Extended abdominal glossary and synonymy

Morphological terms are generally listed in the singular. We indicate whether a term refers to a paired or an unpaired structure, according to the following specifications (note: the following indications refer to the usage of a term rather than to the condition of the structure concerned) – *[paired]*: term referring to a structure that occurs in two exemplars, one on the left and one on the right side of the body, with clear side-homonomy; [unpaired]: term referring to a structure that occurs in one exemplar that is present at the midline but may to a varied extent extend from there to the sides of the body; *[one-sided]*: term referring to a structure that occurs in one exemplar either on the left or on the right side of the body and has no or no identified counterpart on the other side; *[unpaired, (partly) fused from pair]*: term referring to a structure that is unpaired but has originated, at least in part, by a fusion including paired structures; [unpaired, (occasionally) with (partial) median division]: term referring to a structure that is unpaired but consistently or in some taxa shows a partial or complete median division; [paired, (occasionally) with (partial) *median fusion*]: term referring to a structure that is paired but consistently or in some taxa shows a partial or complete median fusion with its counterpart; [paired, separated from unpaired]: term referring to a structure that is paired but has originated from an unpaired structure by its division at midline; [unpaired to paired]: term variously referring to an unpaired or a paired structure in different taxa, while it is unclear which is the plesiomorphic condition.

Pregenital segments

Acrocoxosternal area - CSα [unpaired]: the usually very narrow part of a coxosternite anterior to the coxosternal antecosta; probably only the originally (inter)sternal and antelaterocoxal sclerotizations can contribute to it.

Acrotergal area - $TG\alpha$ [unpaired]: the usually very narrow part of a tergite anterior to the tergal antecosta.

Antecosta - **ac** [unpaired]: a transverse internal ridge assumed to represent the primary border between segments; originally along the entire circumference of a segment, but in adult Mantodea only fragmentary parts on the tergite and coxosternite are distinct.

Antelaterocoxa - **LCa** [paired]: in the likely plesiomorphic condition of Archaeognatha (Klass & Matushkina 2012, unpublished data) an anterior sublateral principal ventral sclerite of an abdominal segment; possibly belonging to the limb base. In Mantodea LCa is likely represented by the far anterior sublateral parts of the undivided coxosternite CS.

Anterior spiracle apodeme - [= ms = manubrium] [paired]: an anteroventrally directed apodeme upon the anterior spiracle sclerite SIm.

Anterior spiracle sclerite - SIm [paired]: the sclerite extending along the anterior wall of the atrium of a spiracle.

Atrium of spiracle - as [paired]: the chamber of the spiracle external to the sclerites SIm and SIk.

Centrotergal area - TGκ [unpaired]: the larger dorsomedian part of a tergite, excluding the paratergal areas.

Conjunctival membrane - a summary term for the intercoxosternal and intertergal membranes, potentially including in addition parts of the membrane separating consegmental coxosternites and tergites, if these are folded in the same direction as ventral or dorsal segmental folds; forming the membranous separation of successive sclerotic units of secondary segmentation; note that in a strict morphological sense the morphological directions 'anterior' and 'posterior' are reverted in the realm of a reflected conjunctival membrane.

Constriction of spiracle - cs [paired]: the circular constriction of a spiracle at the internal end of the tracheal base chamber, separating the latter from the lumen of the tracheal stem.

Coxa - **CX** [paired]: in the likely plesiomorphic condition of Archaeognatha a large (postero)lateral principal ventral sclerite of an abdominal segment; belonging to the limb base. In Mantodea **CX** is represented by large (postero)lateral parts of the undivided coxosternite.

Coxosternal antecosta - acc [unpaired]: the part of an antecosta in the realm of the coxosternum, extending at or near its anterior margin.

Dorsal (segmental) fold - df [unpaired]: the transverse dorsal fold formed by the posterior part of a segment and sclerotized dorsally (rarely also ventrally) by its tergite; overlapping the anterior dorsal part of the following segment.

Intercoxosternal membrane - *[unpaired, partly fused from pair]*: the reflected cuticle extending from the posterior edge of a ventral fold (thus usually from the posterior margin of a coxosternite) to the anterior margin of the following coxosternite; it can include weakly sclerotized areas; the larger part represents the dorsal walls of the medially fused coxal lobes of a segment.

Intertergal membrane - *[unpaired]*: the reflected cuticle extending from the posterior edge of a dorsal fold df (thus usually from the posterior margin of a tergite) to the anterior margin of the following tergite; it can include weakly sclerotized areas.

Laterocoxa - **LC** [paired]: the sclerotizations ante- and postlaterocoxa (**LCa** and **LCp**) together, see there.

Laterodorsal carina - Idca [paired]: a longitudinal ridge that demarcates the deflected lateral paratergal area from the centrotergal area of a tergite.

Laterotergal apodeme - Itga [paired]: a deepened part of the tergal antecosta act on the lateral part of the centrotergal area $TG\kappa$.

Neck of spiracle - ns [paired]: the elongate constriction of a spiracle at the central margins of sclerites **SIm** and **SIk**; separating the atrium as from the tracheal base and surrounding the orifice of the spiracle.

Orifice of spiracle - si-o [paired]: the slit-like orifice at the inner end of the atrium as that is surrounded by the neck of the spiracle.

Posterior spiracle apodeme - ks [paired]: a ventrally directed apodeme upon the posterior spiracle sclerite SIk.

Posterior spiracle sclerite - SIk [paired]: the sclerite extending along the posterior wall of the atrium of a spiracle.

Postlaterocoxa - LCp [paired]: in the likely plesiomorphic condition of Archaeognatha (Klass & Matushkina, unpublished data), an anterolateral principal ventral sclerite of an abdominal segment; belonging to the limb base. In Mantodea the postlaterocoxa is represented by the anterolateral parts of the undivided coxosternite.

Sternum - **ST** [= eusternum] [unpaired]: in the likely plesiomorphic condition of Archaeognatha (Klass & Matushkina, unpublished data), an anteromedian principal ventral sclerite of an abdominal segment; usually divided in an anterior intersternite **STi** and a posterior true sternite **STt**. In Mantodea **ST** is likely represented by the anteromedian part of the undivided coxosternite.

Spiracle sclerotization - **SI** [paired]: one or several sclerites associated with a spiracle; in Mantodea comprising the anterior SIm and the posterior **SIk** sclerites, which form a closing apparatus.

Tergal antecosta - act [unpaired]: the part of an antecosta in the realm of the tergum, extending at or near its anterior margin.

Tracheal base - tb [paired]: the chamber of the spiracle internal to the sclerites **SIm** and **SIk**, bordered by neck of the spiracle **ns** externally and constriction of the spiracle **cs** internally.

Ventral (segmental) fold - vf [unpaired, fused from pair]: the transverse ventral fold formed by the posterior part of a segment and sclerotized ventrally (rarely also dorsally) by its coxosternite; overlapping the anterior ventral part of the following segment; representing the projection of the limb bases of its segment (medially fused coxal lobes).

aha - [one-sided]: an outward-directed membranous folding of the anterior-most right dorsal wall of ventral fold 9, harboring the curved mesal part of apodeme age of the right phallomere (reference: 'apodeme-harboring').

Dorsocoxal sclerotization of ventral fold 9 - CS98 [unpaired, fused from pair?]: the sclerotization in the dorsal wall of ventral fold 9, which is either isolated (then it can alternatively be called sclerite **CSd9**) or connected with the main part of coxosternite 9; representing a dorsal sclerotization of the medially fused coxal lobes 9.

Mesocoxosternal apodeme 9 - mcsa9 [paired, occasionally with partial median fusion]: a flat apodemal extension to the anterior on the ventral anterior margin of abdominal segment 9; sclerotized at least dorsally by anterior part of coxosternite 9; paired but potentially fused at midline.

Stylus-associated process of ventral fold 9 - vfsp9 [one-sided]: a process on ventral fold 9 immediately in front of the stylus base, as far as known, only present on right side.

Ventral (segmental) fold 9 - vf9 [= male 'subgenital lobe'] [unpaired, fused from pair]: the posteriorly directed and usually strongly posteriorly expanded transverse ventral fold of abdominal segment 9, which is ventrally sclerotized by coxosternite 7 and overlaps the male genitalia and postgenital abdomen ventrally; representing the projection of the limb bases of segment 9 (medially fused coxal lobes 9); the term 'subgenital lobe' should be avoided in a morphological context.

Male genital region II: formative elements of phallic organs

are - [one-sided]: right phallomere, a small apodeme upon the posterolateral part of groove age, with an extension parallel to that of groove age in the same area (with **R3** sclerotization) (reference: 'apodeme right').

cbe - [one-sided]: right phallomere, the inwardly (dorsally and anteriorly) bulged midlength ventral wall (membranous) (reference: 'central bulge' as seen from the interior).

goa - [one-sided]: left phallic complex (ventral phallomere), one or several small lobes in the area of the opening of the ejaculatory duct upon the dorsal wall of lobe **vla** (membranous) (reference: 'genital opening [lobe(s)]').

lge - [one-sided]: right phallomere, a groove from articulation **R1-R3** to the area between processes pia and pva, in line with groove age formed by sclerite **R3** (with **R1** sclerotization, border region between parts **R1C** and **R1D**) (reference: 'lateral groove').

maa - [one-sided]: right phallomere, a small mesal accessory lobe of lobe fda (with R1 sclerotization) (reference: 'mesal, accessory [lobe]').

mea - [one-sided]: left phallic complex (left phallomere), the mesally and partly posteriorly directed marginal edge of the dorsal wall of the left complex that more or less strongly projects above the entrance of pouch **pne** (membranous or with **L4B** sclerotization dorsally) (reference: 'mesal edge').

pae - [one-sided]: right phallomere, a small apodeme upon the posterolateral part of groove age and partly upon apodeme are, with an extension perpendicular to that of groove age and apodeme are (with **R3** sclerotization) (reference: 'perpendicular apodeme').

Phallomere gland - phg [one-sided]: left phallic complex (left phallomere), a cuticular (ectodermal) gland whose outlet duct opens into pouch pne (membranous) (reference: 'phallomere gland').

pla - [one-sided]: left phallic complex (ventral phallomere), a lobe arising from the ventral wall at the left-posterior corner (membranous, but potentially with **L4** or **L4A** sclerotization in ventral wall) (reference: 'posterior left [lobe]').

swe - [one-sided]: left phallic complex (left and ventral phallomere), a longitudinal internal ridge at or near left edge (with **L4** sclerotization, or with **L4A** and/or **L4B** sclerotization and articulatory membrane **A1** in between) (reference: 'Skleritwulst').

vla - [one-sided]: left phallic complex (ventral phallomere), the right-posterior ventral lobe (with **L4** sclerotization in ventral wall; with opening of ejaculatory duct in dorsal wall).

Male genital region III: sclerotizations of phallic organs

L5 - [one-sided]: left phallic complex (ventral phallomere), a small sclerite posterior to opening of ejaculatory duct in dorsal wall of lobe **vla**.

Female genital region

Accessory gland pouch - agp [unpaired]: a fairly wide chamber representing the most external part of the accessory gland near its opening.

Accessory gland sclerite - AG [unpaired]: a sclerite in the ventral and apical dorsal walls of lobe agsl, also extending further anteriorly towards $CX9\mu$ area of coxa 9.

Accessory paratergal ridge 9 - aptr9 [paired]: a short, vertical internal ridge upon the paratergal area 9, located in the anterior bend of the tergal antecosta 9.

Acrolaterocoxal area 9 - LC9 α [paired]: the anterior part of sclerite LC9, anterior to ridge sxa (term only valid if ridge sxa is indeed part of the antecosta 9; LC9 α is then located on segment 8).

Anterior spermathecal bulge fold - spba [unpaired]: an external transverse fold bordering the spermathecal bulge to the anterior.

Basicoxal area of coxa 9 - CX9β [paired]: the lateral and posterior proximal parts of a coxa CX9, located anterolaterally to posteriorly at the bases of the gonoplacs 9; forming the lateral and posterior parts of the 'coxal ring' (which is open posteriorly).

Bulb of gland of ventral fold 7 - vfgb7 [unpaired]: the wide distal (= internal to the neck-like constriction) part of the gland **vfgl7** of ventral fold 7.

Central apodeme - cap [unpaired]: a wide, laminar apodeme invaginated from the dorsal base of the medially fused gonapophyses 9; entirely sclerotized, the sclerotization being either a proximal part of the gonapophyseal sclerite 9 or a formerly independent sclerotization **CA** (unresolved).

Central apodeme keel - capk [unpaired]: an inwardly directed median longitudinal keel on the dorsal face of the central apodeme.

Central apodeme sclerotization - CA [paired]: the sclerotization of the dorsal and ventral walls of the apodeme cap; that in the ventral wall of cap is distally continuous with the sclerotization of the gonapophyses 9 (i.e. with GP9).

Centrocoxosternal process 7 - **ccsp7** [paired]: a ventral spine upon the central part of coxosternite 7.

Centrotergal area 8 and 9 - $TG8\kappa$, $TG9\kappa$ [unpaired]: the larger dorsomedian part of tergite 8 or tergite 9, excluding the paratergal areas.

Chamber of gland of ventral fold 7 - vfgc7 [unpaired]: the wide proximal (= external to the neck-like constriction) part of the gland vfgl7 of ventral fold 7; open midventrally.

Coxal lobe 8 - cx8 [paired]: a posteriorly and/or mesally directed projection in the area sclerotized by coxa 8, partly covering the base of gonapophysis 8; the true coxal lobe 8 represents the projection of the limb base of segment 8; in Mantodea a clear identification of projections as parts of the coxal lobes cx8 is ambiguous; the lobelets cxdl, cxvl, and cxml could be parts of a subdivided coxal lobe 8 but could as well be secondary elements of a heavy sculpturing of the coxae 8.

Distal gonapophyseal sclerite 9 - GPd9 [paired]: occupies dorso- and ventrolateral parts of the gonapophyseal wall distal to the distal end of the rhachis.

Descending fold of ventroterminal lobe - tldf7 [paired]: a fold upon the ventral fold 7 that descends from the upward-bent edge of the anterior part of the ventroterminal lobe **vft17** to the level of the vestibular sclerite 7

Dorsobasal transverse fold of gonapophyses 9 - gpdf9 [unpaired]: an anterodorsally directed transverse fold in the dorsal wall of the common stem of gonapophyses 9, very low medially but with high lateral parts forming a condyle fitting into the socket of the gonoplac basal cavity 9 (articulation A5); sclerotized by the medially fused gonapophyseal sclerites 9.

Dorsobasal transverse ridge of gonapophyses 9 - gpdr9 [unpaired]: a strong transverse internal ridge in the dorsal wall of fold **gpdf9**, interconnecting the balls of left and right articulations **A5** and supporting them.

Frontal apodeme of coxa 9 - fa9 [paired]: an internal ridge (anterior part can be expanded to an apodeme) upon a line along the midlength and anterior lateral margin of the basicoxal area 9 and the lateral part of the mediocoxal area CX9μ of coxa 9.

Frontogynal pouch - frgp8 (openings: **frgp-o**) [paired]: a small pouch at anterior bottom of genital chamber, partly sclerotized by sclerite **FG8** (if this is present); possibly a structure of the segmental border 7/8.

Frontogyne - **FG8** [unpaired, occasionally with median division]: a weak sclerite in the anteriormost ventral wall of segment 8, located in the anteriormost dorsal wall of the genital chamber; possibly part of true sternum 8, perhaps the intersternite 8; can be medially divided.

Gland of ventral fold 7 - vfgl7 [unpaired]: a likely glandular, mostly membranous internal sac invaginated from beneath the transverse fold of the ventroterminal lobes **tltf7**, and above the mesal parts of the dorsomesal walls of the ventroterminal lobes **vftl7**.

Gonapophyseal sclerotization 9 - GP9 [paired, with partial median fusion]: the sclerotization of gonapophysis 9; it includes three sclerites, the distal (GPd9), mesal (GPm9), and lateral (GPl9) gonapophyseal sclerites 9, which show a complex distribution over the walls of gonapophysis 9; the medially fused GPl9 are likely additionally fused with a formerly independent sclerotization CA of the central apodeme cap.

Gonoplac basal cavity - glbc [paired]: a partly sclerotized (by coxa 9) cavity beneath the gonoplac basal lobe, part of it forming the socket for articulation with the ball of the dorsobasal transverse fold of gonapophyses 9.

Lateral apodeme of coxa 9 - la9 [paired]: a paired apodeme originating from the lateral extremity of the basicoxal area 9.

Lateral gonapophyseal sclerite 9 - GPI9 [paired, with partial median fusion]: extends along the proximal half of the lateral wall of the gonapophysis, its distal part is placed on the subapical part of the rhachis; at the common basal stem of gonapophyses 9 the left and right GPI9 are fused and cover the entire dorsal wall including fold **gpdf9**; from here **GPI9** extends anteriorly, where it is continuous with the sclerotization of the central apodeme cap (this is likely a formerly independent sclerotization of apodeme cap: **CA**).

Lateral ridge of gonapophysis 9 - gplr9 [paired]: a longitudinal internal ridge extending from near the articulation **A5** ball upon fold **gpdf9** alongside sclerite **GPl9** up to the distal end of the rhachis, which is supported by it.

Laterocoxa 8 - LC8 [paired], **possibility 1**: a pair of weak lateral sclerites in the anteriormost ventral wall of segment 8, located in the lower lateral wall of the genital chamber lateral to the languette sclerite 7 and potentially fused to it; representing a small anterolateral part of the limb-base sclerotization of segment 8.

Laterocoxa 8 - LC8 [paired], possibility 2: a pair of lateral sclerites in the anterior ventral wall of segment 8, located in the upper lateral wall of the genital chamber lateral to the coxal sclerite 8 and separated from it by a narrow linear weakness; representing a small anterolateral part of the limb-base sclerotization of segment 8.

Lateroepigynal pouch - lep7 (openings: lep7-o) [paired]: a small membranous pouch at the flank of sclerite EG7.

Laterolobocoxal area of coxa 9 - CX9λλ [paired]: the parts of a coxa 9 located in the lateral and dorsal surface of the gonoplac 9; not part of the 'coxal ring.'

Laterotergal apodeme 8 and 9 - ltga8, **ltga9** [paired]: a deepened part of the tergal antecosta 8 or 9 on the lateral part of the centrotergal area 8 or 9.

Marginovestibular transverse fold 7 - mvtf7 [paired]: a very shallow outward and forward directed fold at frontal (= morphologically posterior) end of dorsal wall of ventral fold 7.

Mediocoxal area of coxa 9 - CX9μ [unpaired, fused from paired]: the medially fused anteromesal parts of the two coxae CX9, located anterior to the bases of the gonoplacs 9 and gonapophyses 9, and potentially demarcated from the remainder of CX9 by weak sclerotization; forming the anterior part of the 'coxal ring.'

Mediocoxosternal apodeme 7 - mcsa7 [paired]: a short, flat apodeme formed by the anteriorly expanded anterior margin of coxosternite 7.

Mesal gonapophyseal sclerite 9 - GPm9 [paired]: consists of an elongate proximal patch at the ventral base of gonapophysis gp9 and continues from here into the mesal wall of gp9.

Mesolobocoxal area of coxa 9 - $CX9\mu\lambda$ [paired]: the parts of a coxa 9 located in the mesal surface of the gonoplac 9; not part of the 'coxal ring.'

Oblique laterocoxal ridge 9 - sy [paired]: an internal ridge (= sulcus) on laterocoxa 9, extending between articulations **A1** and **A2**.

Outlet tubes of accessory gland(s) - left **aglt**, right **agrt** [forming a pair]: the asymmetrical pair of cuticulized tubes that lead from the accessory gland pouch to the further internal parts of the accessory gland.

Paratergal apodeme 9 - ptga9 [paired]: a deepened part of the tergal antecosta 9 on the paratergal area 9.

Paratergal area 9 - TG9 π [paired]: the ventrally bent lateral part of tergite 9, including a posterior arm that extends further ventrally and is fused with a posterior arm of paratergite 8, **TG8** π , to form the paratergal extension 8+9, **TG8**+9 ϵ .

Paratergal extension 8+9 - TG8+9 ϵ [paired]: a long ventromesally directed extension formed by a posterior arm of the paratergal area 8 and (mainly) by an anterior arm of the paratergal area 9, which are fused.

Postcaudogynal fold - pcgf8 [unpaired]: an outward and posteriorly directed fold at the posterior margin of the caudogyne 8.

Posterior intervalvula 9 - IP [unpaired]: Originally an unpaired transverse sclerite with an unresolved (but not sternal) origin; it connects the dorsal bases of the left and right gonoplacs. Most likely absent in Mantodea.

Posterior spermathecal bulge fold - spbp [unpaired]: an external transverse fold bordering the spermathecal bulge to the posterior.

Sclerite of gland of ventral fold 7 - VG7 [paired]: a small sclerite laterally in the neck part of the gland **vfgl7** of ventral fold 7.

Spermathecal bulge - **sbu** [unpaired]: a median elevated area between the coxae 8 that bears the spermathecal opening, with the posterior and/or anterior parts overfolding the neighboring areas (folds **spbp** and **spba**, respectively).

Tergal antecosta 8 - act8 [unpaired]: an internal ridge assumed to represent the primary segmental border between segments 7 and 8 in the realm of tergum 8.

Tergal antecosta 9 - act9 [unpaired]: an internal ridge assumed to represent the primary segmental border between segments 8 and 9 in the realm of tergum TG9; extending far ventromesally along paratergal extension $TG8+9\varepsilon$.

Tergite 8 - TG8 [unpaired]: the undivided dorsal sclerite of abdominal segment 8 including the dorsal main part, centrotergal area 8, and the pair of lateral, ventrally bent, and indistinctly detached (by weaker sclerotization) paratergal areas 8.

Tergite 9 - TG9 [unpaired]: the undivided dorsal sclerite of abdominal segment 9 including the dorsal main part, centrotergal area 9, and the pair of lateral, ventrally bent, and indistinctly detached (by weaker sclerotization) paratergal areas 9.

Transverse fold of ventroterminal lobes - tltf7 [unpaired]: a median transverse fold upon the ventral fold 7 that connects the dorsomesal walls of the left and right ventroterminal lobes vftl7.

Transverse laterocoxal ridges 9 - sx: sxa and sxp [paired]: two parallel internal ridges (= sulci) on laterocoxa 9, sxa extending between articulations A1 and A3, and sxp lying posterior to it; the anterior ridge sxa is possibly part of antecosta 9.

Ventroterminal lobe 7 - vftl7 [paired]: the terminal (apical) lobe of ventral fold **vf7**, being part of the latter; sclerotized by coxosternite 7 ventrolaterally.

Terminal segments

Articulatory part of tergite 10 - TG10 [paired]: the small, narrow part of tergite 10 that bends into the ventral wall of dorsal fold 10 at the dorsal cercal base to articulate with the latter.

Centrotergal area of tergite 10 - TG10κ [unpaired]: the larger median, dorsally located part of tergite 10, excluding the paratergal, ventral, and articulatory areas.

Cercal sclerotization - CE [paired]: the sum of all sclerites on a cercus, consisting of a varied number of cylindrical sclerites = cercomeres separated by narrow rings of membrane.

Cercus-supporting paraproctal ridge - cspr [paired]: a longitudinal internal ridge located most laterally upon the paraproct, next to its border to the paratergal area 10.

Dorsal (segmental) fold 10 - df10 [unpaired]: the transverse dorsal fold formed by the posterior part of segment 10 and sclerotized dorsally and partly ventrally by tergite 10; usually with the median part more or less posteriorly expanded and forming the apparent posterior tip of the body.

Dorsal (segmental) fold 11 - df11 [unpaired]: a small median lobe placed posterior to tergite 10, but more or less overfolded by dorsal fold 10, and bearing the mediatergite 11; most likely representing the median part of the otherwise reduced dorsal fold 11.

Laterotergite 11 - TGl11 [paired]: a small sclerotization at the ventrolateral base of the cercus, partly fused with the basal cercal sclerotization and fused with the paraproct, appearing as a lateral extension of the latter, but located posterior to the ventromesal extremity of tergite 10 ($TG10\pi$); most likely representing a lateral fragment of tergum 11.

Middorsal carina 10 - mdca10 [unpaired]: a longitudinal external ridge (= carina) or keel at the dorsal midline of segment 10 (on tergite 10).

Paratergal area of tergite 10 - $TG10\pi$ [paired]: the lateral part of tergite 10 that bends ventrally and mesally in front of the cercal base to contact the paraproct; usually not clearly demarcated from centrotergal area 10.

Subanal lobe - sbl [paired]: a posteromesally projecting lobe located posterior to the male or female genitalia, for the larger part sclerotized by the paraproct.

Ventral area of tergite 10 - TG10v [unpaired]: the part of tergite 10 that bends into the ventral wall of dorsal fold 10 in between the cercal bases, potentially contacting the anterior margin of mediotergite 11 near the midline.