

TAXONOMIST'S
GLOSSARY OF
GENITALIA IN INSECTS

TAXONOMIST'S GLOSSARY *of* GENITALIA IN INSECTS

EDITED BY S. L. TUXEN, COPENHAGEN

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PRÉFACE

At the Congress in Amsterdam in 1951 I proposed that a glossary of the outer genitalia in insects be compiled as an aid to the systematist who often cannot find his way through the labyrinth of names applied to these complicated structures by taxonomists and morphologists. The proposal met with general approval and many specialists at once offered their help. During the following year the plan expanded so as to comprise two parts, viz. a general description of the "outer" genitalia in each order of insects, and an alphabetically arranged list of all terms attached to them, either as accepted names or synonyms. 34 specialists have contributed to the general description, compilation and explanation of the terms used by earlier authors. Some started their tasks with the very earliest authors, most of them, however, dated back to some renown handbook. I have not tried to remedy this inconsistency, as it has not resulted in the omission of any terms of importance. All contributors have displayed the greatest keenness and devoted a great deal of time and labour to the task during the years that have elapsed since its inception, eager always to add to the uniformity of the book, and I should like to express my warmest thanks to all of them.

The term "outer" genitalia had, however, to be abandoned as it could not be unanimously delimited. It was removed from the title, the stress being laid upon the purpose of the work, viz. to be an aid to taxonomists, and after this contributors were given a free hand to include as much or as little of the "inner" genitalia as they found suited for solving taxonomic problems. This naturally resulted in some inequality in the contributions in part I, but was, I thought, preferable to rigid pedantry.

Most of the terms are latin, english, french or german, some few in other languages. On the question of guiding principles in the selection of terms worthy of inclusion I refer to the well styled introductory remarks by Klots in the chapter "Lepidoptera". Often "synonyms" are mere translations, for which reason the book may serve also as a help for translators. Some of these "translations", though only given in one group perhaps may yet be of use in others. Many terms are included which are strictly speaking only descriptions (e.g. struts, lobes). Strict consistency on this point has been impossible, the rule having been: better too many terms than too few. Some

few terms have been created for the present book; they are marked in the margin by an asterisk (*).

It has not been my intention to lay down rules as to which terms should be used, and by no means should the book be used for solving nomenclature problems! For the use of descriptive or morphological terms such as those in the present work nomenclature rules have not been and should not be made. Nor, in fact, is it necessary to use the same term for the same structure in all groups; it is not in the least intended that the present work should force a uniform terminology on taxonomists. For example, though plecopterists for years have used *Supra-anal lobe* and *Subanal plates* for what are morphologically epiproct and paraprocts, I have not tried to alter this. Another reason is that in many cases the true morphology or homology can not be given at present. In part II identical definitions are therefore found both under *Supra-anal lobe* and *Epiproct*, but with cross-references. Similarly synonymic references are given to, *Anterior valvulae* (Orth.), *Gonapophyses of abd. VIII* (Het.), *Inferior valvulae* (Chel.), *Valvae ventrales* (Psoc.) etc., though all are identical with *First valvulae*. The cross-references, however, if made fully use of, will unveil the homology. In this way the book should also prove a help to morphologists.

An absolute synonymy or homology is marked by =. In many cases, however, a reference is marked by →, meaning "see" or "see also". This means that more particulars are given under the terms referred to, or also that a synonymy is possible though not proved. The lepidopterists especially have used this form for reference very extensively, as the huge number of terms (more than one fifth of all terms given) and the great diversity of structures exclude a homologizing without many years' study. The → references may facilitate this study in the future.

Each term is defined in part II in its original form or in the form that it has in part I. Generally the term is given in the plural when the structures in question always occur in numbers greater than one (*Paraprocts*), otherwise in the singular (*Epiproct*), but deviations from this rule occur for practical reasons. The application of a term is first given for "♂ and ♀", then for "♂", lastly for "♀"; within these groups the arrangement follows the sequence of the 29 Orders in part I, abbreviated and following Grassé's *Traité*, 1949 et seq.

The latin words are inflected if leading words, but not if synonyms. When the latin term is in the singular the termination is given in the genitive singular and nominative plural, e.g., *Foram|en* (-inis, -ina). When the latin term is in the plural, nominative and genitive singular are given, e.g., *Corem|ata* (pl.; -a, -atis in sing.). When an adjective is added both words are inflected, e.g., *Process|us apical|is* (-us -is, -us -es), but if the noun has

already been inflected only the adjective, e.g., *Processus basal|is* (-is, -es) * *valvae*. * means that the word is a noun in the genitive and should not be inflected. — The latinisations of MacGillivray 1923 (known to me only from Torre-Bueno's Glossary of Entomology 1950 and, to my knowledge, used for genital structures only by Geyer 1951 in Isoptera) are mostly bad latin; I have not tried to inflect them.

German words with ä, ö, ü are given alphabetically as if ae, oe, ue.

In part II references are given, in abbreviated form (see p. 11–16), to the figures in part I. Structures known by the same term have the same abbreviation even if they are not homologous, and structures denominated differently in the different groups, with a few exceptions, are given different abbreviations even if there is no doubt that they are homologous.

A complete list of literature consulted would have occupied another volume; the cited papers may be found under author and year in the Zoological Record. A short list of the most important papers may be found at the end of the chapters in part I.

The whole work, as originally planned, was to have been in english. English, however, was not the mother tongue of many of the contributors; the english of their contributions in part I was corrected by N. D. Riley, British Museum (Nat. Hist.). The english in the definitions of part II was corrected by Alex. B. Klots, New York. The latin inflections as well as the french, german, and italian terms have been checked grammatically by K. Barr, Copenhagen, Cl. Dupuis, Paris, B. Alberti, Berlin, and Fausta Pegazzano, Firenze, respectively. Per Brinck, Lund, has helped me with the proofs. I wish to render my sincere thanks to all these colleagues, as well as to all the scientists who have encouraged my work with the present book, and to the directors of Munksgaards Forlag who approved and followed all my intentions.

To the Rask-Ørsted foundation I am very grateful for financial support to the printing.

This book is not without misprints, inconsistencies, and real errors; I regret every one of them, but knowledge of them will improve a possible second edition. I also feel certain that more synonyms might have been harvested in the literature, but as new synonyms are constantly being born I have not thought it justifiable to postpone publication any longer.

Zoological Museum, Copenhagen, Jan. 1st, 1956.

S. L. Tuxen.

LIST OF ABBREVIATIONS ON THE FIGURES

1-11 — dorsal side of abd. I-XI

I-XII — ventral side of abd. I-XII

a — anus

a.app — anal appendage

a.appar — anal apparatus

a.pl — anal plate

a.sp — anal spine

a.st — anal style

a.tu — anal tube

a.va — anal valve

ac — acetabulum

ac.set — acetabular setae

acc.cp.pr. 1 and 2 — accessory copulatory processes

acc.lo. — accessory lobe

aci — aciculae

aco — antecosta

acr.t — acrotergite

ad — adscensio

ae — aedeagus, aedoeagus

ae.ap — aedeagal apodeme

ae.d.w — aedeagal dorsal wall

ae.pch — aedeagal pouch

am — ampulla

anc — ancora

anel — anellus

anf — anellifer

ann — annulus marginalis

ant.fi — fibula anterior

ant.poi — anterior point

antr — antrum

ap — apodeme

ap.atr — apodeme of atrial rim

ap.ci — apodeme of cingulum

api.lo — apical lobe of basistylus

api.mem — apical membrane of stern. IX

api.pr — apical process of aedeagal shaft

api.scl — apical sclerite of dorsal lobe of aedeagus

api.set — apical setae of stern. IX

apo — apophysis

apo.ant — apophysis anterior

apo.hy — apophysis of hypandrium

apo.int — apophysis interna

apo.p — apophysis of penis

apo.po — apophysis posterior

apo.prox — apophysis proxima

apo.la — apophysis lateralis

apo.vl 3 — apophyse of posterior valvulae

appe — appendage of epiphallus

apr — anoproessus

apx.ang — appendix angularis

apx.bu — appendix bursae

apx.d — appendix dorsalis

ar — arcessus

arc — arcus

area cr — area cribriformis

area tr — area of trichobothria

armat — armature of sheath of tubus interior

art.appar — articulatory apparatus

atr.pl — atrial plate

atr.r — atrial rim

au — auricula

b — base

b.ap — basal apodeme

b.f — basal fold

b.lo — basal lobe of basistylus

b.o — basal orifice

b.p — basal part of penis

b.pc — basal piece

b.peph — basal ring of periphallus

b.pl — basal plate

b.ri — basal ring

b.scl — Basalsklerit

b.ve — basal vesicle

bc — brood canal

bg — bulga

bk — Binnenkörper

bl — bulbus epiphalli

bls — bulla seminalis
 bph — basiphallus
 br — brachium
 bri — bridge connecting basistyli
 bst — basistylus
 bt — basituberculus
 buc — bursa copulatrix
 bvl — basivalvulae

 c — cercus
 c.app — cercal appendage
 ca — cauda
 caps — capsula
 car — carina
 car.p — carina penis
 caul — caulis
 cbp — cercal basipodite
 cc — callus cerci
 cdr.p — cadre pénien
 ce.bo — central body
 ch — chitinous pieces of endosoma
 ch.p — inner chitinous press
 ch.s — chitinous stiffenings of epiphallus
 ci — cingulum
 circ — circum-anal pore ring
 cj — conjunctiva
 cl — clasper
 cl.org — clasping organ
 clav — clavus
 clp — claspette
 cm 1 — first connecting membrane
 cm 2 — second connecting membrane
 cn — connective
 co — costa
 coe — coecum penis
 col — collum
 cor — corona
 cp — copulatory organ
 cp.pr — principal copulatory process
 cpr — catoprocessus
 crn — cornuti
 crp — body of prophallus
 crp.bu — corpus bursae
 crp.cl — corpus of clasper
 cu — cucullus
 cvx — cervix bursae
 cx VIII and IX — coxites of gonopods of
 abd. VIII and IX
 cx.lo — coxal lobes

 d.ae.va — dorsal aedeagal valve
 d.arm — dorsal arm of tubus interior

d.cav — dorsal cavity
 d.cn — dorsal connectives
 d.lo — dorsal lobes
 d.lo.ae — dorsal lobe of aedeagus
 d.lo.fu — dorsal lobe of fulcrum
 d.o — dorsal aperture of median flap
 d.ph.lo — dorsal phallic lobe
 d.pl — dorsal plate
 d.pm — dorsal paramere
 d.pr 9 — dorsal process of abd. IX
 d.pr 10 — dorsal process of abd. X
 d.va — dorsal valve
 de.pl — dentigerous plate
 di.arm — distal arm of stern. IX
 di.ci — distal elongation of cingulum
 di.lo — distal lobe
 dig — digitus
 dir — dirigones
 dP — dorsal process of corpus of clasper
 dph — distiphallus
 dpr — dorsoprocessus
 dst — dististylus
 du.bu — ductus bursae (copulatricis)
 du.comm — ductus communis
 du.ej — ductus ejaculatorius
 du.gl — duct of cement gland
 du.ob — ductus obturatus
 du.sm — ductus seminis
 du.sml — ductus seminalis
 du.sp — ductus spermathecae
 dup.vag — duplicatura vaginalis

e — endomere
 ecp — ectoproct
 ed — editum
 eg — egg guide
 ej — ejaculator
 ej.ap — ejaculator apodeme
 ejs — ejaculatory sac
 ejv — ejaculatory vesicle
 ep — epiproct
 epa — epandrium
 eph — endophallus
 epi — epiandrium
 epbh — epiphallus
 epr — entoprocessus
 eptd — epitendon
 eso — endosoma
 etd — endotendon
 ev — eversible sac
 ext.pm — external paramere

f — finger
 f — folds between dorsal wall of intermittent organ and basistyli
 fa — funnelshaped appendage
 fb — foramen basilare
 fc — forceps (also the forceps of Derm.)
 fi — fibula vaginalis
 fis — fistula
 fl — flagella
 fo — foot
 ft — fultura superior
 fu — fulcrum
 fup — fusion plate
 fus — fustis

g.atr — genital atrium
 g.can — genital canal
 g.lo — genital lobe
 g.o — genital opening
 g.phr — genital phragm
 g.pl — genital plate
 g.po — genital pore
 g.va — genital valve
 gap — gonapsis
 gch — genital chamber
 gcl — gonoclavi
 gcr — gonocrista
 gest — genostyle
 gl.acc — accessory gland of ovipositor
 gl.acc.o — opening of accessory gland
 gl.s — glandula sebacea
 gl.v — glandula vaginalis
 gla — glans of prophallus
 gn — gnathos
 gp — gonapophysis
 gp VIII and IX — gonapophyses of gonopods of abd. VIII and IX
 gpl — lateral gonapophysis
 gpm — median gonapophysis
 gpo — gonopore
 gpo 2 — secondary gonopore
 gpo.pr — gonopore process
 grc — gonarcus
 gs — genital sac
 gsc — genital scale
 gsg — genital segment
 gsl — transverse genital slit
 gt — gonotreme
 gx — gonocoxite
 gx VIII and IX — gonocoxites of gonopods of abd. VIII and IX

ha — hamulus
 ha.ant — hamulus anterior
 ha.h — hamular hook
 ha.po — hamulus posterior
 hca — hypocauda
 hcu — hypocuspis
 he — heel
 hg.va — hypogynal valve
 hi — hinge
 hl — hilla
 hm — hypomere
 ho.pl — horseshoe-shaped basal plate
 ho.sci — horseshoe-shaped sclerite
 hph — hypophallus
 hrp — harpe s.str.
 hst — hypostylus
 htd — hypotendon
 hy — hypandrium
 hy.pr — hypandrium process
 hyi — hypandrium internum
 hyv — hypovalva

i.va — inner valve
 inf.app — inferior appendage
 inf.app.i — lower branch of inferior appendage
 inf.app.s — upper branch of inferior appendage
 ins — insula
 int.app — intermediate appendage
 int.pm — internal paramere
 int.s — internal sac
 is.lo — intersegmental lobe
 ist.mem — intersternal membrane
 iv.ap — intervalvular apodeme
 iv.i — inferior intervalvula
 iv.s — superior intervalvula

jx — juxta

k — Kopulationsgabel

L — lobe of stern. IX
 l.10 — left hemitergite 10
 l.c 1 — basal segment of left cercus
 l.c.bp — left cercus-basipodite
 l.cxp — left coxopodite
 lepph — left epiphallus
 l.phm — left phallomere
 l.pm — left paramere
 l.pp — left paraproct
 l.sub.a — left subanal plate
 l.t.arm — left tergal arm of abd. X