erected, thickened and spiny setulated at surface*

ant1 : ant3 = 1 : \approx 2.5
ant4 : ant3 = 1 : \approx 2
ant5 : ant6 = 1 : 1.2-1.3
ant6+7 \approx ep
ce : LS 9 = 1 : $<$ 1.5
ce : pp = 1 : \leq 2
LS 9 : ep = 1 : $<$ 1.4 ($>$ 1)
LS 9 : fl = 1 : 6-9
MS : 14-16
PS : 11
smw : ep = 1 : \geq 1.3
te10 : ce = 1 : \approx 4.5
te10 : ep = 1 : 5-7
te10 : ant3 = 1 : \geq 2(-3)
wep : ep = 1 : \approx 2

> *S. vulgatum*

(not available) > *S. vulg. decoloratum*

> *DS 4(5)-7 (8) very short, thickened and recurved, less erected*

setae longer than in flaveolum
fr with median notch narrow
ant1 : ant3 = 1 : \leq 3
ant4 : ant3 = 1 : \approx 1.55
ant5 : ant6 = 1 : \approx 1.6
ant6+7 : ep = 1 : 1.2-1.3
ce : ep = 1 : \approx 1.5
ce : LS 9 = 1 : 1-1.2
ep : m = 1 : \leq 3.5
LS 9 : ep = 1 : $<$ 1.7
LS 9 : fl = 1 : 4-5
LS 8 : m = 1 : \geq 6 (10-13)
MS 14 (-18)
PS 11
te10 : ant3 = 1 : \approx 2
te10 : ep = 1 : \approx 5
wep : ep = 1 : 1.3-1.4

> *S. imitans*

(E-palaeartic)

> *LS 9 : st9 = 1 : > 1.5*
LS 9 : hw = 1 : 6-10
LS 9 : m = 1 : > 5 (-10)
w head : wprnotum = 1 : 1.9-2

> *DS (3) 4- 7 (8) thin. short and flat or less erected,*
DS 3+8 mostly absent
eye in frontal view more laterally protruding (w ≈ l)
LS 8 : st8 = 1 : ≥ 5
LS 8 : m = 1 : >> 20
hw : t3 = 1 : > 1.3
basal sm about quadrangular and narrow notched
fr widely flat bilobed

ant1+2 : w arch = 1 : ≈ 1.8
ce : ep = 1 : ≈ 1.1
d (ce-ep) : ft3 = 1 : > 30
ep : t3 = 1 : > 5
LS 8 : LS 9 = 1 : ≤ 3
LS 8 : hw = 1 : > 1.2
LS 9 : hw = 1 : > 1.1
LS 9 : ce = 1 : > 1.4 (2)
LS 9 : tw = 1 : ≈ 2
LS 9 : ep = 1 : > 2
LS 9 : ant5-7 = 1 : ≈ 3
MS : 14
pp : m = 1 : ≥ 2.5
PS : 11
smw : m = 1 : > 6
smw : LS 8+9 = 1 : < 1.2
tw : dwfr = 1 : ≈ 1.1

> **S. danae**

> *DS 3(4-5) - (7) 8 , flat, less erected,*
DS 3+8 mostly visible
eye in frontal view slightly elongated (w < l)
LS 8 : st8 = 1 : 3-4
LS 8 : m = 1 : < 10 (-4)
hw : t3 = 1 : < 1.3
basal sm about rectangular with a small wavy incurve
fr narrow wavy bilobed

ant1+2 : w arch = 1 : ≈ 1.5
ant1 ≤ ant3

ant7 < ant6
 ant4 : ant6 = 1 : ≤ 2
 ant4 : ant3 = 1 : < 2
 ant5 : ant6 = 1 : ≈ 1.3
 ce : ep = 1 : ≈ 1.5
 dce (-ep level) : ft3 = 1 : < 30
 ep : t3 = 1 : ≤ 5
 ep : ft3 = 1 : < 9
 fr median widenotched
 LS 8 : LS 9 = 1 : < 2.4
 LS 9 : st9 = 1 : ≤ 2
 LS 9 : tw = 1 : < 1.7
 LS 9 : ep = 1 : < 1.5
 LS 9 : ant 5-7 = 1 : ≈ 2
 m : ft3 = 1 : ≤ 2.5
 MS 13-14
 pp : m = 1 : ≈ 2
 PS 11 (+2)
 smw : m = 1 : ≈ 5
 smw : LS 8+9 = 1 : ≈ 1.5
 te10 : ant3 = 1 : < 2
 tw : dwfr = 1 : ≈ 1.2
 mesosternal lateral protrusion curved
 hindborder of pronotum broad and bulgy
 lateralwards abruptly narrowed

> S. flaveolum

> *st 7 and 8 with MaS (rows of spiny setulae on
 hindborder) (on st7 sometimes reduced or
 weakly expressed)*

> *DS 8 height : length = 1 : ≈ 4-5
 DS 3-8 ; 5- 8 very long and strong, curved*

> *LS 8+9 very long
 LS 9 : st9 = 1 : < 1 (0.6-0.8)
 LS 8 : st8 = 1 : < 1.5 (1-1.2)
 smw : LS 8+9 = 1 : 3-4
 smw : ep = 1 : 1.5-2.5
 smw : m = 1 : ≈ 6
 smw : pp = 1 : > 2.3
 te10 : LS 8+9 = 1 : ≥ 10*

bw of DS 8 about half of te8
 fr median narrow notched
 ep: ft3 = 1 : 8-12
 ep : hw = 1 : 3.5- 4
 ep : m = 1 : ≈ 3 (≈ 3.3 „frequens“)
 ep : ant5-7 = 1 : ≤ 1
 LS 8 : LS 9 = 1 : 1.25-1.35
 LS 8 : LS 9 = 1 : < 1.7
 LS 8 : hw = 1 : ≈ 4
 LS 9 \approx pp
 LS 9 reaches or surpasses level of tip of ep
 LS 9 : hw = 1 : ≈ 3
 MS: 15-16 continuous
 pp : hw = 1 : ≈ 3
 pp : ft3 = 6-8
 pp : m = 1 : 2-2.6
 PS: 10 -12
 smw : ft3 = 1 : > 10 (-20)
 tw : ep = 1 : ≥ 1.25

> *S. depressiusculum*
 (incl. syn. *S. frequens* - E-palaeartic)

> *LS 8+9 strong,*

LS 9 : st9 = 1 ≤ 1.5

LS 8 : st8 = 1 : ≥ 2

smw : LS 8+9 = 1 : < 1.5

smw : ep = 1 : ≈ 1.1

smw : m = 1 : ≈ 4

smw : pp = 1 : ≈ 1

te10 : LS 8+9 = 1 : > 6

arch approx. symmetrically curved

fr with lobes wide but depressed

ep : fl = 1 : ≥ 2.5

ep : hw = 1 : 3.4

ep: t3 = 1 : ≈ 5

ep : ft3 = 1 : ≈ 11

ep : m = 1 : ≈ 3.6

ep : ant5-7 = 1 : > 1.2

LS 9 reaches level of tip of ce

LS 9 : pp = 1 : ≈ 2

LS 9 : hw = 1 : ≥ 5

LS 8 : hw = 1 : ≈ 8

LS 8 : LS 9 = 1 : ≈ 1.5
 MaS on st 7-8 strong
 MS 11-15
 pp : ft3 = 1 : > 10
 pp : m = 1 : ≈ 4
 pp : hw = 1 : ≈ 4
 PS 10 (11)
 st7 hindborder strongly setulated (MaS)
 smw : ft3 = 1 : 10-11
 te10 : smw = 1 : ≈ 5
 te10 : ep = 1 : 6-7
 tw : ant6+7 = 1 : > 1.2

> *S. tibiale*

> *DS 8 height : length = 1 : ≤ 3*

- > - *eyes in dorsal view less protruding and distinctly longer than the lateral border of occiput ($\approx 2/3$ the length of head)*
- *eyes in frontal view: scarcely surpassing lateralwards the angle of palpus*
w of eye : vertical length of eye
(from interommatidial corner to palpal border)
= 1 : ≥ 1.4)
- *lateral view : bw of DS 7 : mediocarina before spine*
= 1 : > 1
- *w between LS 9- LS 9 : w of apical border of st9*
= 1 : > 1.8 (1.9-2.5)
- *arch flat symmetrical curved*
- *fr not straight*
LS 8 : st8 = 1 : < 2.4 (1.3-2.2)
LS 9 : hw = 1 : 3-5
LS 9 : m = 1 : 3-5
LS 9 \gg tw
LS 9 : pp = 1 : ≈ 1
LS 8+9 : m = 1. ≥ 2
smw : LS 8+9 = 1: 2.5-3 (*> 182*)

> *striolatum-meridionale-arenicolor complex*

> smw : m = 1 : > 5.5 (5.6-6.8)
fr ≥ tw

> S.meridionale
> S. arenicolor

> smw : m = 1 : < 5 (4-4.9)
fr < tw

> S.striolatum
> S. nigrifemur
> S. commixtum

> smw : m = 1 : 5 - 5.5

> intermediare sector
(striolatum, meridionale, arenicolor)

> - DS max. 3-8, DS 7 mostly strongest one,
slender, curved or reduced (> 181)

> - border lip of palpus narrow (in frontal view)
- tip of hw bud similar to sanguineum
(≈ 3 : 1 –broadly curved)

w head : w pronotum = 1 : ≈ 1.8-1.9

ep : ft3 = 1 : ≥ 10

ep : t3 = 5-5.8

ep : m = 1 : 3.5-3.9

PS 10 (11)

(> 180)

- fr with narrow lobes and with a narrow median
notch (wavy bilobed)

- costal seam of hw with short spiny setulae
till to level of pt

- hindborder of pronotum thick above spiracle and
bordered lateralwards with rel. short hairy setulae

- su broad and long (about half the length of bp)

- hamulus -(genital print of male on st 3) < half
of st length, with distinctly curved lateral
borders and strong protrusions longer
than half of print length

- *males print (gon) on st9 with median expression (gonopore) smaller than laterals*
- *females genital print on st 9 with inner (inside) tubercle of lateral expressions (valves) distinctly smaller than outer (outside) tubercles*

ant6+7 : ep = 1 : 1-1.2

ant6 : ep = 1 : 2-2.5

ant2 : ant3 = 1 : ≈ 2

ant3 ≤ ant6

ant 5-7 >> ep

bwm < wep

bwm : ant7 ≈ 2 : 1

dwfr ≥ tw

(versus striolatum)

arch > smw

ant1+2 : arch = 1 : ≈ 1.9

ep : pp = 1 : 1.2-1.3

LS 8+9 : t3 = 1 : 3-4

LS 8 : dwfr = 1 : < 2

LS 8 : LS 9 = 1 : ≈ 2

pp : hw = 1 : 3-3.5

smw : LS 8+9 = 1 : >>2

te10 : pp = 1 : ≥ 6

te10 : LS 8+9 = 1 : ≥ 7

(versus sanguineum)

ant5 : ant 6 = 1 : ≈ 1.3

bwm : m = 1 : ≈ 3.5

ep : hw = 1 : > 4

hw : t3 = 1 : ≈ 1.25

pp : t3 = 1 : ≤ 4.5

smw : LS 8+9 = 1 : ≈ 3

smw : tw = 1 : ≥ 1.3

te10 : wep = 1 : ≈ 4.5

te10 : hw = 1 : > 21

t10 : LS8 = 1 : ≤ 3

tw : ant6-7 = 1 : > 1.2

tw : t3 = 1 : ≤ 6

tw : hw = 1 : ≈ 5

DS (3) 4-8

(versus arenicolor)

> S.meridionale

- > - *fr* with wide curved lobes and wide notch (wide bilobed)
 - *MaS* on *st7* stronger than in *sanguineum*
 - *DS* stronger, erected and more similar to *S.sanguineum*

ep : hw = 1 : < 4
 hw : t3 = 1 : ≈ 1.45
 pp : t3 = 1 : < 5
 smw : LS8+9 = 1 : ≈ 2.5
 smw : t3 = 1 : < 1,3
 te10 : ep = 1 : 5- 6
 te10 : wep = 1 : ≈ 5
 te10 : hw = 1 : ≈ 20
 tw : hw = 1 : < 5
 tw : t3 = 1 : 6.5-7
 tw : ant 6+7 = 1 : < 1.2

(versus meridionale)

LS8 : LS9 = 1 : > 1.5
 LS 8+9 : t3 = 1 : ≈ 3.5
 LS8 : st 8 = 1 : < 2
 LS9 : hw = 1 : ≈ 4
 smw : LS8+9 = 1 : ≈ 2.5
 te10 : LS8+9 = 1 : 8-10
 te10 : pp = 1 : 6-7

(versus sanguineum)

ant5 : ant6 = 1 : 1.1
 ant 6 : ep = 1 : ≈ 3
 ant 5-7 >> ep
 bwm : m = 1 : ≥ 4
 bwm : hw = 1 : < 5
 dwfr : tw = 1 : ≥ 1
 ep : pp = 1 : 1.1-1.2
 f1 : m = 1 : ≈ 1.3
 LS 9 : st9 = 1 : < 1
 LS 8 : te10 = 1 : ≈ 3
 LS 8 : m = 1 : 6-7
 LS8 : dwfr = 1 : > 1.5
 LS9 : m = 1 : >3
 LS9 : pp = 1 : ≈ 1
 MS 13
 PS 10 (11)

pp : hw = 1 : \approx 3.5
 pp : t3 = 1 : 4.5-5
 te 10 : fl = 1 : \approx 13
 te 10 : ant3 = 1 : \approx 2
 tw : LS9 = 1 : > 1
 ant1+2 : w arch = 1 : \approx 1.5

> **S. arenicolor**

- > - border lip of palpus thick in frontal view
- tip of hw (distal of pt) triangularly curved with w about 2.5 times the height
 - costal seam till to pt level with fine and long hairspiny setae near pt and base
 - w head : w pronotum = 1 : \approx 1.7 -1.8
 - ep : ft3 = 1 : < 10
 - ep : t3 = 4 -5.2
 - ep : m = 1 : 2.8-3.5
 - PS 11 (12)
 - su narrow and short
 - hindborder of pronotum rel. slender above spiracle and bordered with long and fine hairy setae lateralwards
 - laterodistal lobe short and with long hairspiny setulae
 - hamulus (genital print on st 3 in male) \geq half of st, with straight or weakly curved lateral borders and medium to weakly expressed protrusions, about half of print length
 - males gen.print on st 9 (gon) with median expression (gonopore) bigger than laterals and with distinctly expressed inner spineshaped tubercles
 - females genital print on st 9 (valves) with inner (inside) tubercles of lateral expressions about same sized than outer (outside) tubercles
- dwfr < tw
 bwm : m = 1 : < 4
 ep : hw = 1 : < 4
 LS9 : hw = 1 : < 5
 pp : m = 1 : \leq 3
 pp : ft3 = 1 : \leq 8

> **S. striolatum-group**

- > ant5-7 \leq ep
- ant6+7 : ep = 1 : \approx 1.5
- ant6 : ep = 1 : \approx 3
- ant3 \geq ant6
- bwm : t3 = 1 : \approx 6
- bwm \geq wep
- bwm : ant7 \approx 2.5 : 1
- LS8 : ep = 1 : \leq 2
- smw : pp = 1 : $<$ 2
- smw : ft3 = 1 : \approx 12-14
- te10 : wep = 1 : \approx 4
- tw : ant6-7 = 1 : \leq 1.2
- > *S. striolatum*
- (syn.. *str. nigrescens*)

- > ant5-7 $<$ ep
- DS 4-8
- hw : t3 = 1 : \leq 1.35
- LS 8 : ep = 1 : \approx 2.4
- MaS on st 8 weak, st 7 absent
- smw : pp = 1 : 1.3-1.5
- smw : LS 8+9 = 1 : $>$ 1.6
- te10 : LS 8+9 = 1 : \leq 7
- tw : ant6-7 = 1 : $<$ 1
- (ratios mostly identic or in range with *S. striolatum*)

> *S. (str?) commixtum*
(*oriental*)

(not available) > *S. str. pallidum*

> DS (4) 5- 7 (8), short, small and partly rudimentary

- ce : pp = 1 : $<$ 2
- ce : ep = 1 : $<$ 1.5
- ce : hw = 1 : 5-6
- ce : m = 1 : \approx 5
- ep : f1 = 1 : $<$ 2.5
- ep : ft3 = 1 : \leq 9
- LS 8 : LS 9 = 1 : \approx 2
- LS 8 : ep = 1 : $>$ 2
- LS 9 : f1 = 1 : $>$ 2.5
- LS 8 : s 8 = 1 : $<$ 2
- LS 9 : s 9 = 1 : \approx 2.5
- m : ft3 = 1 : $<$ 3
- m : hw = 1 : $>$ 1
- pp : hw = 1 : \leq 3.5
- pp : t3 = 1 : 4-5
- smw : m = 1 : $<$ 5

(ratios mostly identic or in range with *S. striolatum*)

> *S. (str) nigrifemur*

- > - *w head (incl eye) : w pronotum = 1 : $\approx 1.9 - 2$*
- *eyes smaller and flatter in dorsal view, more laterally expanding (kink between eyes border and occiput well expressed)*
- *approx. of same length than vertical occiput (\approx half the length of head)*
- *surpassing the angle of palpus border lateralwards (in frontal view)*
- *w of eye : vertical l (from interommatidial corner to palpal border) = 1 : ≤ 1.3 (in frontal view)*
- *arch highly semicircular*
- *fr approx. straight transverse with narrow and weak median notch*
- *lateral border of st 9 + LS 9 about straight (in merid. slightly incurved)*
- *lateral view : bw of DS 7 : mediocarina before spine = 1 : < 1*
- *w between LS 9- LS 9 : w of apical border of st9 = 1 : ≈ 1.7 (1.5-1.8)*
- *DS on endsegments erected, curved, with surface spiny setulated and at base widened:*
- *bw of DS 7 : l of DS 7 = 1 : < 3 (> 3 mer)*
- *hw distal tip (apical pt) broad circular (height : w = 1 : ≈ 3)*
- *lateral hairy setulae of pronotum nearly reaching the anterior corner*
- *hindborder of pronotum flat, less bulged and lateralwards softly narrowed*
- *apical lobe distinctly thickened and nearly half the l of pronotum (1 : ≈ 1.2)*
- *spiracle behind pronotum slender, about half the l of bulge on hindborder*
- *st 7-8 hindborders with short and fine spiny setulae (on 7 often restricted to mid)*
- *su about 2/3 of ep (in merid about 3/5)*
- *mesosternal lateral border corner about angled*
- *LS 9 \leq tw*
- *smw : LS 8+9 = 1 : ≤ 2*

ant1+2 : w arch = 1 : ≈ 1.6
 ant4 : ant 6 = 1 : > 2
 ant6 $>$ ant3
 bwm: t3 = 1 : ≈ 7
 DS 4 (5-6)-8
 ep : m = 1 : ≤ 4
 ep : pp = 1 : ≈ 1.1
 ep : t3 = 1 : > 4.5
 ep : ft3 = 1 : ≥ 10
 hw : t3 = 1 : > 1.3
 LS 8 : st8 = 1 : ≥ 2.5 (-4)
 LS 8 : dwfr = 1 : > 2
 LS 8 : LS 9 = 1 : ≤ 2.5
 LS 9 : ant5-7 = 1 : ≈ 1.5
 LS 9 : pp = 1 : $\gg 1$
 LS 9 : hw = 1 : 5-6
 LS 9 : m = 1 : 5-6
 LS 8+9 : t3 = 1 : 4-5
 m : ft3 = 1 : ≈ 2.9
 MS: 12 (-14) (8-9 long-staged)
 PS : 9 (-11)
 pp : hw = 1 : ≤ 4
 pp : t3 = 1 : > 4.5
 smw : m = 1 : 5-6
 smw \approx arch
 te10 : LS 8+9 = 1 : < 6
 te10 : pp = 1 : ≤ 5
 te10 : ep = 1 : < 5

> *S. sanguineum*

> WITH DS REACHING te 9/10

> DS 2-9 (10)

(> 187)

> OCCIPUT TRAPEZOIDE , WITHOUT PROTRUDING
 TUBERCLES AT CORNERS AND WITHOUT
 A STRONGLY ELONGATED ANTERIOR BRANCH OF
 PROCOXAE

- DS 2-9 broadbased, flatcurved
- eyes directed lateralwards
- ep mediocarinated (edged)
- pyramid short
- mesosternum with a median spiny setulated field
- dbp weakly crenated
- obp strongly short setulated
- procoxae scarcely notched and with a flat circular posterior branch and a broad triangular anterior branch directed apicad
- habitus (body shape) looking similar to *Zyxomma petiolatum*
- fr strongly and widely bilobed
- interommatidial angle ending ovoide with correlating incurved border of occiput
- LS 9 surpasses level of tip of ce
 - m : hw = 1 : \approx 1.85
 - MS 14-17
 - pp : hw = 1 : \approx 5
 - PS 10 -11
 - t3 : hw = 0.9 : 1
 - ant1+2 : w arch = 1 : \approx 1.3
 - arch-lo waved

> *Pseudothemis zonata*
(TRITHEMISTINAE)
(E-palaeartic)

- > - OCCIPUT TRAPEZOIDE, AT CORNERS WITH PROTRUDING TUBERCLES
- PROCOXAE BROAD AND WITH A STRONGLY DEVELOPED, FINGERTIPSHAPED ANTERIOR BRANCH DIRECTED FAR APICAD
- PRONOTUM WITH DISTAL ERECTED BORDER
- FEMORA FLATTENED, LEGS SHORT

- > - DS (2-9-10) BLUNT ,BROAD, ERECTED
- EYES BIGSIZED, GLOBULAR PROTRUDING
- m VERY SHORT : bwm : m = 1 : < 2
 - smw : m = 1 : \approx 2
 - m : hw = 1 : \geq 1.7
- ant1+2 : w ARCH = 1 : \geq 2.5
- LS 8-9
- ep COMPLETELY MEDIOCARINATED (EDGED)
- obp SET WITH LONG AND DENSE SETULAE
- WITHOUT MESOSTERNAL SETAE BUT WITH

**LATERAL FIELDS OF SPINY SETULAE
ON METASTERNUM
- ARCH-lo WAVED**

> gen. ZYGONYX (ZYGONICHINA)

- >- *meso- and metasternum without distinct lateral processes*
- *LS 9 max surpassing st10 slightly*
- *no distinct DS on te10*

- > - LS in lateral view with tips bent downwards
 - DS 9 short, by far not reaching end of te10
 - lo with ligula about triangularly shaped
 - tubercle at occipital corner broad triangular shaped
 - pronotum distal with erected tip
 - m : ft3 = 1 : ≤ 3.5
 - ep: m = 1 : > 1.5
 - smw: m = 1 : ≥ 2
 - smw: ep = 1 : < 1.2
 - w of eye : occiput- l = 1 : ≤ 2
 - vertical eye- l : occiput -l behind = 1 : < 1
 - oblique l of eye (frontal to distal corner) :
vertical l of occiput behind eye = 1 : ≤ 0.8
 - LS edged, strongly diverging and with hairy tufts
 - ant4 : ant3 = 1 : ≈ 2.5
 - ce : ep = 1 : ≈ 3
 - ce : pyramid = 1 : ≈ 3
 - m- bp : dp = 1 : ≤ 1.7
 - MS 8 (9)+ spinules 6-7
 - PS 9 + 2- 4
 - whw: hw = 1 : ≥ 2

> *Zygonyx torridus*

- > - LS in lateral view with tips bent upwards
 - DS 9 reaching or surpassing the end of te10
 - lo with ligula convex curved
 - tubercle at occipital corner small triangular shaped
 - pronotum distal with less erected border
 - ep : m = 1 : < 1.5
 - m : ft3 = 1: ≈ 4
 - smw : ep = 1 : ≥ 1.2
 - smw : m = 1 : < 2

> *Zygonyx natalensis*
(afrotropic)

- >- meso- and metasternum with distinct lateral processes
- LS 9 long, reaching about level of half of pp,
- with a distinct DS on te10

- > - LS in lateral view with tips directed straight
- tubercle at occipital corner very small and fingery shaped
- pronotum distal with strongly erected and acute tip
- ep : m = 1 : < 2
- m : ft3 = 1 : ≈ 4

> *Zygonyx iris*
(indopacific)

- > - DS ACUTE , ERECTED
- NO PROTRUDING EYES
- m SHORT : smw : m = 1 : > 2.5
- smw : ep = 1 : ≈ 1
- LS 5-9
- ant1+2 : w ARCH = 1 : ≥ 2

- LS oblique, directed slightly downwards in lateral view
- LS 9 slightly surpasses tip of pp in dorsal view
- occiput tubercle at corner very broad and blunt
- pronotum with tip erected
- no distinct meso- and meatasternal lateral processes
- DS on te 9+10
- ep : m = 1 : > 2.5
- m : ft3 = 1 : ≈ 3

> *Zygonoides fraseri*
(afrotropic)

- > - OCCIPUT BOWLSHAPED AND WITHOUT ERECTED TUBERCLES AT CORNERS
- PROCOXAE WITH A FLAT POSTERIOR BRANCH AND A SMALL TRIANGULAR ANTERIOR BRANCH
- FEMORA NOT FLATTENED

- m with smw narrower and m longer than in *Zygonyx* (reaching mesocoxae)
- meso- and metasternum without laterosternal processes
- pronotum distal with slightly erected border
- legs long
- DS 2-9 acute
- DS 9 surpasses te10
- DS 2 minute
- ep : m = 1 : ≤ 2
- LS on 8+9 , short and about of same length

m : ft3 = 1 : < 4
smw : m = 1 : ≈ 4
smw : ep = 1 : ≈ 2

> *Olpogastra lugubris*
(afrotropic)
(ONYCHOTHEMISTINA)

> DS 3-9 (10) (> 194)

> LS 8+9 (> 193)

> ep NOT MEDIOCARINATED
EYES PROTRUDING

- ce : ep = 1 : ≈ 2
- LS 9 >> LS 8
- PS > 10

> *Sympetrum croceolum*

> ep STRONGLY MEDIOCARINATED
EYES LESS PROTRUDING

- ce : ep = 1 : ≈ 3
- LS 9 ≈ LS 8
- PS < 10

- MESOSTERNAL SETAE: 2 X 1
- dwfr : vfr - SCAPAL SOCKET = 1 : > 1.3
- dwfr : vfr- EPISTOMAL SUTURE = 1 : ≈ 2
- m- bp : dp = 1 : ≈ 2
- obp WITH SETULAE
- smw : m = 1 : < 5.5
- TRIGONAL SPACE in fw NARROWED (IF VISIBLE)
- whw: hw = 1: < 2
- arch-lo angled

> gen. TRITHEMIS
(TRITHEMISTINAE)

> *ep* < *pp*
ce > *LS* 9 (*> 193*)

> *LS* : *st* = 1: 2-4
ant1+2 : *wf arch* = 1: ≈ 1.5 (*> 190*)
ant 4: *3* = 1: ≈ 1.3
ant2 \leq *ant7*
ant > *f1*
ant6+7 : *pp* = 1: ≤ 2
bwpp : *pp* = 1 : 1.2-1.35
DS forming a dark mediocarinal ridge
from mid of *te 5* to the end of *10*
(in dorsal view)
hw : *ft3* = 1 : > 2.1 (-2.6)
m : *ft3* = 1 : > 2.5(-3)
ep : *hw* = 1 : > 2.1
smw : *m* = 1:4-5
tw : *dwfr* = 1 : < 1
wep : *ep* = 1 : ≤ 2
PS 7 (6) *MS* 9 (-11)

> lat.view: *DS* 6: *hight* > *bw*
DS 5 erected: *bw* : *height* = 1: > 1.5
DS 9 reaches or surpasses slightly end of *te10*
and dorsal slightly incurved
fr widely bilobed
ep : *m* = 1 : ≤ 2
dwfr : *tw* = 1 : ≥ 1
dwfr : *m* = 1 : ≥ 4
ant1: *ant7* = 1 : ≥ 2
ant1 : *ant3* = 1 : ≈ 2
bw of *DS* 6 : *ep* = 1 : > 3
ce : *ep* = 1 : > 2.6
ce : *pp* = 1 : > 2.4 (m) 1: > 2.7 (f)
dwfr : *ep* = 1 : ≥ 1.8 (-2.4)
ep : *f1* = 1 : ≤ 1.4
f1 : *m* = 1: ≤ 1.3
soc : *vfr* - basoscapal level = 1 : 2.5 - 3
soc : *dwfr* = 1 : < 2.5
smw : *m* = 1 : ≈ 4
st10 : *pp* = 1 : ≈ 5

> *T. annulata*

> lat.view : DS 6 : hight < bw
 DS 5 strongly curved- bw: heighth = 1 : < 1.5
 DS 9 surpassing the end of te.10 by far and
 dorsally nearly straight
 fr flat and narrow bilobed (wavy bilobed)
 ep : m = 1 : < 2
 dwfr : tw = 1 : < 1
 dwfr : m = 1 : < 4
 LS : st = 1 : 2-3
 st9+10 : pp = 1 : ≈ 1

ant1 : ant3 = 1 : ≤ 1.5
 bw of DS 6 : ep = 1 : < 3
 ce: pp = 1 : < 2.4(m) 1:< 2.5 (f)
 ce : ep = 1 : ≤ 2.7
 dwfr : ep = 1 : ≤ 2 (-1.5)
 ep : f1 = 1 : ≥ 1.4
 m : f1 = 1 : ≥ 1.3
 soc : vfr - basoscapal level = 1 : 3.5- 4
 soc : dwfr = 1 : > 2.5
 st10 : pp = 1 : < 5
 smw : m = 1 : ≈ 4.5
 tw ≈ w of interscapal protrusion

> T. festiva

> lat.view : DS 6 : hight < bw
 DS 5 curved - hight > bw
 DS 9 reaching max. the end of te.10
 ep : m = 1 : > 2
 fr high and wide bilobed
 dwfr : tw = 1 : < 1
 dwfr : m = 1 : ≈ 4
 hw : ft3 = 1 : ≤ 2
 LS : st = 1 : 3 (-4)
 smw : ep = 1 : ≈ 3
 smw : m = 1 : ≤ 4.8
 st9+10 : pp = 1 : < 1

bwm : m = 1 : ≈ 3.1
 bwpp : pp = 1 : ≈ 1.45
 bw of DS : ep = 1 : > 3
 ce : ep = 1 : ≈ 2.5 (f) < 2.5 (m)
 DS 3-9 (10 only rimmed)
 DS 3-5 shortened, 3-4 thin, 5 curved
 and slightly flattened

ep : hw = 1 : > 2.5
 ep : ft3 = 1 : 5-6
 ep : fl = 1 : 1.4-1.5
 ep ≈ py
 lo : m = 1 : ≈ 1.7
 m : hw = 1 : ≈ 1.6
 m : ft3 = 1 : < 2.5
 MS 11-12
 soc : dwfr = 1 : < 2.5
 soc : smw = 1 : ≈ 2.5
 soc : vfr - basoscapal level = 1 : > 3
 smw : pp = 1 : > 1.5
 smw : dwfr = 1 : > 1
 smw : ft3 = 1 : > 10 (-11)
 st9 : st10 ≈ 3.5 : 1
 st10 : pp = 1 : > 4
 te10 : ep = 1 : ≤ 4
 te9+10 : py = 1 : > 1.5
 tw > w of interscapal protrusion
 wep : ep = 1 : ≈ 2.5

> *T. aurora*
 (*asiatropic*)

> abdomen triquetral
 DS erected
 MS 3 PS 9-10
 LS short, distalborder of palpus straight

(*not available*) > *Atoconeura* gen.
 (*afrotropisch*)

> *LS : st = 1 : > 4 (-6)*
ant1+2 : w arch = 1 : < 1.3

- > - lat.view: DS 6 strongly curved and wide at base
 (bw : height = 1 : < 0.5)
 DS 5 strongly curved (bw : height = 1 : ≈ 1)
 DS 9 reaching scarcely end of te10
- dorsal view: DS forming a continuous
 mediocarinal ridge from
 beginning of te5 to the end of te10
- obp with small and minuite setulae
- fr flatlobed (widely bilobed)
- tw : dwfr = 1 : > 1
- soc : dwfr = 1 : ≥ 2.5

ant1 : ant7 = 1 : ≈ 1.5
 ant2 \geq ant7
 ant4 : ant3 = 1 : ≥ 1.5
 ant6+7: pp = 1 : > 2
 ant7: ant3 = 1 : > 1.5
 antennae \leq f1
 bw of DS 6 : ep = 1 : < 3
 bwm : ep = 1 : ≤ 1.5
 bwm : m = 1 : ≤ 3.2
 bwm : hw = 1 : < 3.5
 ce : pp = 1 : > 2.6 (m) 1: > 2.4 (f)
 dwfr : m = 1 ; 4-4.5
 ep : ft3 = 1 : ≥ 5
 ep : hw = 1 : > 2
 ep : m = 1 : ≥ 2
 ep : f1 = 1 : ≥ 1.5
 MS 12 (13)
 PS 8(7)
 st10 : pp = 1 : > 5
 smw : m = 1 : ≤ 5
 te9+10 : pyramid = 1 : ≥ 1.6
 wpp : pp = 1 : $\approx 1.15-1.45$
 wep : ep = 1 : ≈ 1.75 (-1.9)

> T.kirby ardens

MS 9 (10)
 PS 5 6)
 bwm : m = 1 : ≥ 3.2 (-3.4)
 bwm : hw = 1 : > 3.5
 bwm : ep = 1 : ≥ 1.5 (-1.8)

> T.kirby ardens
 (small oasis type - Nefta)

> MS 9 (8) PS 6 (7)
 wep : ep = 1 : ≈ 2
 (after Carchini)

(not available) > T. furva
 (afrotropic)

> - lat.view DS 6 flat and weakly curved, narrow at base
 (bw : height = 1 : > 0.7)
 DS 5 slender and erected (bw : height = 1 : > 2)
 DS 9 reaching about half the l of te10
 - dorsal view: DS forming a continuous mediocarinal
 ridge from te 6.5- 9.5(10)
 fr highlobed (widely bilobed)
 dwfr :tw = 1 : ≈ 1
 dwfr : m = 1 : ≈ 4.5
 ep : m = 1 : ≈ 2.5
 hw : ft3 = 1 : ≈ 2.4
 smw : ep = 1 : ≈ 2
 smw : m = 1 : > 5
 st10 : pp = 1 : ≈ 6 (5.5-6.5)
 st9+10 : pp = 1 : ≤ 1,2
 ant1+2 : w arch = 1: ≥ 1.5

ant1 : ant7 = 1 : ≥ 2
 ant2 < ant7
 ant4 : ant3 = 1 : < 1.5
 ant6+7 : pp = 1 : << 2
 ant7 : ant3 = 1 : < 1.3
 antennae ≤ f1
 bw pp : pp = 1 : < 1.2
 bw of DS6 : ep = 1 : ≥ 3
 ce : ep = 1 : ≈ 2.8 (females 2.2 (males)
 ce : pp = 1 : ≥ 2
 ep : f1 = 1 : ≥ 1.5
 ep : ft3 = 1 : 6-7
 ep : hw = 1 : ≤ 3
 dwfr : vfr -basoscapal level = 1 : ≈ 1.3
 lo : m = 1 : ≈ 1.5
 LS : st = 1 : 4.5-6
 m : ft3 = 1 : ≈ 2.8
 MS 11(10)
 obp with strong setulae
 PS 8(9)
 pp : te9+10 = 1 : ≈ 1.1
 smw : ft3 = 1 : ≥ 12
 smw : ep = 1 : ≈ 2
 smw : dwfr = 1 : > 1.1
 soc : dwfr = 1 : > 2.1
 soc : smw = 1 : ≈ 2
 soc : vfr - basoscapal level = 1 : ≈ 2.5
 te9+10 : pyramid = 1 : < 1.4
 wep : ep = 1 : ≤ 1.6

> T. arteriosa

> *ep* > *pp*
ce < *LS9*

bwm : *m* = 1 : ≈ 2.4
ce : *ep* = 1 : > 4
fr strongly wide lobed (widely bilobed)
DS 3-9, 6-9 long
ep : *hw* = 1 : ≤ 1.8
ep : *m* = 1 : ≈ 1.2
LS 8 : LS 9 = 1 : ≈ 2
m : *ft3* = 1 : > 3.3
st10 : *pp* = 1 : > 6
ant1+2 : *w arch* = 1 : < 1.4

> *T. pallidinervis*
(*asiatropic*)

> LS (5) 6-9

(LS on segs. 4-5-6-7 are only known from a few Libellulids like *Zygonoides*, *Malgassophlebia*, *Nannophyopsis*, *Onychothemis*, e.g.)

> DS 3 (4)-9 well erected, strong and recurved
DS 9 surpasses *te10* ; LS 9 reaches about level of tip of anal pyramid
and has about same length as its *st*
epicranial hairtuft longhairy
fr widely bilobed
arch-lo angled
LS 8 : LS 9 = 1 : ≈ 2
LS 8 : *st8* = 1 : ≤ 2
LS 8 : *m* = 1 : ≈ 5
LS 9 : *st9* = 1 : ≈ 1
LS 9 : *ep* = 1 : ≈ 1
LS 9 : *hw* = 1 : ≈ 3
smw : *m* = 1 : 7- 8.3

> *Leucorrhinia caudalis*
(syn. *Coenotiata caudalis*)
(possibly a separate genus?)

> DS 4-9

- DS HIGHLY ERECTED AND ON ENDSEGMENTS RECURVED
- ep MEDIOCARINATED
- WITHOUT MESOSTERNAL SETAE
- w OF EYE : OCCIPUT-L = 1 : > 2
- VERTICAL EYE-L : OCCIPUT - L = 1 : ≤ 1
- dbp DISTINCTLY CRENATED
- TRIGONAL SPACE NARROW ENDING (IF VISIBLE)
- obp WITH VERY SHORT SETULAE
 - ant4 : ant3 = 1 : ≥ 1.5
 - ce : ep = 1 : > 1.6 (< 2)
 - ant1+2 : w arch = 1 : < 1.3
- ARCH-lo ANGLED

> gen. BRACHYTHEMIS
(SYMPETRINAE)

> - *LS 8+9 long and directed outwards* *(diverging from body)*

- *LS 9 surpasses level of tip of ce*
- *occiput shape trapezoid*
- *eyes approx. half the length of head*
- *vertical l of eye : occiput-l = 1 : < 1*
- *PS 4 (+1)*

bwm : m = 1 : > 2.2

ce : hw = 1 : > 5

dwfr : distance between scapal sockets = 1 : ≈ 1

DS slender based on segs.8+9 , flat and slightly recurved

f1 : t3 = 1 : ≥ 2

f1 : hw = 1 : ≈ 1.7

LS 8 : st 8 = 1 : ≥ 2

LS 9 : st9 = 1 : ≈ 1

LS 8 : LS 9 = 1 : ≈ 2

LS 9 : ep = 1 : ≈ 1

LS 8 : m = 1 : ≈ 4

LS 9 : hw = 1 : ≈ 3

MS 5(+1)

smw : ant5-7 = 1 : ≈ 1.5

whw : hw = 1 : ≥ 2

> B. leucosticta

- > - *LS 9 reaches scarcely base of pyramid*
- *occiput shape about rectangular*
- *eyes less than half the length of of head*
- *vertical l of eye : occiput -l = 1 : > 1*
- *DS are very broadbased and flattened*
 - bwm : m = 1 : ≥ 3*
 - ce : hw = 1 : ≈ 5*
 - ce : py = 1 : ≥ 1.5*
 - dwfr : distance between scapal sockets*
 - = 1 : < 1*
 - f1 : t3 = 1 : ≤ 2*
 - f1 : hw = 1 : ≥ 1.5*
 - LS 8 : LS 9 = 1 : ≈ 1*
 - m : dwm = 1 : ≥ 1.1*
 - smw : ant5-7 = 1 : ≈ 1.5*

> **hindborder and distal border of pronotum thick bulgy**

- bwm : ep = 1 : ≤ 1.8**
- ce : m = 1 : ≈ 3.5**
- ce : bwm = 1 : > 1.1**
- LS 9 : pp = 1 : ≈ 4**
- LS 9 : hw = 1 : > 10**
- m : hw = 1 : ≤ 1.5**
- m : ft3 = 1 : ≤ 3**
- smw : m = 1 : > 3**
- ant6 longest one**
- ce : pp = 1 : ≈ 1.8**
- DS 4-6 more vertical erected**
 - on 4-5 strong and flattened**
- ep : m = 1 : ≤ 2**
- f1 : m = 1 : > 1.1**
- LS 8 : st8 = 1 : ≈ 3**
- LS 9 : st9 = 1 : ≈ 3.5**
- LS 9 : ep = 1 : ≈ 4**
- LS 9 : m = 1 : 7-8**
- lo of m with a field of scattered subsidiary spines (>12)**
- MS 11 (± 2)**
- m : t3 = 1 : < 1.8**

PS 6 (± 1)
st10 : ep = 1 : ≈ 3
st10 : pp = 1 : ≤ 3

> **B. fuscopalliata**

> **hindborder and distal border of pronotum flat bulgy**

bwm : ep = 1 : > 1.8

ce : m = 1 : ≈ 3

ce : bwm = 1 : ≤ 1

LS 9 : pp = 1 : ≈ 3

LS 9 : hw = 1 : ≈ 8

m : hw = 1 : > 1.55

m : ft3 = 1 : ≈ 3.5

smw : m = 1 : ≈ 4

ce : pp = 1 : ≈ 1.6

DS 4-6 oblique erected and on 4-5 shorter and lesser flattened than in fuscopalliata

ep : m = 1 : < 1.7

LS 9 : st9 = 1 : ≈ 3

LS 8 : st8 = 1 : ≈ 2.5

LS 9 : ep = 1 : ≈ 3

LS 9 : m = 1 : ≈ 5

LS 9 : hw = 1 : ≈ 8

m : fl = 1 : ≈ 1

m : t3 = 1 : ≥ 1.8

MS 13

PS 7 (± 1)

smw : ant5-7 = 1 : ≤ 2

st10 : ep = 1 : > 3.1

st10 : pp = 1 : ≥ 3

> *B. contaminata*
(asiatropic)

> PS 3 (after Suhling)

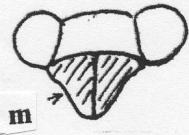
(not available) > *Brachythemis lacustris*
(afrotropic)

> DS 4-9(10)

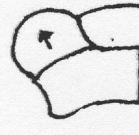
anal pyramid short (see : smalleyed species)

> *Zygomma petiolatum*
(asiatropic)

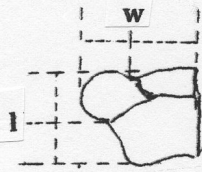
Libellulidae



m

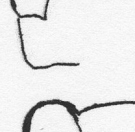
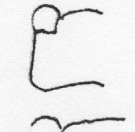


eyes orientation



l

w



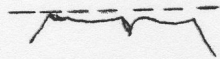
coxae 1



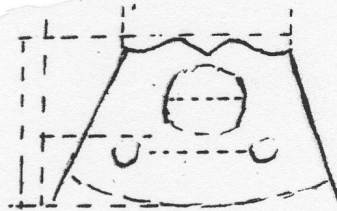
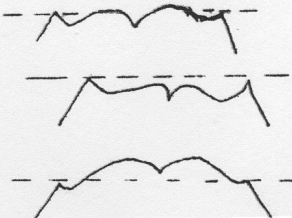
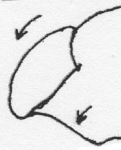
lo



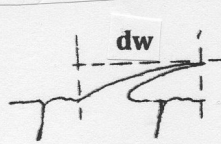
lateral occiput



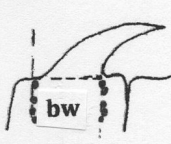
fr



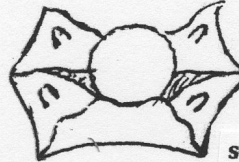
flat-wavy-small bilobed -wide bilobed



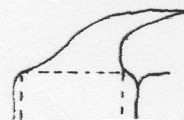
dw



bw



sternal tubercles

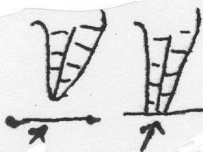


dorsal spines



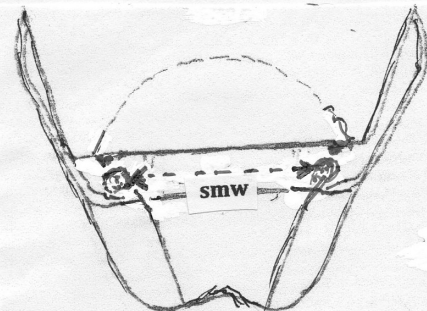
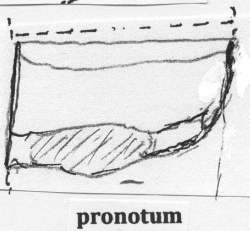
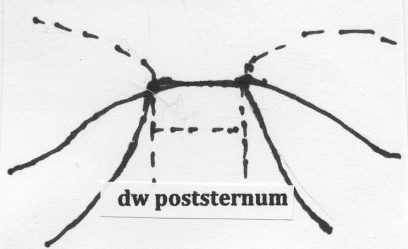
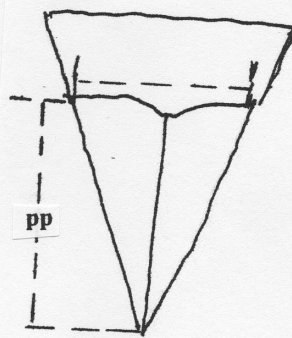
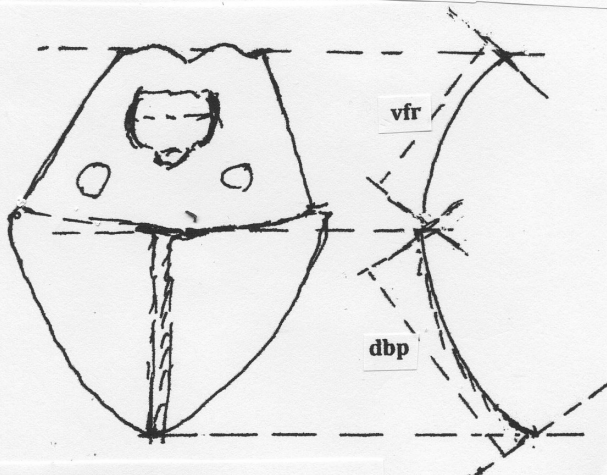
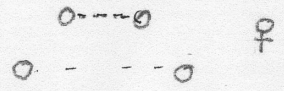
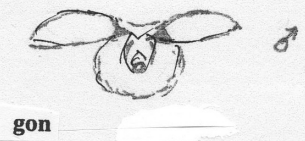
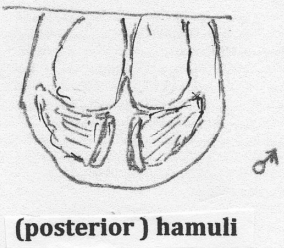
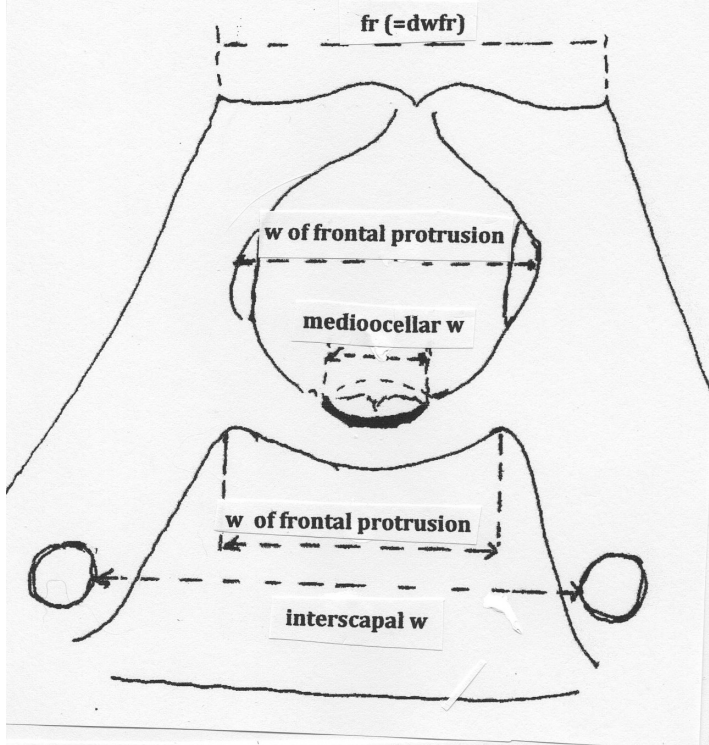
hw

wingbud features

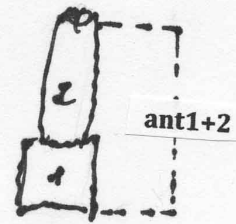
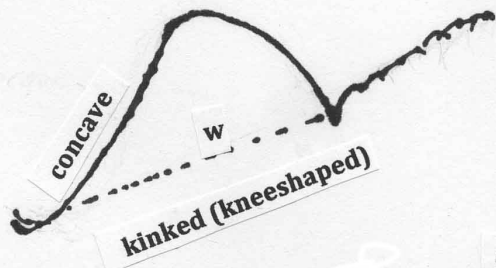
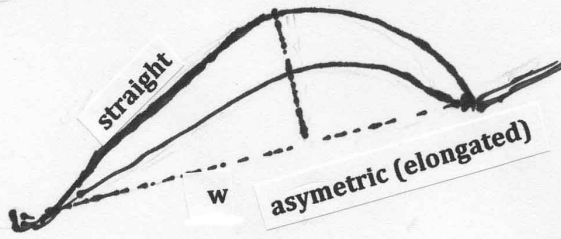
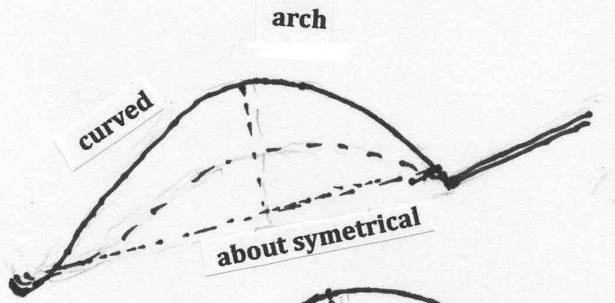


anal loop : closed/open

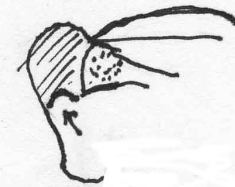
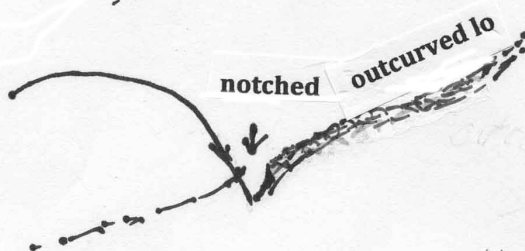
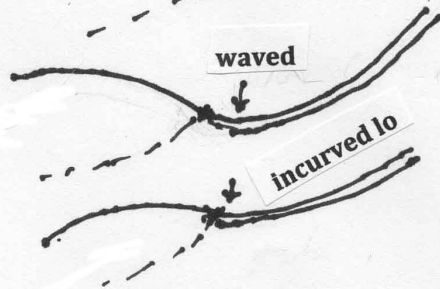
Libellulidae



Libellulidae



arch-lo contact



Eyes dorsomedian incurve
(on lateral occiput)