

A Mosquito Taxonomic Glossary

I. Adult Head (External)*

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Simplification is always a worthwhile goal and never more so than at present when a growing complexity is characterizing all aspects of science and of life itself. The attempt to develop a standardized mosquito taxonomic glossary should, therefore, need no further justification. Not only is there often more than one term in use for a feature of the mosquito anatomy, but all too frequently there is a distressing amount of impreciseness of meaning also involved.

Attention has particularly been drawn to the need for such a glossary because of the recent development of several large-scale mosquito taxonomic efforts, as for example, those being conducted by Belkin (1969, 12) and DeMeillon (1969,8). In such projects, a number of individuals are involved in preparing species descriptions and the maintenance of any sort of uniformity of the terminology employed in the resulting publications is particularly difficult.

In the belief that efforts directed towards the development of a standardized glossary should eventually result in simplifying both the taxonomy and the identification of mosquitoes, the American Mosquito Control Association was requested to give their official sanction to the undertaking of such a project. This was done at the annual meeting of the Association at Williamsburg, Virginia in 1969 and a working committee consisting of Botha DeMeillon, Harry Pratt, Alan Stone and the author (as chairman) was established. Dr. J. L. Laffoon, Department of Zoology and Entomology, Iowa State University and a specialist in entomological terminology consented to serve as a consultant to the project.

The glossary will be developed in parts, with each part being issued in Mosquito Systematics Newsletter as it is completed. This initial presentation will give the opportunity to all individuals interested in mosquito systematics and morphology to comment fully on both the choice of terms for standardization and on the definitions developed. Part I of this effort is presented here. Hopefully, an additional part will appear in each subsequent issue. Following completion of a serial presentation and allowing sufficient time for revision, the total glossary will be issued elsewhere under a single cover.

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In beginning this work, the problem arose repeatedly of whether all anatomical features of mosquitoes should be named in the glossary or just those which have been used taxonomically. I have compromised here by including strictly morphological terms where the structures involved could be clearly observed, even though they are not of current taxonomic use.

Terms recommended for standardized use are given fully capitalized. Synonyms to these are in lower case and underlined. Standardized abbreviations are also suggested. In-so-far as possible, it is planned to illustrate the terms proposed for standardization.

Wherever homologies seem to be evident, the correct anatomical term is suggested for standardization, even though this action means discarding a term long used in taxonomic literature (for example, the substitution of "pedicel" for "torus").

The only previous serious effort to produce a glossary of mosquito anatomical terms was by Belkin (1962, 547). This fine treatment has been frequently drawn upon for this work. Christophers (1960) accomplished a very complete morphological study of Aedes (Stegomyia) aegypti (L.). This, together with the more generalized account by Snodgrass (1959), has been of great value to this task. However, this effort would not have been possible without the help of Dr. J. L. Laffoon who most generously made available both his tremendous file of definitions of insect anatomical structures and his profound knowledge of these structures.

Presently, terms are arranged by life stage and by body region. When the anatomy of all portions of all life stages has been considered and the revised final treatment is consolidated, all of the terms will be given in a single alphabetical list. However, an index will be appended to the final treatment in which the terms recommended for standardization will be listed according to life stage and body region.

anteclypeus.— See LABRUM.

ANTENNA (A).— In adult mosquitoes consists of a narrow ring-like basal segment (scape), a second globular and cup-shaped segment (torus), and a third segment (flagellum) comprised of a series of 13-14 flagellomeres. In most earlier mosquito taxonomic literature, each of the 15-16 divisions of the antenna were referred to as an antennal segment.

antennal fossa.— See ANTENNAL SOCKET.

antennal segment.— See ANTENNA.

ANTENNAL SOCKET (AS).— Membranous pit on adult head into which base of antenna is set. (Syn.: antennal fossa.)

ANTERIOR TENTORIAL PIT (ATP).— The point at which the anterior tentorial arm attaches to the head capsule; in adult mosquito it occurs where the epistomal suture meets the antennal socket; obscured by the pedicel.

appressed scale.— See DECUMBENT SCALE.

basal bristle .— See LABIAL BASAL SETA.

CERVICAL SCLERITE (CS).— A sclerite situated laterally on the neck; anteriorly it articulates with the margin of the occipital foramen and posteriorly with the prothorax. (Syn.: jugular sclerite.)

clypeal fossa.— See LABRUM.

CLYPEOLABRAL SUTURE (CLS).— See LABRUM.

CLYPEUS (Clp).— A conspicuous projecting area of the adult head just below the antennal bases; specifically delimited above by the epistomal suture and below by the clypeolabral suture.

COMPOUND EYE (CE).— A large convex kidney-shaped structure occupying much of the anterolateral surface of the adult head capsule; consisting of several hundred circular ommatidia and bounded at least in part by the ocular sclerite.

CORONAL SUTURE (cs).— A median longitudinal suture on the dorsal surface of the adult head, partly apodemalous but becoming shallower anteriorly, passing forward from upper margin of occipital foramen to the frons where it forks to form the frontal sutures; sometimes hidden by dorsal head scaling.

DECUMBENT SCALE.— An adult head scale, either broad or narrow, that lies flat or depressed. (Syn. recumbent, appressed, flat.)

epicranial plate.— Used by Gater (1935, 16) to designate the vertex, gena, postgenae, occiput, and postocciput in the aggregate.

EPICRANIAL SUTURE.— Refers to the combined coronal and frontal sutures on the adult head.

EPISTOMAL SUTURE (EpS).— A suture marking the anteroventral limits of the frons and terminating laterally in the anterior tentorial pits. (Syn.: frontoclypeal suture, preantennal suture.)

ERECT SCALE (ES).— An elongate adult head scale, narrow at base and gradually widened distally to a forked or toothed apex, that stands at least partially erect. (Syn.: upright forked scale.)

eye.— See COMPOUND EYE and OCELLUS.

FASCICLE.— The closely appressed bundle of six stylets forming the piercing and siphoning apparatus of the mouthparts of the adult mosquito.

flagellar segment.— See FLAGELLOMERE.

FLAGELLAR WHORL (FW).— A ring of long curved setae borne by each flagellomere of the adult antenna; may be situated basally, medially, or apically.

FLAGELLOMERE (Flm).— An individual unit of the adult antennal flagellum. (Syn.: flagellar segment.)

FLAGELLUM (F1).— The third segment of the adult antenna, comprised of a series of 13-14 flagellomeres.

flat scale.— See DECUMBENT SCALE.

foramen magnum.— See OCCIPITAL FORAMEN.

FRONS (Fr).— The area on the anterior surface of the adult head lying between the frontal sutures dorsally and the epistomal suture ventrally; largely obscured by the convergent antennal sockets. (Syn.: front, frontal area.)

front.— See FRONS.

frontal area.— See FRONS.

frontal bristle.— See INTEROCULAR SETA.

FRONTAL SUTURE (fs).— A short V-shaped line of thickening along the anterior margin of the interocular space, connecting laterally with the ocular sclerite; it constitutes the arms of the epicranial suture; usually visible only in cleared specimens. (Syn.: postfrontal suture.)

FRONTAL TUFT (FT).— A specialized name applied to a group of erect elongate setae and scalelike setae arising from the interocular space and the immediately adjacent portion of the vertex of adult mosquitoes (anophelines in particular).

frontoclypeal suture.— See EPISTOMAL SUTURE.

FURCA (Fu).— A prominent basal sclerite on the labellum.

GALEA.— See MAXILLA.

GENA (Ge).— The ventral portion of the adult head capsule lying between the compound eyes and continuing forward without a break to the ventral surface of the proboscis. See hypostomal bridge.

HEAD.— The anterior section of the body; in the adult it bears a large pair of compound eyes, a pair of long slender segmented antennae, a median slender proboscis, and a pair of maxillary palpi.

HEAD CAPSULE.— The sclerotized portion of the head.

HYPOPHARYNX (Hy).— The unpaired mouthpart stylet lying just ventral to the labrum; it carries the salivary duct.

hypostomal bridge.— Used by Waldbauer (1962, 202) to designate the fused genae ventrally between the compound eyes.

INTERANTENNAL GROOVE (ig).— A longitudinal median line produced by the junction of the antennal sockets on the adult head. (Syn.: interantennal suture of Robinson 1939, 215.) Introduced here as a replacement for "interantennal suture" since the line is produced only by the approximation of the antennal sockets and is not a suture in the true sense.

interantennal suture.— See INTERANTENNAL GROOVE.

INTEROCULAR SETA (ISe).— The name applied to the ocular setae arising on the interocular space of the adult head; these setae are often somewhat longer than the other ocular setae. (Syn.: frontal bristle, vertical bristle, interorbital bristle.)

INTEROCULAR SPACE (IS).— The narrow portion of the vertex occurring between the compound eyes of the adult head. (Syn.: interocular vertex, interorbital space.)

interocular vertex.— See INTEROCULAR SPACE.

interorbital bristle.— See INTEROCULAR SETA.

interorbital space.— See INTEROCULAR SPACE.

jugular sclerite.— See CERVICAL SCLERITE.

LABELLUM (La).— One lobe of a partially bilobed structure situated at the apex of the labium; between the lobes on the midline is the ligula; each labellum possesses several cuticular plates (possibly representing palpal segments).

LABIAL BASAL SETA (LBS).— One of a row of setae occurring ventrally near the base of the labium. (Syn.: basal bristle.)

labial gutter.— See PREMENTAL GUTTER.

labial trough.— See PREMENTAL GUTTER.

LABIUM.— The elongate stout ventral portion of the adult proboscis; consists of three parts: the prementum which forms a sheath for the fascicle, a pair of short budlike labella which articulate on the distal end of the prementum, and a short ligula between the labella.

LABELLAR BASAL SCLERITES (LaBS).— Several sclerites occurring ventrally in the membranous articulation between the prementum and the labella of the adult labium.

LABRUM (Lr).— The median dorsal stylet in the premental gutter; proximally its dorsal wall bends dorsally to articulate with the clypeus at the clypeolabral suture; synonyms of this dorsal portion are anteclypeus and clypeal fossa; the labrum forms the food meatus.

lacinia.— See MAXILLA.

LIGULA (Li).— A small sharp-pointed structure of the labium occurring distally on the midline between the labellar lobes.

MANDIBLE (Mn).— The paired stylet occurring just ventrad of the labrum in the premental gutter.

MAXILLA (Mx).— Consists of a paired stylet in the premental gutter of the adult labium (lying along the ventral side of the hypopharynx) and of the maxillary palpus; the stylet is considered to be the galea by some authors and to be the lacinia by others.

MAXILLARY PALPUS (MPlp).— In the adult mosquito it is inserted immediately below the clypens and laterad to the base of the proboscis; varies widely in form according to genus and sex; subject to varying interpretations as to the number of segments but apparently primitively 5-segmented; often referred to in taxonomic literature as the "palps."

NAPE (Na).— A median protuberance occurring posteriorly on the adult head just above the occipital foramen; traversed on the longitudinal midline by the coronal suture; presumably the dorsal portion of the postocciput.

NARROW CURVED SCALE (NCS).— Self explanatory.

NECK (N).— A membranous tube attaching the thorax to the margins of the occipital foramen of the adult head; laterally supported by the large cervical sclerite.

OCELLUS (Oc).— A simple eye; present in adult mosquitoes as a small indistinct circular area on either side of the interantennal groove.

OCCIPITAL FORAMEN (OF).— Posterior opening of the head capsule; the neck attaches to the edge of this opening. (Syn.: foramen magnum.)

OCCIPITAL REGION.— The region of the occiput.

OCCIPUT (Occ).— Posterior dorsal portion of the adult head capsule; its boundaries with vertex, postgenae, and postocciput are not delimited; usually with erect scales.

ocular bristle.— See OCULAR SETA.

OCULAR LINE (OL).— Area along the anterior border of the vertex between the compound eye margin and the row of ocular setae. (Syn.: orbital line.)

OCULAR SCALE (OS).— One of the scales occurring on the ocular line of the adult head.

OCULAR SCLERITE (OSl).— A rim of thickened cuticle occurring along the margin of the adult compound eye; united at the interocular space with the frontal suture.

OCULAR SETA (OcS).— One of a line of setae occurring on the head near the posterior margin of each compound eye; one or more pairs usually differentiated as interocular setae; the ocular setae along dorsal margin of the eye are the upper ocular setae and those along the lateral margin of the eye are the lower ocular setae. (Syn.: ocular bristle, orbital bristle.)

ONMATIDIUM (O).— One of the component units of a compound eye.

orbital bristle.— See OCULAR SETA.

orbital line.— See OCULAR LINE.

PALPIFER (Pl).— A small lobe laterad of the clypeus at the base of the maxillary palpus; anatomically a small lobe of the maxillary stipes to which the maxillary palpus articulates.

PARAOCCIPUT (Po).— A thickening located on the upper margin of the occipital foramen of the adult head on either side of the middle line; bearing a projection which articulates with the anterior arm of the cervical sclerite.

PEDICEL (Pe).— Second or subbasal segment of the antenna; in the mosquito adult, usually enlarged and appearing as the basal segment; often bearing hairs and/or scales. (Syn.: torus).

POSTERIOR TENTORIAL PIT (PTP).— The point at which the posterior tentorial arm attaches to the head capsule; in adult mosquitoes, it occurs laterally on the ventral margin of the occipital foramen.

postfrontal suture.— See FRONTAL SUTURE.

POSTGENA (PG).— The lateral and ventral portions of the adult head capsule behind the compound eye; not differentiated from the occiput, vertex, and gena.

POSTGENAL SETA (PgS).— One of a group of setae on the posteroventral aspect of the head capsule.

preantennal suture.— Used by Christophers (1960, 421); probably equivalent to EPISTOMAL SUTURE.

PREMENTAL GUTTER. — See PREMENTUM. (Syn.: labial gutter, labial trough.)

PREMENTUM (Prm).— The elongate stout ventral portion of the proboscis; with a median dorsal longitudinal groove (premental gutter) holding the fascicle; bearing the ligula and labella distally. (Syn.: theca.)

PROBOSCIS (P).— The greatly elongated sheathlike adult labium and its enclosed stylets.

recumbent scale.— See DECUMBENT SCALE.

ROSTRUM.— The snoutlike prolongation of the adult head, consisting dorsally of the clypeus and ventrally of a portion of the gena, of the proboscis, and of the maxillary palpi.

SCAPE (Sc).— The first or basal segment of the adult antenna; greatly reduced in mosquitoes and hidden by the pedicel.

SUBGENAL SUTURE (SG).— An externally visible thickening of cuticle on the lateral rostral wall; extends cephalad from the lower edge of the anterior tentorial pit; an external manifestation of the genal shelf; it marks the boundary between the clypeus and the gena.

sulcus.— See SUTURE.

SUTURE (sulcus, in part).— Applied either to a seam produced by the union of two areas of sclerotization (as used in vertebrate morphology), or to a groove produced incidental to the formation of a strengthening ridge on the inner surface of the cuticle (sulcus); does not apply to a line of weakness marked neither by a groove externally nor by a ridge internally (Matsuda 1965,35).

theca.— See PREMENTUM.

torus.— See PEDICEL.

upright forked scale.— See ERECT SCALE.

VERTEX (V).— Dorsal surface of the adult head behind the eyes and the interocular space; its boundaries with the occiput, genae, and postgenae not delimited.

vertical bristle.— See INTEROCULAR SETA.

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ABBREVIATIONS

AS	-antennal socket	Li	-ligula
ATP	-anterior tentorial pit	MPlp	-maxillary palpus
CS	-cervical sclerite	Na	-nape
ClS	-clypeolabral suture	NCS	-narrow curved scale
Clp	-clypeus	N	-neck
CE	-compound eye	Oc	-ocellus
cs	-coronal suture	OF	-occipital foramen
EPS	-epistomal suture	Occ	-occiput
ES	-erect scale	OL	-ocular line
FW	-flagellar whorl	OS	-ocular scale
Flm	-flagellomere	OSl	-ocular sclerite
Fr	-frons	OcS	-ocular seta
fs	-frontal suture	O	-ommatidium
Fu	-furca	Pl	-palpifer
Ge	-gena	Po	-paraocciput
ig	-interantennal groove	Pe	-pedicel
ISe	-interocular seta	PTP	-posterior tentorial pit
IS	-interocular space	PG	-postgena
La	-labellum	PgS	-postgenal seta
LBS	-labial basal seta	Prm	-prementum
LaBS	-labellar basal sclerites	Sc	-scape
Lr	-labrum	V	-vertex

Explanation of Figures

Illustrations of the head of Aedes (Ochlerotatus) grossbecki Dyar and Knab.

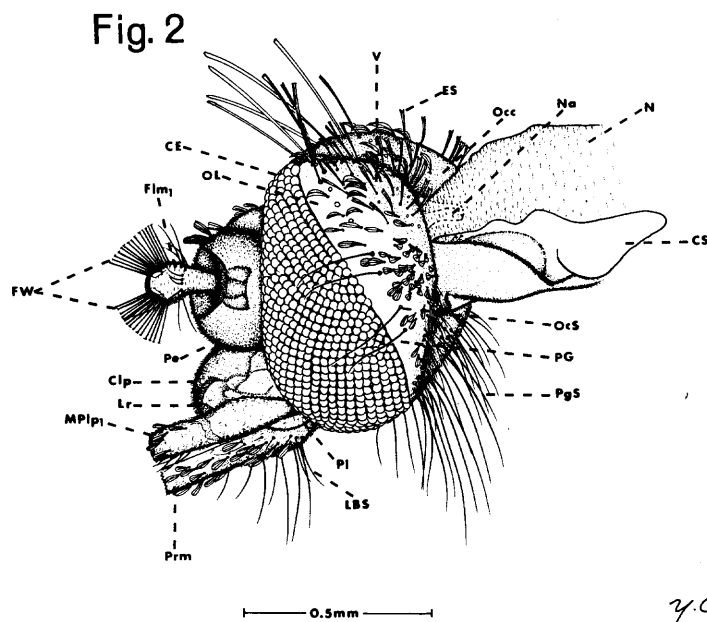
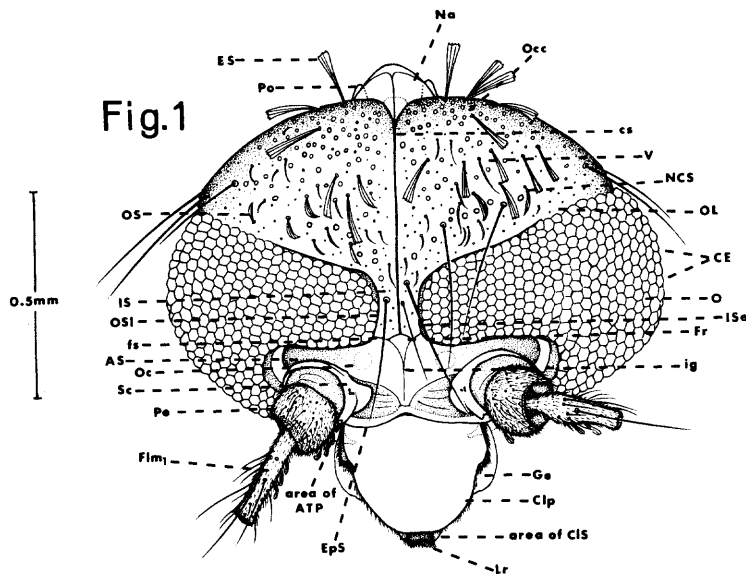
Fig. 1 Anterior view of female head.

Fig. 2 Lateral view of male head.

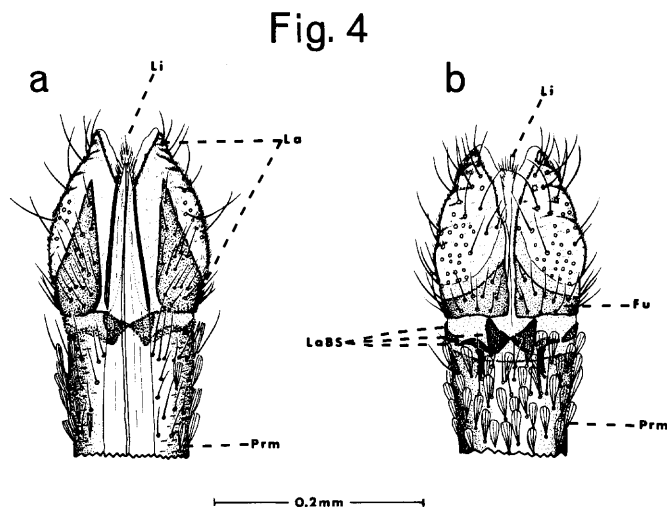
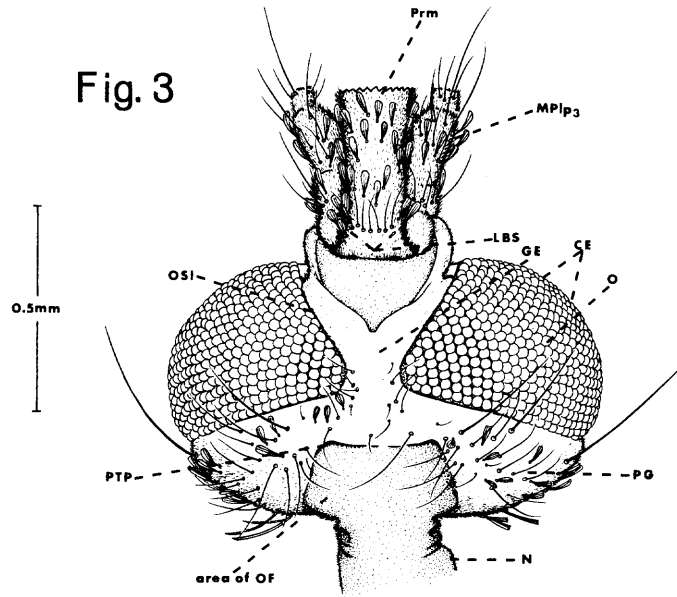
Fig. 3 Ventral view of female head.

Fig. 4 Labella and distal portion of prementum. a. Dorsal aspect.

b. Ventral aspect



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