

The
Genitalia
of the
Geometridæ

BY
F·N·PIERCE·F·E·S.



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THE GENITALIA OF THE BRITISH
GEOMETRIDÆ.

*Even the smallest contribution to our knowledge
adds to the common store.*

The Genitalia
of
The Group Geometridæ
of the Lepidoptera
of the
British Islands.

AN ACCOUNT OF THE MORPHOLOGY OF
THE MALE CLASPING ORGANS AND THE
CORRESPONDING ORGANS OF THE FEMALE.

BY

F. N. PIERCE, F.E.S.

ILLUSTRATED BY THE AUTHOR.

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INDEX OF GENERA.

	Page				Page	
Abraxas	24	Deuteronomos	...	8
Acasis	60	Dyscia	...	24
Acidalia	32	Earophila	...	74
Agriopis	20	Ectropis	...	19
Alcis	17	Ellopia	...	13
Aleucis	22	Ematurga	...	16
Alsophila	21	Ennomos	...	8
Amœbe	61	Entephria	...	61
Anagoge	5	Epione	...	7
Anaitis	77	Epirrhoe	...	69
Angerona	12	Erannis	...	21
Ania...	28	Euchloris	...	2
Anteois	26	Eulype	...	55
Anticlea	74	Euphyia	...	56
Aplasta	2	Eupithecia	...	44
Apocheima	15	Glaucopteryx	...	61
Aspilates	22	Gnophos	...	23
Asthena	39	Gonodontis	...	7
Biston	13	Gymnoscelis	...	54
Boarmia	16	Hemerophila	...	17
Boletobia	38	Hemistola	...	4
Bupalus	13	Hemithea	...	2
Cabera	31	Hipparchis	...	1
Calliclystis	53	Hydriomena	...	68
Campæa	12	Hygrochroa	...	9
Campyogramma	75	Iodis	...	3
Carsia	77	Lampropteryx	...	62
Cepphis	5	Larentia	...	71
Chesias	77	Lithina	...	6
Chloroclystis	54	Lithostege	...	78
Chlorissa	3	Lobophora	...	59
Cidaria	64	Lycia	...	14
Cleora	18	Lygris	...	63
Cleorodes	17	Lythia	...	37
Codonia	36	Macaria	...	10
Cœnocalphe	57	Melanthia	...	56
Collix	54	Mesoleuca	...	71
Colotois	9	Mesotype	...	75
Comibæna	2	Minoa	...	38
Cosmorhoë	29	Nothopteryx	...	60
Cosymbia	37	Nyssia	...	14
Crocallis	8	Ochyria	...	74
Deileptenia	19	Odezia	...	78

INDEX OF GENERA.

	Page		Page
Operophtera	40	Pseudopanthera	4
Opisthograptis	7	Pseudopterpnæ	1
Oporinia ...	41	Psodos ...	15
Ortholitha ...	76	Ptychopoda ...	26
Orthonama ...	74	Rhodomætra	35
Ourapteryx ...	4	Selenia ...	5
Pachycnemis	6	Selidosema ...	18
Parascotia ...	38	Sterrha ...	27
Pelurga ...	66	Thalera ...	3
Perconia ...	22	Thera ...	66
Percnoptilota	75	Theria ...	22
Perizoma ...	42	Timandra ...	36
Philereme ...	58	Triphosa ...	59
Plagodis ...	5	Xanthorrhœ ...	72
Plemyria ...	66		

INDEX OF SPECIES.

(Synonyms in Italics.)

	Plate	Page		Plate	Page
abbreviata	...27	45	bilunaria ...	... 5	6
<i>abietaria</i> ...	...12	19	bimaculata	...20	31
abruptaria	...11	17	bipunctaria	...47	76
absinthiata	...29	49	bisetata ...	...17	26
<i>adequata</i>	...26	42	bistortata...	...13	20
adustata ...	...16	24	<i>biundularia</i>	...13	20
advenaria ...	... 3	5	blandiata ...	...26	42
æscularia ...	...14	21	blomeri ...	...24	39
æstivaria ...	... 1	2	boreata ...	...25	40
affinitata ...	...26	43	brumata ...	...25	40
albicillata	...45	71	brunneata	... 8	11
albipunctata	...30	51	cæsiata ...	...38	61
albulata ...	...26	42	<i>callunaria</i>	...28	46
alchemillata	...26	43	cambrica ...	...24	40
alniaria ...	... 7	8	<i>campanulata</i>	...27	45
alternata ...	... 8	12	candidata ...	...24	39
alternata (<i>sociata</i>)	...44	70	carbonaria	... 8	10
amata ...	...23	36	carpinata ...	...37	60
annulata ...	...23	37	castigata ...	...31	52
<i>angelicata</i>	...	45	certata ...	...33	55
angularia ...	...12	18	cervinaria	...44	71
apiciaria ...	... 6	7	christyi ...	...25	41
aquata ...	...35	57	chrysoprasaria	... 2	4
arceuthata	...28	47	cinctaria ...	...11	16
assimilata	...30	49	<i>circellata</i>...	...17	28
associata ...	...40	63	clathrata ...	... 8	11
atomaria ...	...13	16	cognata ...	...42	67
atrata ...	...48	78	comitata ...	...41	66
aurantiaria	...13	21	concinata	...40	65
autumnalis	...43	68	<i>consignata</i>	...27	45
autumnaria	... 4	8	consonaria	...12	19
autumnata	...25	41	consortaria	...11	16
aversata ...	...19	30	<i>constrictata</i>	...27	44
badiata ...	...46	74	contiguaria	...18	28
<i>belgiaria</i> ...	...15	24	coracina ...	...13	15
berberata ...	...36	59	coronata ...	...32	54
betularia ...	...10	14	coronillaria	...	1
bicolorata	...41	66	corylata ...	...41	66
bidentata ...	... 4	7	crepuscularia	...13	19
bifasciata ...	...26	42	cucullata ...	...45	71
bilineata ...	...46	75	<i>curzoni</i> ...	...28	46

INDEX OF SPECIES—(Synonyms in *Italics*).

	Plate	Page		Plate	Page
debiliata ...	...32	53	griseata ...	...48	78
<i>decolorata</i> ...	...26	43	grossulariata ...	...16	26
defoliaria ...	...14	21	halterata ...	...37	59
degeneraria ...	...19	30	hastata ...	...33	55
denotata ...	...27	45	haworthiata ...	...32	53
<i>designata</i> ...	...46	73	helveticaria ...	...28	47
didymata ...	...26	42	herbariata ...	...18	29
<i>dilutaria</i> ...	...18	29	hippocastanaria ...	5	20
dilutaria ...	...18	29	hirtaria ...	...10	14
dilutata ...	...25	41	hispidaria... ..	...10	15
dimidiata... ..	...17	27	<i>holosericata</i> ...	...18	29
distinctaria ...	...27	44	humiliata... ..	...18	29
dodoneata ...	...28	46	imitaria ...	...22	34
dolabraria ...	3	5	immanata ...	...40	65
<i>dotata</i> ...	...40	64	immorata... ..	...21	33
dubitata ...	...36	59	immutata... ..	...21	34
elinguaria ...	4	8	indigata ...	...30	50
emarginata ...	...18	28	<i>innotata</i> ...	...28	46
emutaria ...	...22	35	inornata ...	...19	30
ericetaria... ..	...12	18	insigniata... ..	...27	45
erosaria ...	7	9	interjectaria ...	...18	29
exanthemaria ...	...20	31	inturbata... ..	...31	52
exiguata ...	...27	45	irriguata ...	...30	49
expallidata ...	...29	48	<i>isogrammaria</i> ...	...32	53
extensaria ...	...29	48	<i>jasioneata</i> ...	...27	45
fagaria ...	...15	24	jubata ...	...12	18
ferrugata ...	...45	72	juniperata ...	...42	66
filigrammaria ...	...25	41	<i>knautiata</i> ...	...29	49
fimbrialis... ..	2	3	lactearia ...	2	3
firmata ...	...42	67	lapidata ...	...35	58
flavicinctata ...	...38	61	lapponaria ...	...10	14
flavofasciata ...	...26	43	lariciata ...	...28	47
floslactata ...	...22	34	leucophearria ...	...13	20
fluctuata ...	...45	72	lichenaria... ..	...11	17
fluviata ...	...47	75	limbaria ...	8	12
fraxinata ...	...28	46	limitata ...	...47	76
fuliginaria ...	...23	38	linariata ...	...31	52
fulvata ...	...41	66	linearia ...	...23	37
fumata ...	...21	33	lineata ...	...15	23
furcata ...	...43	68	liturata ...	8	11
fuscantaria ...	6	9	lunaria ...	5	6
galiata ...	...44	70	luridata ...	...12	19
gemmaria ...	...12	18	luteata ...	...24	39
gilvaria ...	...15	22	luteolata ...	6	7
<i>glabraria</i>... ..	...12	18	macularia... ..	3	4
goosensiata ...	...29	49	<i>mancuniata</i> ...	28	

INDEX OF SPECIES—(Synonyms in Italics).

	Plate	Page		Plate	Page
margaritata	... 9	12	plumbeolata	...31	51
marginepunctata	...22	35	polycommata	...37	60
marginaria	...13	20	polygrammata	...47	73
marginata	...16	24	populata	...39	63
miata	...40	64	porata	...23	36
minorata	...26	42	porrinata	... 2	3
<i>minutata</i>	...29	49	procellata	...34	56
montanata	...45	72	prosapiaria	... 9	13
multistrigaria	...38	61	pruinata	... 1	1
munitata	...46	73	prunaria	... 9	12
muricata	...17	26	prunata	...39	63
murinata	...24	38	pulchellata	...31	52
myrtillata	...15	23	pulveraria	... 3	5
nanata	...28	46	pumilata	...32	54
nigrofasciaria	...46	74	punctaria	...23	36
notata	... 8	11	punctularia	...11	17
<i>obfuscaria</i>	...15	23	puppillaria	...	37
obeliscata	...42	67	purpuraria	...23	37
<i>oliquaria</i>	...48	78	pusaria	...20	31
obliterata	...24	39	pusillata	...27	44
oblongata	...27	44	pustulata	... 1	2
obscuraria	...15	23	pygmæata	...32	52
ocellata	...39	63	pyraliata	...40	64
ochrata	...17	27	quadrifasciaria	...46	74
ochrearia	...15	23	quercinaria	... 6	8
olivata	...38	61	rectangulata	...32	53
ononaria	... 1	2	<i>remutaria</i>	...22	34
orbicularia	...23	37	repandata	...12	17
ornata	...21	33	reticulata	...41	65
paisley pug	...	50	rhammata	...36	58
paludata	...48	77	ribeata	...12	19
pantaria	...16	25	rivata	...44	69
papilionaria	... 1	1	roboraria	...11	16
paralellaria	... 5	7	ruberata	...43	68
pectinitaria	...38	61	<i>rotundaria</i>	...20	31
pedaria	...10	15	rubidata	...44	70
pendularia	...23	37	rubiginata	...22	35
pennaria	... 7	9	<i>rubricata</i>	...22	35
perochraria	...18	28	rufata	...48	78
petraria	... 5	6	rupicapraria	...14	22
picata	...34	56	rusticata	...19	30
pictaria	...14	22	sacraria	...23	35
pimpinellata	...30	50	sagittata	...33	56
piniaria	... 9	13	salicata	...39	62
plagiata	...48	77	sambucaria	... 3	4
plumbaria	...47	76	satyrata	...28	46

INDEX OF SPECIES—(Synonyms in Italics).

	Plate	Page		Plate	Page
scabiosata	...28	47	tersata ...	...35	57
sexalisata ...	...37	59	testacea	...24	39
silacea ...	...41	65	testata ...	...39	63
<i>simulata</i> ...	...42	67	tetralunaria	... 5	5
siterata ...	...40	64	togata ...	...32	53
smaragdaria	... 1	2	<i>trifasciaria</i>	...43	68
sobrinata ...	...27	45	trigeminata	...17	27
<i>sociata</i> ...	...44	70	trisignata...	...29	48
<i>sordidata</i>...	...43	68	tristata ...	...44	69
sparsata ...	...33	54	truncata ...	...40	65
spartiata ...	...48	77	unangulata	...34	56
straminata	...17	27	undulata ...	...33	55
strataria ...	...10	13	unidentaria	...45	73
<i>stevensata</i>	...	45	<i>unifasciata</i>	...26	42
strigaria ...	...21	34	valerianata	...30	50
<i>strigata</i> ...	... 1	2	variata ...	...42	67
strigilaria	...21	32	vauaria ...	... 8	11
strigillaria	...15	22	venosata ...	...32	53
<i>subciliata</i>	...31	52	<i>vernaria</i> ...	... 2	4
subfulvata	...29	48	vetulata ...	...36	58
subnotata...	...31	51	viretata ...	...37	60
subsericeata	...17	28	virgata ...	...47	75
succenturiata	...29	48	virgaureata	...30	50
suffumata	...39	62	virgularia...	...18	29
sylvata ...	...16	25	viridaria ...	...38	61
<i>sylvata</i> ...	...24	39	viridata ...	... 1	3
syringaria	... 7	9	vitalbata ...	...35	57
<i>tamarisciata</i>	...	46	vittata ...	...46	74
tæniata ...	...26	43	vulgata ...	...30	49
temerata ...	...20	31	zonaria ...	...10	14
tenuiata ...	...31	51			

PREFACE.

The cordial reception extended to the "Genitalia of the British *Noctuidæ*," published in 1909, has induced me to launch on the sea of scientific literature a second volume dealing with the interesting and important study of the genitalia of the *Lepidoptera*. The former volume, I believe, has been the means of directing attention to the difficult family of the *Diptera*, and Prof. Newstead is now doing good work among the *Tse Tse* flies, while the genitalia of other groups are being studied.

In presenting this account of the genitalia of the *Geometridæ*, I have had the advantage of the criticisms passed on the previous work, and thus have been enabled to make good the omissions that it contained, and, I trust, also to make the present volume more complete.

The publication in the "*Noctuidæ*" of names for the different parts of the genitalia has produced a good deal of interest in this department of our study, particularly with reference to the standing of the names under the law of priority, and as a result several employed in the above work have had to fall before others previously given. Dr. J. McDonnough, in the "*Canadian Entomologist*," for June, 1911, vol. xliii., No. 6, has attempted the difficult task of unravelling the nomenclature and of giving a complete list of the names which for the future should be employed. With many of his conclusions I agree, and, so far as our present knowledge will permit, I have tried to make use, in the descriptions of the parts, of all now established names. I would here like to impress upon those working on the genitalia the necessity of using

definite names for the parts, rather than such obscure phrases as "*medio dorsal process*" and the like, which to the bewilderment of the reader frequently occur in what would otherwise be valuable contributions to the study of the genitalia.

During the course of my preparations for the present work I have been most fortunate in having the indefatigable assistance of my valued friend, the Rev. C. R. N. Burrows, F.E.S., to whose generous co-operation I owe more than I can express, and to whom the production of this work in a comparatively short period of time is largely due. During the past six years our correspondence has been almost a daily one, indeed it was an unusual event not to find a letter from him on the breakfast table, and often a second would arrive during the course of the day. As was natural in such an investigation as this, we could not always see eye to eye, and I cannot say too much of Mr. Burrows' patience, whilst his kindly nature was revealed in the care with which he explained his views, illustrating his points with the neatest of little sketches, until at last agreement was reached. When unusually knotty questions arose and letters failed to elucidate matters, it was often necessary for me to journey down to see him. On all such occasions I was welcomed at his home with its wonderful garden where he has taken so many rare and notable species. There Mr. Burrows has again and again proved himself to be not only a man of science, but also a most genial host, and my visits will always remain as red letter days in my memory. I rejoice to take this opportunity of expressing my deep debt of gratitude for all that his friendship has meant during these six years of unceasing co-operation.

In the course of preparing the present work, Mr. Burrows and I have each made a complete set of mounts of all the species of the *Geometridæ*, and in a large number of cases several mounts of the same species. This has been an additional safeguard in securing accuracy, besides

conclusively proving how small is the variation that exists between different mounts of the same species. The first sketches were made by Mr. Burrows from the most perfect of the mounts by means of the Camera Lucida, whilst the descriptions were written with the aid of all the material at our disposal. As the females showed well marked differences, the salient features of the genitalia in this sex have been added (on the left of each figure), and they have helped to elucidate the relationship between species where the male organs exhibited great divergence of form. I am still of the opinion that drawings are preferable to photographs, as the latter, by showing too much, make it difficult to grasp the significant points.

As the penis forms an important, in many cases the most important, structure for purposes of differentiation, drawings of this organ have been added (on the right of each figure), but I would warn workers that it is extremely difficult in this case to get uniformity of position.

I have again adopted the plan of placing the name of the species beside each drawing, and I regret that this has not been done by more writers, whilst I am glad to be able to refer to a notable exception in Dr. Eltringham's splendid article on the group *Acraea*, published in the Transactions of the Entomological Society of London, 1913.

The methods of preparation were fully described in the "Noctuidæ," and to this work I would refer my readers. The only improvement I can suggest is in reference to staining, which is of great assistance. So far we have found a difficulty in obtaining a permanent stain, but the cause of the failure seems really to be due to the imperfect removal of the Caustic Potash. On the suggestion of Mr. Burrows, citric acid was employed in the washing process with very good results. If this point be attended to, Stevens' green ink will be found to be a very satisfactory stain.

For the supply of specimens both rare and local, I would again express my warmest thanks to our British lepidopterists, and particularly to Messrs. Louis B. Prout, J. H. Harrison and Dr. E. A. Cockayne, whose generous help has materially assisted the production of the present volume.

For the generic and specific names Mr. Louis B. Prout has made himself almost entirely responsible.

I would also like to state that the Rev. J. W. Metcalfe, F.E.S., has associated himself with me in the work, and that it is my intention to publish an account of the Genitalia of the *Tortricidæ* at no distant date, for which volume Mr. Metcalfe has undertaken the drawings.

F. N. PIERCE.

THE ELMS,
DINGLE,
LIVERPOOL.
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SYNOPSIS OF THE INTRODUCTION.

I. THE MALE GENITALIA.

General Statement.

A. THE EXTERNAL PART.

(i) The tenth segment.

The Uncus.

The Socii.

The Gnathos.

The Anus.

The Transtilla.

(ii) The ninth segment.

The Tegumen.

The Saccus.

The Valvæ.

Costa, valvula, sacculus.

The Harpe.

The Furca.

(iii) The eighth segment.

The Octavals.

The Cerata and Mappa.

The Abdominal plate.

(iv) The seventh segment.

The Coremata.

B. THE INTERNAL PART.

(v) The Penis.

The *Ædœagus*.

The Anellus.

The Juxta.

The *Cristæ*.

The Anellus lobes.

The Calcar.

The Canaliculus.

The Manica.

The Labides.
The Ductus ejaculatorius.
The Vesica.
The Cornuti.

II. THE FEMALE GENITALIA.

General Statement.

- (vi) The Ovipositor.
The Ostium.
The Ductus Bursæ.
The Bursa Copulatrix.
The Signum.

THE INTRODUCTION.

The study of the whole order of *Lepidoptera* has convinced me that the genitalia throughout the order have been developed on the lines of one common plan, which has been so far modified as to suit the requirements of each individual group. Some of the parts may be atrophied or even absent, others decorated with elaborate armature, others much displaced, others now free, now fused together, but the main features remain common to all the groups. Thus it is true to say, though this general statement needs some qualification, that the main characters of the male genitalia in the *Geometridæ* are very similar to those in the *Noctuidæ*. The different organs may be conveniently divided into two parts, the external and the internal. This division is well shown in the curious specimen of *Hydræcia*, captured by Mr. Burrows, the body of which was prepared by him and figured in the "Entomologist's Record," Vol. xxiv., p. 171.

The external part consists of:—(i) *The Uncus*, which is attached to the dorsal region of the tegumen. (ii) *The Tegumen*, which consists of the ninth and possibly part of the tenth abdominal segments. (iii) *The Saccus*, which is a development of the base of the tegumen. (iv) *The Valvæ*, which form a pair of lateral flanges, articulated to the tegumen. (v) *The Anus* with its armature. (vi) *The Transtilla*, a cross-bar uniting the costæ of the valvæ.

The internal part consists of *The Penis* with its armature. The seventh and eighth abdominal segments also possess characters which I consider to be of sufficient importance for inclusion in the descriptions of the text.

THE TENTH ABDOMINAL SEGMENT.

In the present state of our knowledge, it is very difficult to say what exactly represents the tenth segment, it has even been questioned whether it exists at all. Zander states that he has been able to discover very little of the wall of the thirteenth (tenth abdominal) segment as it remains membraneous and hidden beneath the twelfth (ninth abdominal) segment, being withdrawn beneath it. He further concludes from a study of the development within the pupa that the uncus and scaphium (my gnathos) are secondary appendices of the tenth segment. However, for the present I can only leave the question undetermined.

THE UNCUS.—*Gosse.*

Attached to the dorsal portion of the tegumen is the uncus. This, in the *Geometridæ*, is generally produced in the form of a hook (*Cepphis advenaria*, pl. iii), usually single, but sometimes bifurcate. It is, however, subject to much variation, being in some species merely a thin projection (*Aspilates*, pl. xv.) and in others practically absent (*Acidalia*, pl. xxi.).

THE SOCII.—*Pierce.*

On either side of the base of the uncus, on the ventral surface there is often a hairy pad. When this pad is developed into a weakly chitinised hairy process I have termed it *The Socius* (*Hemithea*, pl. i) (*Wytzman Genera Insectorum Hemitheinxæ*, p. 6).

THE GNATHOS.—*Pierce.*

Springing from the base of the uncus, where it is hinged, there is often a free ring, enclosing the anus and, if present, the subscaaphium, having a central curved lip generally decorated with scobinations, spines, or squamous markings. Sometimes the parts other than the curved lip are fused to the tegumen, from which, in this case, the tip

appears to spring. This organ we have called *The Gnathos* (*Ourapteryx*, etc., pl. iii.) (Wytsman, l.c. p. 6). It has been mistaken for the Scaphium of the *Papilios*, with which, however, it has no connection. It was figured in the "Noctuidæ" in the genus *Brephos*, but not named.

This organ has appeared to me to be of such importance as to form two primary divisions of the *Geometridæ*, according as it is present or absent, and for these divisions I propose the names *Gnathoi* and *Agnathoi*. The species falling within the *Gnathoi*, but having the gnathos rudimentary or atrophied, are so few that they may be left out of consideration.

THE ANUS.

At the base of the uncus on the ventral surface of the tegumen is an opening through which passes the anal tube. In the *Agnathoi* this tube is very long and is decorated with spines (*Perizoma didymata*, pl. xxvi.). Attached to the under side of the tube is a thickened chitinised process, generally taking the form of a plate, but sometimes that of a hook, which I have previously named *The Subscaphium* ("Noctuidæ," p. 13).

THE TRANSTILLA.—*Pierce*.

From the bases of the valvæ arises a cross-bar which I term *The Transtilla* (*Ennomos autumnaria*, pl. iv.). The cross-bar may be incomplete, the opposing arms not uniting, and whilst it is often simple, it is capable of great development, occasionally producing free arms, and becoming in the *Tortricidæ* a highly complex part.

THE NINTH SEGMENT.

This segment is very probably represented by the tegumen. It is generally composed of thin chitine, but it sometimes resembles a normal segment. In the *Eupitheciina* it is introverted and holds the genitalia within the eighth segment, as in a bag. In this group also

it bears small coremata or membraneous sacs covered with hairs (*Gymnoscelis pumilata*, pl. xxxii.). In the *Acidaliinæ* the coremata consist of pencils of long hairs (pl. xxi). I give further details of this segment under the next heading.

THE TEGUMEN.—*Buchanan White.*

The base of the tegumen rests in the plane of the ventral surface, whilst the upper part curves anally until it lies longitudinally in the plane of the dorsal surface. It may perhaps be best described as a complete ring of chitine, dorsally broad, ventrally narrow, with much strengthened edges, and it is articulated laterally in the middle, enabling the upper half to be thrown backwards towards the head. The penis and its armature are connected at this articulation.

THE SACCUS.—*Bethune Baker.*

The basal portion of the tegumen, which I called the Vinculum in the "Noctuidæ," had already been named *The Saccus* by G. Bethune Baker (Trans. Ent. Soc. London, 1891), and this latter name I accordingly now adopt. Its form is generally that of a pouch or bag, but in some species it is incomplete, the two sides of the tegumen failing to meet (*Deuteronomos erosaria*, pl. vii.).

THE VALVÆ.—*Burmeister.*

Below the articulation of the tegumen on either side is hinged a lateral flange which was called the Harpe in the "Noctuidæ." I now adopt the name of *Valva* used previously by Burmeister. Rambur, in 1838, employed the word pincés. In the *Geometridæ* the valva is often simple, but occasionally possesses a spiny armature, by no means as constant in form in this family as in the *Noctuidæ*. I have therefore united the parts of this armature, where it occurred, under Gosse's name, *The Harpe*. The valva may be divided into three parts, which are usually more or less fused together, but are sometimes separated and free.

To these parts I have given the names, *The Costa*, *The Valvula*, and *The Sacculus* (*Thera*, pl. xlii.).

THE COSTA.—Pierce.

The costa or upper margin of the whole valva is generally thickened. It is occasionally decorated and may take the form of a free arm (*Xanthorhæ montanata*, pl. xlv.) or of a free spatulate plate (*Ortholitha bipunctaria*, pl. xlvii.), whilst it sometimes possesses a branching arm in the middle, which I term *The Costal Arm* (*Angerona prunaria*, pl. ix.).

THE VALVULA.—Pierce.

The central part of the valva, lying between the costa and the sacculus, I call *The Valvula*. It is in most cases composed of thin semi-transparent chitine, and is covered more or less with hair. As a rule the valvula is united to the costa and sacculus, but sometimes it projects free. Its outer margin is subject to extreme modification and ranges from an even curve to a deeply emarginate one.

THE SACCULUS.—Pierce.

The inner, or as drawn in the figures the lower, portion of the valva has been called by me, in the "Noctuidæ," *The Sacculus*. This part invests the base of the valva and is often extended on its outer margin into a free arm (*Asthena*, pl. xxiv.).

THE FURCA.—Pierce.

The two sacculi may project centrally quite apart from the valvæ and are sometimes fused together. To the organ thus formed I have given the name of *The Furca* (*Ennomos autumnaria*, pl. iv.).

THE EIGHTH SEGMENT.

This segment bears no spiracles. The anal edge of the sternite may be scalloped, and is often otherwise modified. Sometimes it is hardened and produced in a single,

occasionally scobinate, protruberance, or it may bear a pair of such protruberances which have been termed *The Octavals* (*Oporinia*, pl. xxv.) (Seitz. Macro-lepidoptera of the World, iv. p. 51).

CERATA AND MAPPA.—Pierce.

In the *Acidaliinæ* the eighth sternite consists of a chitinous plate which is internal for about half its length and then coming to the surface is continued in two pointed arms, which I name *The Cerata* (*Acidalia*, pl. xxi.). These show almost constant asymmetry, the right being commonly larger and more fully developed than the left. In the natural position the cerata lie in the lateral grooves of the body and in most cases project beyond its anal extremity.

Covering the cerata is a loose semi-circular flap, clothed with long narrow scales. This flap I term *The Mappa*.

ABDOMINAL PLATE.—White.

In the *Eupitheciinæ* there is a plate, similar to that which bears the cerata, to which attention was drawn by Dr. Buchanan White, who figured it in a certain number of species in the "Entomologist," Vol xxiv., p. 129, 1891. Dr. Petersen has also figured the abdominal plate in his "Eupithecia," but as I read the preparations rather differently, I have added figures of this organ (*Eupithecia*, pl. xxvii.). A similar sternite plate is found in *Catogramma*, a Central American *Nymphalid*, in *Pero*, a South American *Geometrid*, in the *Pyralidæ*, and probably also in other groups. Under natural conditions the genitalia are withdrawn beneath this plate.

THE SEVENTH SEGMENT.

This is sometimes highly developed, being produced on either side as an extensile pouch or bag clothed with hairs, and bearing a spiracle. These bags are *The Coremata*

(Wytsman Gen. Ins. Hem. p. 6), to a form of which I have referred above as occurring on the ninth segment in the *Eupitheciinæ*. The hairs are variously arranged and there may also be present large spatulate spines (*Ochyria quadrifasciaria*, pl. xlv.).

I now proceed to consider the internal part which constitutes the sexual organ, remarking that the central area is extremely complex, and that in some cases it is very difficult to allocate the various parts on any uniform system. The central organ is *The Penis*, which emerges from a circular cone, *The Anellus*. This cone is attached laterally to the costal fold of the valvulæ, dorsally to the transtilla, and ventrally to the base of the valvæ. In the *Geometridæ* the penis is retractile and is attached to the edge of the anellus by a membraneous tube, *The Manica*. The anellus is subject to great modification, and bears organs to which I have given distinctive names as a helpful aid in differentiation.

THE PENIS.

As this name has been given to various parts by different writers, I think it advisable to state definitely that the penis is the whole central organ.

It consists of :—(i) *The Œdæagus*, a strong tube or trough which is kept in position in the centre of the tegumen by means of the manica. (ii) *The Manica*, a sleeve-shaped eversible membraneous tube surrounding the ædæagus. (iii) *The Anellus*, the funnel-like cone from which the ædæagus protrudes. (iv) *The Vesica*, which with its armature *The Cornuti*, is extruded into the bursa of the female during copulation. (v) *The Ductus Ejaculatorius*, which, entering the ædæagus just above its blind end, runs throughout its length, and is continued in unbroken connection with the vesica, the two together forming the seminal duct.

THE ÆDŒAGUS.

This, in most cases, is a slightly curved stout tube, in some, however, the curvature is great, whilst in others the tube is slender and needle-like. Occasionally it is decorated at the orifice with spines, and rarely it is branched.

THE ANELLUS.—*Pierce.*

This cone-like tube bears on its ventral surface a shield or plate, called *The Juxta*, which is commonly decorated on either side by a pad covered with hairs or scales which I term *The Cristæ*. The *cristæ* are subject to great modification as they may lie flat on the skin of the *juxta* or they may be more or less raised so as to form *papillæ* (*Ectropis*, pl. *xiii.*).

The *anellus* may also be extended into two lateral lobes which are termed *Anellus lobes*. These lobes are in some cases united so as to produce a single arm of varying length which is called *The Calcar*. (*Xanthorhæ*, pl. *xl.*).

The upper edge of the *juxta* itself may be produced centrally in the form of a long lip or spout, which may possibly act as a guide to the penis. This lip I call *The Canaliculus* (*Ortholitha*, pl. *xlvi.*).

THE MANICA.—*Pierce.*

This name is applied to the eversible membraneous sleeve in which the *ædœagus* lies. The basal part closely invests the blind end of the *ædœagus* to which it is fused just above the point of entrance of the *ductus ejaculatorius*. When the penis is not extruded the *manica* lies wholly within the *anellus*, but during extrusion it is drawn out and may be seen surrounding the *ædœagus*. The *manica* may become chitinised, and is often decorated with spines, scobinations, teeth, or hooks (*Xanthorhæ ferrugata*, pl. *xl.*).

THE LABIDES.—*Pierce.*

Springing from the points of union of the *transtilla*

with the costæ, there may arise two long arms, each bearing a soft hairy pad, and united together by a thin membrane. These arms I term *The Labides* (*Eupithecia*, pl. xxvii.).

THE DUCTUS EJACULATORIUS.

This with the vesica forms the seminal duct. Passing from the vasa differentia it enters the ædœagus just above its blind end. Thence it runs throughout the length of the ædœagus until it unites with the vesica (*Carsia paludata*, pl. xlviii.).

THE VESICA.—Pierce, "Noctuidæ."

This is the extrudible part of the seminal duct which, during copulation, penetrates into the bursa of the female. It is generally scobinate and is often armed with remarkable spines called *The Cornuti* (*Deuteronomos fuscantaria*, pl. vi.).

THE CORNUTI.—Pierce, "Noctuidæ."

These are very variable in character. Usually they are strong spines grouped in clusters, but occasionally there is only a single spine. Very rarely there are found articulated spatulate spines of markedly different formation. During copulation these are transferred to the bursa, but I am quite unable to say what function they perform. In the *Geometridæ* we have found this form only in *Gnophos obscuraria*, but in many groups of the *Tortricidæ* it is general. Dr. Chapman has recorded a similar occurrence in *Pyraustra* in the form of a single specialised spine ("Ento. Record," Vol. xxv., p. 106, 1913).

When stating the number of the cornuti in any species it must be understood that only the approximate number can be given.

THE FEMALE.

The genitalia of the female consist of:—(i) *The Ovipositor*. (ii) *The Ostium*, attached to which there may be an *Operculum*. (iii) *The Ductus Bursæ* with its armature. (iv) *The Bursa*, on the armature of which the most important feature is *The Signum*.

The egg after leaving the branched ovaries and before entering the ovipositor is fertilised by the entrance of the male sperm at its micropyle. The spermatazoa having been received during copulation into the bursa are thence discharged through a tube called *The Ductus Seminalis* on to the eggs as each passes through the vagina (*Calliclystis debiliata*, pl. xxxii.).

Usually two other tubes enter at the same point, of which one undoubtedly furnishes the adhesive secretion by which the eggs are fastened to the food plant. Should the female be killed after the fertilisation of an egg, but before it has been laid, such an egg will produce a larva, which being unable to escape perishes, and its existence is only discovered on preparing the body of the parent for the microscope. Hence no doubt the legend of viviparous Lepidoptera. I have found such larvæ in a large number of species.

THE OVIPOSITOR.

The form of ovipositor general in the *Geometridæ* consist of a pair of lobes set with bristles. The retractile or telescopic form, developed in order to reach far into a crevice, as for instance a rolled-up grass stem, also occurs. Further, there is a tubular form, and I draw especial attention to yet another which is elaborately decorated with long thickened hairs and scales. This last form I call *Floricomus*, it is rare in the *Geometridæ*, occurring only in *Theria rupicaprararia* and *Aleucis pictaria*, pl. xiv., but it is found also in *Cosmia* amongst the *Noctuidæ*, and is by no means uncommon in the *Tortricidæ*.

THE OSTIUM.

The ostium is the external opening of the *Ductus Bursæ*. It is directly attached to the segmental rods which are sometimes dorsally united by a hard chitinous band. When this is the case I speak of the ostium as being encircled. Occasionally there is a covering or flap which

appears to close the orifice and which I term *The Operculum* (*Macaria clathrata*, pl. viii.). Surrounding the ostium there may also be a flattened plate, and in the case of the *Acidaliinæ* there is a loose apron, corresponding to the mappa of the male, which hangs over the ostium and which I have named *The Instita*.

THE DUCTUS BURSÆ.

This usually consists of a tube of varying length, leading from the ostium to the bursa. In many cases it is so closely united to the bursa that it is practically impossible to say where the one ends and the other begins, or even to decide whether they are really separate organs. The ductus bursæ is often armed with spines (*Nothopteryx*, pl. xxxvii.).

THE BURSA COPULATRIX.

This is usually subglobular, and consists of thin chitine which may either be scobinate, or drawn into numerous points forming star-shaped folds on the outer surface. When the latter decoration completely covers the surface I say that the bursa is Instrate (*Eupithecia pimpinellata*, pl. xxx.), when the surface is only partially covered I speak of the bursa as Pannicular (*E. albipunctata*, pl. xxx.). When the bursa possesses a distinct hard chitinous patch on the surface I term this patch *The Signum*.

THE SIGNUM.—Pierce.

This is an important character and extremely variable. It may be merely a simple scobinate patch or it may be an elaborately spined prominence (*Gonodontis bidentata*, pl. iv.). A description is given in the text wherever it occurs.

NOTE.—The numbers placed in the text after the specific names indicate the number of mounts, male and female respectively, made of that species.

Classification of the British Geometridæ
based on the structure of the male and
female Genitalia.

GEOMETRIDÆ.

GNATHOI.

Geometrinæ.

Valva elongate generally simple. Uncus bifurcate or if single with protruding socii. *In situ* the uncus is folded over the gnathos. Gnathos rarely strong. *Ædœagus* stout or more generally pistillate. Eighth segment developed often scobinate. Coremata on ninth segment.

Hipparchis papilionaria, L.

6—3

Valvula peaked, narrow; costal fold short; sacculus extended. Transtilla large rounded plates. Uncus bifid, widely divided. Gnathos point long, weakly scobinate. *Ædœagus* pointed. Saccus lobed at centre, with central inward projection. Margin of eighth sternite bilobed.

Ostium small. Ductus bursæ weak. Signum small, double pointed.

Pseudoterpna pruinata, Hufn.

6—2

Valvula narrow; harpe raised, long, heavily spined. Uncus bifurcate, pads hairy. Gnathos squared, scobinate. *Ædœagus* narrowed towards tip, orifice with long serrated arm. Saccus pointed. Coremata short, on ninth segment.

Ostium weak. Ductus bursæ thickened. Bursa elongate.

It has been questioned if *coronillaria*, Hb. is not a

melanic form of this species. In the two male specimens we have examined, there appears a difference in the scobinations of the gnathos, which in *coronillaria* are more heavily dentate, and the serrations on the arm of the ædœagus of *pruinata* extend over a larger space. In the female the ductus bursæ is stronger.

Aplasta ononaria, Fues. 2—2

This species is related to *Pseudoterpna pruinata*. The uncus being very similar also the harpe of one valva.

Valvæ asymmetrical, right with harpe heavily spined (valvæ accidentally reversed in figure, Plate I.), left simple, without harpe. Uncus bifurcate. Gnathos trilobed, scobinate. Ædœagus pistillate widened above. Saccus bluntly pointed. Small coremata on ninth segment.

Ostium produced. Signum a deep ridge.

Comibæna pustulata, Hufn. 12—3

Valva fused; valvula rounded; costa arched, inner margin dentate; sacculus fused at base, elongate plate. Uncus bifid, curved; socii strong, head geniculate, longer than uncus. Gnathos atrophid. Ædœagus pistillate, scobinate. Anellus weak, hairy. Saccus squared, centre deeply indent. Eighth sternite produced ventrally, slightly bilobed, strongly dentate.

Ostium weak, plate scobinate. No signum.

Euchloris smaragdaria, Fb. 14—4

Valva fused below; costal fold long; sacculus fused to valvula. Uncus bifid; socii large, tapered. Gnathos separate, broad, weak. Ædœagus pistillate, pointed. Saccus squared, deeply indent. Eighth sternite produced ventrally, bilobed.

Ostium strong.

Hemithea æstivaria Hb, strigata, Müll. 8—3

Valvula peaked; costal fold long, dentate near base; sacculus spined. Uncus curved, tapered; socii long.

Gnathos atrophid. *Ædœagus* pistillate, pointed. Saccus pointed. Coremata extensile, on ninth segment.

Ostium bilobed, with two hairy papillæ. Ductus bursæ thickened, ribbed.

Chlorissa viridata, L. 12—3

Valvula peaked; costa produced, pointed, scobinate, inclosing the base of a patch of long clavate scales; costal fold long produced in free rounded arm. Uncus bulbed at base; socii long. Gnathos atrophid. *Ædœagus* pistillate. Cornuti short in patch. Saccus large, central lobe. Eighth sternite produced ventrally, edge dentate.

Ostium with two hairy papillæ. Bursa very long.

Porrinata, Zel. 2—2

This species has been recorded by Hodgkinson (Entomologist 1871). It is so nearly like *viridata*, it is possible it has been overlooked.

The genitalia are very similar but *porrinata* may at once be distinguished by the eighth sternite, which is scobinate.

Thalera fimbrialis, Scop. 2—2

This species is included on the capture of a single specimen, by Charles Capper, at Beachy Head, August 7th, 1902.

Valva partly fused: costa free, edge dentate. Uncus tapered; socii long, wide at base. Gnathos atrophid. *Ædœagus* pistillate. Saccus rounded, sides indent.

Ostium large, strong, hairy pads at entrance of orifice.

Iodis lactearia, L. 6—4

Valvula simple, indent semi-transparent on outer margin. Uncus tapered; socii long. Gnathos long, pointed. *Ædœagus* pistillate. Juxta bilobed. Saccus squared, lobed at centre. Eighth sternite produced ventrally, bilobed, scobinate.

Ostium weak. Signum double pointed.

Hemistola chrysoprasaria, Esp.
vernaria, Hb.

6—5

Valva broad; costa short; harpe weak, raised; sacculus produced, strong, tapered. Uncus long, parallel; socii nearly length of uncus. Gnathos long, pointed, scobinate. Ædœagus pistillate; cornuti short, a large and a small band. Saccus squared. Eighth sternite produced ventrally bilobed, scobinate.

Ostium elaborate, operculum finely spined. Ductus bursæ with two strongly spined discoid lobes. Bursa elongate, ribbed.

Ourapteryginae.

Valva simple. Uncus short. Gnathos fairly well developed, tip free. Furca fused in long rod. Female with long ribbed ductus bursæ. Signum stellate. Confined in this country to a single species.

Ourapteryx sambucaria, L.

11—4

Valva simple, broad. Furca fused forming a single curved arm terminating in fine spines, always lying to the right, curving to the left. Uncus short, stout tapered, pads hairy. Gnathos strong, broad, tip scobinate. Cornuti many, fine, massed.

Ostium weak. Ductus bursæ ribbed. Signum discoid, dentate.

Ennominae.

Valva generally broad. Furca when present fused, forked. Uncus strong. Gnathos strong, dentate. Ædœagus generally broad and narrowed to a point. Often coremata on ninth segment. In the female signa dentate in varied degree.

Pseudopanthera macularia, Dup.

8—5

Valvula narrow, simple, costal apex truncate. Furca long, slender, curved ends deeply dentate on outer edge, free.

Uncus long, narrow, pointed, pads raised hairy. Gnathos pointed, with four sharp teeth. Ædœagus long, small curved thumb at apex. Anellus produced hairy. Saccus squared angularly, centre indent. Coremata short, rounded, extensile, on ninth segment.

Ostium weak. Ductus bursæ thickened. Signum discoid, dentate.

Cepphis advenaria, Hb. 3—2

Valva simple. Furca long, curved, spined. Uncus long, narrow, pads raised hairy. Gnathos tip pointed with three or four sharp teeth. Ædœagus stout, pointed. Cornuti three to eight short spines. Saccus bilobed. Coremata short, rounded, extensile, on ninth segment.

Ostium produced. Signum weak, angular, dentate.

Plagodis dolabraria, L. 4—2

Valvula wider below, outer margin slightly indent; costa almost straight. Furca asymmetrical, left two-thirds of right, spined. Uncus long, slender; pads hairy. Gnathos long, slender, hooked, with four teeth. Ædœagus short, stout, pointed. Cornuti double row, converging. Juxta bilobed, rugose. Saccus very wide, centre indent.

Bursa subglobular. Signum small, trifold, pierced.

Anagoge pulveraria, L. 6—2

From a genitalic point of view this species is closely related to *Plagodis dolabraria* in both sexes.

Valva peaked, outer margin slightly indent with points on the edge. Furca long, furnished with spines. Uncus long, parallel, pads raised hairy. Gnathos long with four sharp teeth. Ædœagus short, stout, small thumb at orifice. Saccus wide, centre indent.

Ostium weak. Bursa small, delicate. Signum weak, circular, containing a harder centre.

Selenia tetralunaria, Hufn. 2—2

This species is very like *bilunaria* but may be distinguished

by the scobinate gnathos, and the apex of the valva not sharply geniculate.

Valvula simple; costa almost straight. Furca curved. Uncus tapered, pads raised hairy. Gnathos pointed, scobinate. *Ædœagus* spoon shaped thumb at orifice. Cornuti many, long. Saccus rounded, centre indent. Coremata on ninth segment.

Ostium slightly produced. Signum small, irregular, spined.

Bilunaria, Hb.

15—4

Valvula simple; costa geniculate before apex. Furca short, two curved arms, variable in thickness in the two broods. Uncus short. Gnathos stout, ctenoid, three or four teeth. *Ædœagus* short. Cornuti long, fine, numerous. Saccus broad, squared, indent at centre.

Ostium weak. Signum discoid, dentate, rugose.

Lunaria, Schiff.

7—1

Valvula simple; costa short. Furca fused at base, long, pointed, diverging. Transtilla separate, rounded with point. Uncus broad, spatulate. Gnathos short, hooked, with teeth. *Ædœagus* broad, long, cylindrical, with thumb at orifice. Cornuti fine, short, about twelve. Saccus broad, bilobed. Coremata large, on ninth segment.

Bursa long, ovate, cylindrical. Signum small, discoid, dentate.

Lithina petraria, Hb.

4—2

Valvula simple; costa gibbose. Furca fused at base, not long, scobinate. Uncus large, curved. Gnathos long, tip ctenoid. *Ædœagus* stout with thumb. Cornuti strong, numerous, about twenty-four. Saccus rounded.

Ostium not strong. Signum ovate, obtusely serrated and scobinate.

Pachycnemia hippocastanaria, St. 4—2

This species appears related to this group.

Valvula simple; costa thickened, truncate. Furca slender, spined above. Uncus broad, cylindrical, trilobed at apex. Gnathos strong, scobinate. Ædœagus falcate. Cornutus long, lunular, with strong curved base. Saccus rounded, slightly indent at centre. Coremata short, clothed with spatulate, clavate scales, on ninth segment.

Ostium simple. Ductus bursæ spiral. Bursa irregular. Signum lunate, spined.

Epione paralellaria, Schiff. 4—2

Valvula simple. Uncus long, narrow, tapered, pads raised, hairy. Gnathos pointed, tip dentate. Ædœagus pistillate. Vesica without cornutus. Saccus long, bilobed. Coremata long, delicate, extensile, on ninth segment.

Ostium weak, encircled. Signum oblong, rugose.

Apiciaria, Schiff. 3—3

Valvula simple. Uncus long, narrow, tapered; pads raised hairy. Gnathos pointed, tip finely dentate. Ædœagus pistillate. Vesica without cornutus. Saccus long, bilobed. Coremata long, delicate, extensile, on ninth segment.

Ostium weak, encircled. Signum ovate, rugose, dentate.

Opisthograptis luteolata, Dup. 8—4

Valvula simple. Uncus short, stout, tapered. Gnathos pointed, tip with about six sharp teeth. Ædœagus pointed. Vesica thickly spined with minute spines. Saccus rounded.

Ostium produced, weak. Ductus bursæ ribbed.

Gonodontis bidentata, Clerck. 8—6

Valva tapered; costa truncate; costal fold produced in a short arm. Furca curved, slightly serrated at edge. Uncus long, tapered. Gnathos strong, dentate. Ædœagus with a thumb and about eight strong spines at the orifice. Cornuti a band of long spines.

Ostium wide, lobed at either side (guides). Ductus

bursæ thickened. Bursa subglobular. Signum discoid, spined.

The furca arms are inserted in the ostium, and act as a guide during copulation.

Crocallis elinguaris, Tr. 5—2

Valva slightly tapered; costal fold heavily spined on the edge. Furca long, curved. Uncus tapered; pads long, lobed, hairy. Gnathos tips separate, widely apart, concave. Ædœagus pistillate, with one or two spines at the orifice. Saccus rounded.

Ostium produced, wide. Ductus bursæ thickened. Bursa elongate. Signum rounded, crinkled, very delicate.

Ennomos autumnaria, Wernb. 2—2

Valva broad; costa produced, gibbose. Furca long, fused, bifurcate. Uncus broad, spatulate. Gnathos dentate. Ædœagus spined at orifice. Cornuti few, short. Saccus squared.

Ostium wide, strong. Bursa subglobular. Signum elongate, ovate, spined.

Quercinaria, Hufn. 8—5

Valva simple, heavily spined; costa produced, pointed. Furca fused, bifurcate, arms lying close together. Uncus long, tapered. Gnathos weak, tip stronger, slightly scobinate. Ædœagus narrow towards apex, crescent of small spines at orifice. Cornuti five or six spines. Saccus rounded.

Ostium strong. Signum weak, irregularly pointed.

Deuteronomos alniaria, L. 2—2

Valva peaked, median spines; costa short. Furca fused, short, indent above. Uncus long, tapered; pads raised hairy. Gnathos very broad, squared, spined. Ædœagus short. Cornuti many. Saccus pointed.

Ostium wide, strong. Signum diamond shaped, spined, small.

Erosaria, Bork.

2—2

Valva peaked, median patch of spines. Costa short, wide. Furca fused, bifurcate. Uncus tapered, pads hairy. Gnathos rounded, heavily spined both at the tip and along the entire width. *Ædœagus* cylindrical. Cornuti nine short, four long spines. Saccus divided, two ends of ring of tegumen not united.

Ostium produced, bilobed. Ductus bursæ ribbed. Signum discoid, crinkled.

Fuscantaria, Haw.

3—3

Valva short, heavily spined; costa short. Furca completely fused in broad plate. Uncus hooded, short, broad; pads raised, hairy. Gnathos broad, squared, scobinate. *Ædœagus* short, geniculate. Cornuti three. Saccus rounded, weak.

Ostium wide, produced. Signum small, irregular, rugose, delicate.

Hygrochroa syringaria, L.

10—4

Valva rounded; costa pointed at apex. Uncus short, bilobed. Gnathos separate, arms long, heavily scobinate. *Ædœagus* large, stout, cylindrical. Cornuti strong, band of about fifteen spines. Saccus wide, rounded, bilobed.

Ostium wide. Ductus bursæ ribbed. Bursa globular, rugose.

Colotois pennaria, L.

3—3

Valva wider below; costa produced, thickened throughout; from base across the valva and entirely round outer margin thickened, intervening angular portion, semi-transparent. Furca fused, widely bilobed. Uncus bifurcate, slightly asymmetrical. Gnathos absent. *Ædœagus* narrow, geniculate. Cornuti two to three strong. Saccus rounded.

Ostium wide. Ductus bursæ short, narrow. Bursa subglobular.

Macarinae.

A well marked group, but a difficult one to locate; the large sized signum, discoid and stellate, shows close relationship to *Ennominae*, *Bistoninae*, and some *Hyberninae*.

Carbonaria, *Cl.* and *limbaria*, *F.* must be included; each of these species is closely allied to the other species which we have included and possibly forms a subgenus. *Carbonaria* has the distinctive uncus and the octavals, but lacks the peculiar pointed form of ædœagus. *Limbaria* has the peculiar pointed ædœagus, but the cornuti are different and it lacks the distinctive uncus and octavals.

General description: Valvula weak, much reduced; costa extended; sacculus extended set with more or less than three papillæ, first at the junction of the costa and valva, second near the distal end of the sacculus, third on the inner edge of the sacculus. Uncus has a pair of stout spines dorsally at the apex. Gnathos pointed, strong. Ædœagus pointed. Cornuti rounded patch of overlapping scobinations. Eighth sternite cleft, forming octavals.

Ostium is peculiar, possessing a hinged lid which completely closes the orifice, the operculum. In the plate containing *clathrata* we give a drawing showing the ostium open and closed. The signum is always discoid, stellate, generally of large size. In *clathrata* this varies considerably.

Some of the characters appear to connect this group with the *Abraxinae*, e.g. the rose thorn ædœagus of *clathrata*, and the gnathos of *limbaria*.

Macaria carbonaria, *Clerck.*, *L.*

3—3

Valvula small; first papilla only. Ædœagus stout, dentate above. Cornutus absent. Saccus rounded. Octavals cleft, shallow.

Ostium weak. Signum discoid, obtusely serrated and spined.

Clathrata, L.

6—23

Valvula ample, first papilla only, large. *Ædœagus* pointed, with rose thorn. Cornuti numerous, short spines in band. Saccus rounded. Octavals wide, but not deeply cleft, projecting tips hardened.

Ostium with operculum. Signum discoid, stellate, variable, *inter se*.

Vauaria, L.

3—3

Valvula ample; first and second papilla large, third papilla absent. *Ædœagus* point serrate. Cornuti long ovate patch. Saccus broad. Octavals deeply cleft.

Ostium produced, long. Signum discoid, large.

Brunneata, Thunb.

4—2

Valvula smaller than *vauaria*; first papilla strong, rounded; second papilla practically absent; third papilla quite absent. *Ædœagus* small. Cornuti long ovate patch. Saccus broad. Octavals widely but not deeply cleft.

Ostium produced weak. Signum discoid stellate, internal points small.

Liturata, Clerck.

2—2

Valvula ample; first papilla raised, second papilla raised, third papilla a single lobe. *Ædœagus* short, pointed. Cornuti ovate patch. Saccus broad. Octavals deeply cleft, inner edges emarginate.

Ostium produced, with operculum. Ductus bursæ cylindrical. Signum discoid, stellate, large.

Notata, L.

4—2

Valvula ample; first papilla raised, second papilla raised, third papilla single lobe, spined. *Ædœagus* short, pointed. Cornuti ovate patch. Saccus broad. Octavals deeply cleft, inner edges emarginate.

Ostium produced, with operculum. Ductus bursæ cylindrical. Signum discoid, stellate, large.

There appears to be little observable difference

between the genitalia of this species and *liturata*, unless the papilla is larger.

Alternata, Hb.

4—2

Valvula ample; first papilla raised, broad; second papilla small, scobinate; third broad, sometimes divided into two, bearing large spines. *Ædœagus* pointed. Cornuti oval patch. Saccus broad, rounded. Octavals deeply cleft.

Ostium produced, with operculum. Bursa elongate, delicate. Signum discoid, stellate, large.

Limbaria, Fb.

5—2

Valvula ample; without papillæ. Uncus pointed, without the pair of spines. Gnathos tip swollen, rounded, squamous. *Ædœagus* broad, pointed. Cornuti weak, in radiating broken bands. Saccus pointed. Octavals absent.

Ostium with operculum. Signum discoid, stellate, small.

A group of five species which seem to have little connection with any other group, or even with each other, except *margaritata* and *prosapiaria*. Asymmetry in species seems to denote transitional forms.

Angerona prunaria, L.

4—2

Valva shape irregular; costa spined at apex; costal arm produced, curved, spined at apex. Uncus bluntly rounded. Gnathos broad, tip scobinate. *Ædœagus* stumpy. Cornutus bifurcate towards tip. Saccus rounded. Margin of eighth sternite bilobed.

*Ostium with operculum. Signum a ring of thickened chitine.

Campæa margaritata, L.

10—3

Valva widely and deeply emarginate, apex widened, incurved, outer margin curved, bearing towards apex a short pedunculate spine; costal arms asymmetrical, left

* Drawing of ostium reduced by one-half.

broad, indent towards scobinate tip; right longer, tapered, curved. Uncus stout, pointed; pads hairy. Gnathos atrophid. *Ædœagus* slender sigmoid. Cornuti long band of fine short spines. Juxta sub-ovate, *cristæ* hairs numerous. Saccus pointed.

Ostium produced. Ductus bursæ thickened. Bursa globular, pannicular.

Ellopia prosapiaria, Tr.

5—3

Valva slightly emarginate, apex slightly widened, outer margin curved bearing towards apex one or more short, varying, pedunculate spines; costal arms slender, parallel, hairy. Uncus bluntly pointed; pads raised hairy. Gnathos atrophid. *Ædœagus* slender, sigmoid, branched about centre, longer arm closed, scobinate. Cornuti short, double row. Juxta clavate, *cristæ* hairs few. Saccus long pointed.

Ostium weak. Signum lunular, small, dentate.

Bupalus piniaria, L.

4—3

Valva short; costa spread over a large area, spined; sacculus heavily spined above. Tegumen a deeply arched hood. Uncus wide, trilobed. Gnathos large, strong, scobinate. *Ædœagus* sigmoid, gibbose above. Saccus pointed.

Ovipositor normal. Ostium strong, produced. Bursa short, globular.

The genitalia of this species bear a strong resemblance to those of the *Noctuid* moth *Cymatophora duplaris*.

Bistoninæ.

Valva narrow, simple, or spined. Uncus broad, strong, hooded. Gnathos strong. Furca a fused thin transparent plate. *Ædœagus* thumbed.

Ovipositor retractile.

Biston strataria, Hufn.

4—3

Valva simple, sides parallel; costal half heavily spined. Furca fused, stout, tapered, tip hooked. Uncus blunt,

slightly bifurcate. Gnathos broad, squamous. *Ædœagus* short, stout. Saccus abruptly pointed.

Ovipositor long, retractile. Signum short, linear.

Betularia, L.

4—3

Valva simple, sides parallel; costal half heavily spined. Furca fused, spatulate, weak. Uncus blunt, bifid. Gnathos squared, squamous. *Ædœagus* long, stout. Cornuti many, fine in band, and small patch. Saccus abruptly pointed.

Ovipositor long, retractile. Signum arcuate.

Lycia zonaria, Schiff.

3—6

Valva simple; costa thickened. Furca fused, very weak chitinised plate. Uncus thick, pointed. Gnathos wide, squamous. *Ædœagus* thick, short. Cornuti irregular, thorn-like. Saccus rounded.

Ovipositor long, retractile. Ductus bursæ long. Bursa subglobular, without signum.

Hirtaria, Leach.

4—3

Closely related to species included in genera *Lycia* and *Nyssia*. It is interesting to note that hybridisation between this and those species, has been accomplished.

Valva simple; costal fold long. Furca broad, fused, thin. Uncus thick, pointed. Gnathos broad, squamous, weak. *Ædœagus* rather stout, thickened on the side of orifice. Cornuti thorn-like. Saccus rounded, central inward projection.

Ovipositor long, retractile. Bursa small, delicate. Signum triangular.

Nyssia lapponaria, Bdv.

3—3

Valva simple; costa thickened. Furca broad, fused, thin. Uncus thick, pointed. Gnathos broad, squamous, weak. *Ædœagus* tipped. Cornuti thorn-like. Saccus rounded, curved inward projection.

Ovipositor long, retractile. Bursa small, delicate. Signum triangular, pointed.

Apocheima hispidaria, Fb.

4—3

This species has little resemblance to the species placed in the genus *Nyssia*, but is closely allied to *pedaria*.

Valva excavated, broad, short; costa slightly spined at apex; harpe produced, rounded, with row of spines. Uncus broad, minutely bifurcate, pads hairy. Gnathos broad, squamous. *Ædœagus* narrow, short. Saccus pointed, narrow.

Ovipositor narrow, short.

Pedaria, Fb.

3—3

Valva tapered; costa spined; harpe produced, rounded, spined. Uncus short, minutely bifurcate. Gnathos broad, hooked, squamous. *Ædœagus* stout, pointed; vesica thickened. Saccus short, rounded.

Ovipositor moderately long. Ostium produced. Ductus bursæ short.

This species appears related to *Boarmiinae*.

Psodos coracina, Esp.

9—4

Valva peaked, short, broad; costa produced, on upper third a single row of blunt spines. Furca partly fused, strongly dentate on upper edge, which is square. Transtilla separate, developed, pointed. Uncus strong, tapered, pads hairy. Gnathos strong, tip broad. *Ædœagus* pistillate, narrow, two minute points at orifice. Saccus pointed.

Ostium large, strong, rounded. Ductus bursæ short. Bursa small.

There are two strong spines near the edge of seventh segment.

Boarmiinae.

Valva with spiny armature. Uncus strong. Gnathos strong, generally present. Ovipositor usually retractile. Signum dentate.

A large and somewhat irregular group.

Ematurga atomaria, L.

7—4

Valva peaked; harpe partly fused to skin, spined, spines short, stout. Uncus short, stout; from behind on either side on the anal edge of the ninth tergite, spring some four or five wide parallel hairs. Gnathos broad, scobinate in lines. Ædœagus short, tapered. Cornuti in two bands, some very long. Saccus pointed.

Ovipositor long, retractile. Ostium weak. Bursa subcylindrical.

Boarmia consortaria, Fb.

4—4

Valva peaked; harpe long, heavily spined; sacculus produced, spines strong. Uncus tapered, pointed; from behind (dorsal) on either side arises a long arm terminating in long agglutinated spines, hooked at the tips. Gnathos broad and double lobed, hardly free. Ædœagus short, stout, tapered. Cornuti one short, and one long band of spines. Juxta full, weak, cristæ hairs straight, each terminating in a point. Saccus rounded.

Ovipositor moderately long, retractile. Ostium weak. Signum small, ovoid, pointed.

Roboraria, Schiff.

5—3

Valva peaked, wider below; costa widened at apex; harpe round, spined; sacculus heavily spined above. Uncus tapered, pointed. Gnathos broad, squamous. Ædœagus stout, pointed below. Cornuti four sets, one single large, serrated at base; a band of long spines; a band of short spines; and one single, broad with large scobinations. Juxta weak, cristæ hairs curved, each terminating in a globe. Saccus rounded and lobed.

Ovipositor moderately long, retractile. Ostium wide. Ductus bursæ ribbed, scobinate. Signum ovoid with points.

Cinctaria, Schiff.

2—2

Valvula short, peaked; costa widened at apex; harpe extensive raised, edge serrate, one large spine. Uncus

tapered. Gnathos broad, weak, spined. *Ædœagus* short, obtusely pointed. Cornuti one curved, single pointed; one many pointed. Juxta centrally thickened, *cristæ* hairs curved, each terminating in a cup-shaped head. Saccus rounded.

Ovipositor long, retractile. Ostium produced. Bursa large. Signum small discoid, irregularly crinkled.

Hemerophila abruptaria, *Thunb.* 4—3

Valva simple, outer margin excavated; costa sinuous, with chitinous teeth. Uncus short, blunt. Gnathos rounded, squamous. *Ædœagus* stout. Cornuti one short, one long. Saccus broad, central excavation.

Ostium weak. Signum small, discoid, stellate.

Cleorodes lichenaria, *Hufn.* 4—2

Valva simple, narrow, peaked. Transtilla separate, extended in an upward direction into two peaked, roundly pointed free plates. Gnathos atrophid. *Ædœagus* short, broad, thumbed at orifice. Cornutus large, strong, sigmoid, pointed. Saccus rounded.

Ostium weak. Signum irregularly lunular.

Punctularia, *Hb.* 4—2

Valvula broadest above, semi-transparent; costa extended beyond valvula, spined; harpe produced towards anal angle, spined at the rounded head. Uncus short, rounded. *Ædœagus* thickened and produced at orifice. Vesica scobinate. Saccus divided.

Ostium produced. Ductus bursæ thickened, short. Signum discoid, flattened.

Alcis repandata, *L.* 4—3

Valva rounded; costa broader towards apex; harpe two pointed projections on inner edge of costa, the upper swollen at the base and heavily spined. Furca curved, pointed, united at base. Uncus blunt. Gnathos hooked,

rounded, squamous. *Ædœagus* fusiform, orifice thickened, with right angled hook. Saccus rounded.

Ovipositor long, retractile. Ostium thickened. Signum irregular, rounded, pointed.

Jubata, *Thunb*, **glabraria**, *Hb.* 3—2

Valva simple, broad; costa thickened, spined, projecting at apex; harpe angular finger-like projection. Furca bifurcate. Uncus blunt, ridged. Gnathos pointed, squamous. *Ædœagus* short fusiform. Cornutus weak, little more than thickening of vesica. Saccus rounded.

Ostium weak. Ductus bursæ short.

Selidosema gemmaria, *Brahm.* 5—3

Valva pointed; costa produced at tip; fold produced, and spined on angle of inner margin. Uncus short, pointed, with rounded, raised hood. Gnathos atrophid. *Ædœagus* long, cylindrical, pointed, serrated towards tip. Cornuti numerous, short, two bands. Saccus rounded.

Ovipositor short, retractile. Ostium wide. Bursa very long. Signum irregular, serrate.

Ericetaria, *Vill.* 3—1

This species appears closely allied to the species included in the *Boarminæ*, both in the male and female.

Valva truncate; costa greatly developed, produced, spined on upper and under margin, spines strong. Uncus short, blunt. *Ædœagus* with projecting rose thorn near orifice. Juxta bilobed. Saccus rounded.

Ostium small. Bursa small, delicate, subglobular. Signum arcuate, scobinate ridge.

Cleora angularia, *Thnb.* 2—1

Valva broad, peaked; costa spined at apex; sacculus extended, spined. Uncus blunt, spatulate, wider at tip. Gnathos pointed, squamous. *Ædœagus* long, narrow, thumbed, spoon-shaped above. Saccus rounded.

Ostium small, weak. Signum discoid, stellate.

Deileptenia ribeata, Clerck., abietaria, Hb.

2—2

Valva peaked; costa spined; harpe raised, twisted, heavily spined. Uncus small, minutely bifid. Gnathos rounded, squamous. Ædœagus short, stout, tapered, pointed. Vesica scobinate. Cornutus long. Saccus rounded.

Ovipositor moderately long, retractile. Ostium weak. Ductus bursæ thickened, ribbed. Bursa subglobular. Signum small, ovoid with points.

Luridata, Bork.

4—3

Valva peaked; costa spined, edge set with beautiful tufts of wide clavate scales; harpe a fold, spined. Uncus short, stout. Gnathos weak, tip pointed. Ædœagus short, stout, tapered, thumbed. Cornuti two sets, one about twelve strong, and one long, strong, with large corrugated base. Saccus rounded.

Ovipositor retractile. Ostium strong, with operculum. Ductus bursæ thickened, ribbed. Signum discoid, folded.

Consonaria, Bdv.

5—2

Valva peaked; costa thickened; harpe three, rarely four spines, strong, springing from a bulbed base. Uncus short, three minute projections at tip; from the tegumen behind the uncus, on either side, are two beautiful tufts of clavate scales. Gnathos rounded, squamous. Ædœagus short, tapered, thumbed. Cornuti two sets, one many long and short, and one long, strong, scobinate. Saccus pointed.

Ostium with ovate plate. Ductus bursæ thickened, ribbed. Signum discoid, stellate.

Ectropis crepuscularia, Hb.

10—3

Valva long, narrow; costa thickened. Uncus strong, tapered, without pads. Gnathos absent. Ædœagus long, cylindrical, thumbed at orifice. Vesica scobinate. Cristæ hairs long, each terminating in a cup-shaped head. Saccus rounded.

Ovipositor long, retractile. Ostium full. Ductus bursæ short. Signum ovate, stellate, spined. Ninth segment thickly clothed with hair.

Bistortata, Goetze. biundularia, Bork.,

Esp. 8—3

Valva long, narrow; costa thickened. Uncus strong, tapered, without pads. Gnathos absent. Ædœagus long, cylindrical, thumbed at orifice. Vesica scobinate. Cristæ hairs long, each terminating in a flattened disc. Saccus rounded.

Ovipositor long, retractile. Ostium full. Ductus bursæ short. Signum ovate, stellate, spined. Ninth segment thickly clothed with hair.

Eranninæ.

Valva spined. Uncus short with two minute points. Ædœagus with a single spined cornutus. Juxta a thin bifurcate plate. The whole genitalia seems to bring some of the species into close relationship to the *Bistoninæ*.

Agriopis leucophearia, Schiff.

6—3

Valva peaked, partly semi-transparent; costa spined towards apex; harpe a long curved pedunculate spine. Uncus broad, terminating in two points. Gnathos strong, squamous. Ædœagus rounded at apex. Cornutus single, base corrugated. Juxta bifurcate, peaked. Saccus rounded.

Ovipositor retractile, long. Ostium strong, simple. Bursa subglobular.

Some of the characters of this species seem to indicate a relationship with the *Boarminæ*.

Marginaria, Bork.

5—2

Valva narrow, strong spine at apex, heavily spined along the fold. Uncus slightly bifurcate. Gnathos strong, rounded, squamous. Ædœagus apex rounded. Cornutus strong. Juxta indent above. Saccus bluntly pointed.

Ovipositor rather long, retractile. Ostium wide. Ductus bursæ short. Signum irregular, with two points.

Aurantiaria, *Esp.*

4—1

Valva narrow, tip pointed and curved; costal fold heavily spined above to the tip. Uncus broad, terminating in two points. Gnathos strong, broad, rounded, squamous. Ædœagus long. Cornutus strong, curved. Juxta bifurcate, terminating in two long spines. Saccus rounded.

Ovipositor retractile, fairly long. Ostium strong. Ductus bursæ thickened. Bursa ovate, cylindrical.

Erannis defoliaria, *Clerck.*

6—4

Valva elaborate; costa curled inwards with comb of spines, apex produced, lobed, with spined papillæ, outer margin indented; harpe a narrow flap, surmounted by two long hairs. Uncus broad, tip square. Gnathos wide, deep, curled at the tip. Ædœagus broad, scobinated orifice. Cornuti short in band. Juxta broad, lipped. Saccus pointed.

Ovipositor rather long, retractile. Ostium wide, with in-turned scobinate flap at the orifice. Bursa ovate, cylindrical.

The construction of the Genitalia is unlike the rest of the *Eranninæ*. The scaling is similar to *Bistoninæ*.

Alsophila æscularia, *Schiff.*

3—3

A solitary British example of a small genus confined so far as is known to Europe, Asia, and America, of which only five species are recognised, these we have examined, all agree in their genitalic characters.

Valva deeply emarginate; costa produced in long arm; apex emarginate with two shorter projections. Uncus broad, square at tip. Peniculus with long scales. Ædœagus narrow, pointed. Juxta narrow, forked. Saccus pointed.

Ovipositor normal. Ostium wide, with narrow ductus bursæ.

Theria rupicapraria, Hb.

6—3

This species has some resemblance to *pictaria* in both sexes. It is curious that the wing parts and time of appearance have not suggested an affinity.

Valva simple; from the base of the costa spring a pair of serrated, scobinate plates. Uncus curious, long, slender, with a well developed hard chitinous hood behind. *Ædœagus* slender, pistillate. Juxta bifurcate, pointed, strong, with spines at either side. Saccus very long, pointed.

Ovipositor beautifully clothed with long, curled, clavate scales, floricomus. Ostium weak, with small operculum. Bursa very small, rounded. Signum irregular, pointed.

Aleucis pictaria, Curt.

3—4

Valva short, simple. Uncus long, hooked; pads hairy. Gnathos a ring, atrophid. *Ædœagus* short, curved. Cornutus strong bulbed. Juxta bilobed, peaked. Saccus elegantly pointed.

Ovipositor beautifully clothed with long curled clavate scales, floricomus. Ostium weak, with small operculum. Bursa pointed and ribbed at the extremity.

Gnophinæ.

Valva rounded. Uncus generally weak. Gnathos strong, often narrow. Costal arm produced, set with socketed spines. Female irregular.

Aspilates strigillaria, Tr.

6—4

Valva peaked, simple; costa short, peaked. Uncus strong, tapered; pads hairy. Gnathos rudimentary only free at tips which are separated. *Ædœagus* short, branched, with long hooked arm at orifice. Saccus rounded.

Ostium produced. Signum cup-shaped.

Gilvaria, Fb.

6—4

Valva rounded, wider above, asymmetrical; costal arm produced with two hamulate spines; right harpe, a dentate

rounded plate; left a row of short spines. Uncus weak, knob at apex. Gnathos strong, narrow, tip scobinate. *Ædœagus* intortate, strong spines at apex. Saccus rounded.

Ostium produced, narrow. Bursa very small.

Ochrearia, *Rossi*.

9—4

Valva rounded, costal arm produced with three hamulate spines; harpe a long row of short spines. Uncus weak, with knob at apex. Gnathos strong, narrow, tip squamous. *Ædœagus* short, with double row of teeth at orifice. Saccus roughly rounded.

Ostium wide. Ductus bursæ short, thickened in parts. Bursa small.

Lineata, *Scop*.

4—2

Valva rounded; costal arm long, terminating in stout, hamulate spine. Uncus weak, broad, knob at apex. Gnathos long, scobinate. *Ædœagus* dentate. Cornuti five to eight. Saccus wide, rounded.

Ostium with operculum. Ductus bursæ ribbed. Bursa sub-cylindrical. Signum elongate, irregularly serrated, spined.

Myrtillata, *Thunb.* **obfuscaria**, *Gn*.

4—3

Valva peaked; costal arm short, emitting two long hamulate spines. Uncus short, rounded. Gnathos rounded, squamous. *Ædœagus* short, stout, pointed. Cornuti numerous, short, stout. Juxta weak, bifurcate. Saccus pointed.

Ostium weak. Bursa subglobular. Signum irregular, cup-shaped ridge.

Gnophos obscuraria, *Hb*.

4—5

Valva short, peaked, wider below; costal arm produced, terminating in a long hamulate spine. Furca arms long. Uncus short, rounded; pads, long hairs. Gnathos free but weak. *Ædœagus* thickened at orifice. Cornuti two sets;

five to eight strong, straight, firmly fixed; and many long, curved at base, socketed. These latter are transferred to the bursa of female during copulation. We have only found a fragment of one of the stronger spines in the bursa of this and the preceding species, so that we are of opinion the stronger ones are not shed.

Ostium weak. Ductus bursæ very strong, ribbed, heavily dentate along the ridges in combs, probably for retaining the cornuti. Signum very large, rounded, stellate, four pointed.

Dyscia fagara, Thunb. belgiaria, Hb. 7—3

Valva rounded; costal arm long, curved, tipped with a short blunt spine. Uncus very weak, broad, rounded, spined. Gnathos broad, rounded, with strong blade-like tooth. Ædœagus lunular, bifurcate, one point curved outwards, the other large falcate. Cornuti small, about twelve to fourteen. Saccus irregularly rounded with free inward, peaked projection.

Ostium produced. Bursa small.

Abraxinæ.

Valva deeply emarginate; costa generally long free arm. Gnathos only present sometimes. Ædœagus usually with rose-thorn.

Female has a large stellate signum.

Abraxas marginata, L.

3—3

Valvula peaked, simple; costa separate, long curved arm, terminating in socketed spine. Uncus tip minutely bifurcate. Gnathos rounded, squamous. Ædœagus long, spoon-shaped at orifice, edge thickened. Cornuti about fourteen, short to long, stout. Saccus bluntly pointed.

Ostium small spined. Signum discoid stellate, very variable in spining.

Adustata, Schiff.

3—3

Valvula short, emarginate at anal angle; costa separate, long slender arm pointed. Uncus broad, tapered. Gnathos

weak, bluntly rounded. *Ædœagus* short, blunt, truncate (rose thorn) spine before orifice. *Cornuti* short, stout, in patch about sixteen. *Cristæ* set with six spines. *Saccus* short, rounded.

Ostium produced. *Signum* discoid stellate.

Sylvata, Scop.

22—4

Valvula short, dentate, deeply emarginate at anal angle, the point scobinate; costa separate, long curved arm with single spine at apex. *Uncus* weak, except tip, which is stronger and rounded; behind the *uncus* at the end of the ninth tergite is a hairy papilla which varies considerably in size. *Ædœagus* cylindrical, with strong, short, truncate rose thorn at orifice. *Cristæ* a rounded patch of spines. *Saccus* bluntly pointed.

Ostium with operculum. *Ductus bursæ* thickened. *Signum* discoid stellate.

Pantaria, L.

6—1

This species has, as far as we are aware, never been taken in England, although it has often been recorded. We have examined a number of so-called *pantaria*, but in each case they have been proved to be *sylvata*.

The genitalia are very distinct and we have added a figure, so that any doubtful specimens may be examined and proved whether they are this species or not.

The main point of difference lies in the deep emargination of the valva before the large emargination. In *pantaria* it is deep and forms two long claws, which are not specially noticeable in *sylvata*. We have also examined a number of other specimens from various parts of the world, all very similar in wing markings to *sylvata* and find the genitalia show a number of distinct species.

Valvula short, dentate, anal angle emarginate, point not scobinate; costa separate, long curved arm with single spine at apex. *Uncus* weak, except at tip, which is stronger and rounded. No hairy papilla on ninth tergite. *Ædœagus* pistillate with strong truncate rose thorn at

orifice, and disc at base. Cristæ a rounded patch of spines. Saccus rounded.

Ostium strong, bilobed. Ductus bursæ thickened. Signum discoid stellate.

Grossulariata, L.

12—28

Valvula short, slightly pointed, emarginate at the anal angle; from the inner margin springs a bifid tooth, the edges of which are often dentate, below this is the harpe, a single spine; costa separate, long curved. Uncus short, with large spreading pads. Ædœagus pistillate, strong truncate rose thorn at orifice. Cristæ a rounded patch of spines. Saccus rounded, with prolongation at base.

Ostium small. Ductus bursæ thickened. Signum discoid stellate, variable in the twenty-eight specimens examined.

Ptychopodinæ.

Valva partially fused, sometimes squared at the apex, with two points.

Female bursa also irregular, may be plain, spined, or pannicular. Not a compact group.

Anteois muricata, Hufn.

12—4

Valva fused, long, simple, twisted. Transtilla strong, peaked, long scobinations. Uncus bifurcate. Gnathos strong, pointed, scobinate. Ædœagus short, orifice scobinate. Cornuti pointed, flattened, one large, two strong. Saccus rounded.

Ostium strong, lipped. Ductus bursæ ribbed. Bursa spined, ridged.

Ptychopoda bisetata, Hufn.

8—4

Valva fused, apex wider, with three or four spines on the outer margin; apex set with clavate scales. Uncus tapered. Gnathos pointed, squamous. Ædœagus sigmoid, tip scobinate. Cornutus large, irregularly curved. Juxta bilobed. Saccus pointed.

Ovipositor quadri-lobed. Ductus bursæ long curled. The male possesses on the first abdominal sternite a rounded sac, set with clubbed glands forming in the mount a beautiful rosette. Behind this are a pair of lobes in which are placed the tips of the hairs forming the fan foot which spring from near the junction of the femur with the tibia. This formation also occurs in the *Lobophorinæ*.

Trigeminata, Hw.

3—2

Valva fused at base, irregularly curved, anal angle pointed. Uncus tapered, tip rounded. Gnathos tapered, squamous. Ædœagus, orifice scobinate. Cornutus sigmoid. Saccus bluntly pointed.

Ostium not produced. Ductus bursæ armed with a few short spines.

Sterrha ochrata, Sc.

3—2

Valva fused, apex squared, with hook at anal angle. Uncus long, narrow, behind the uncus dorsally is a spined cap, which is probably the anal edge of the ninth tergite. Gnathos broad spined. Ædœagus curved. Cornutus pointed, base rounded. Saccus rounded.

Ovipositor quadri-lobed. Ostium lipped. Bursa globular, instrate.

Dimidiata, Hufn.

6—3

Valva fused, apex set with clavate scales, asymmetrical; right valva emarginate with long point, left valva emarginate with short point. Uncus tapered. Gnathos tapered, squamous. Ædœagus sigmoid. Cornutus a long indefinite spine. Saccus rounded.

Ovipositor quadri-lobed. Ostium small, opening into which is a long curved blind duct. Bursa globular, instrate.

Straminata, Tr.

4—2

Valva fused, rounded, apex set with clavate scales. Uncus tapered. Gnathos broad, squamous. Ædœagus short. Vesica scobinate. Saccus rounded.

Ovipositor quadri-lobed. Ostium weak. Bursa elongate, instrate. There appears to be no difference between this species and *circellata*, Knaggs.

Subsericeata, Hw.

6—3

Valva not fused, rounded. Uncus tapered. Gnathos broad, squamous. Ædœagus with falcate hook at orifice. Saccus pointed.

Ostium weak. Ductus bursæ constricted at the junction of bursa. Bursa instrate. There appears to be no difference between this species and *mancuniata*, Knaggs.

Perochraria, F.R.

4—2

Valva fused, emarginate and produced on outer edge; sacculus extended, tip spined. Uncus broad. Ædœagus base bulbed, from the interior of the base arise two pointed arms which are probably cornuti. Saccus rounded.

Ostium wide. Ductus bursæ short. Bursa subglobular, upper part thick dark chitine.

Contiguarina, Hb.

6—6

Valva fused, emarginate on outer edge; costa produced, tip free, pointed. Uncus tapered. Gnathos tapered. Ædœagus narrow, asymmetrically scobinate above. Saccus pointed.

Ostium simple. Ductus bursæ large, thickened. Bursa very small.

Ania emarginata, L.

12—4

Valva partly fused, irregularly curved, heavily spined at the articulation and along the costa, with strong spines. Tegumen arched, hooded. Uncus tapered. Gnathos broad, squamous. Ædœagus fairly long. Cornuti short, six to ten. Saccus bluntly pointed.

Ostium wide. Bursa twisted, curled, spined.

Cosmorhoë virgularia, Hb. 6—3

Valva fused, rounded at apex. Uncus tapered, narrow. Gnathos broad, squamous. Ædœagus long. Cornutus very long, slender. Saccus long, pointed.

Ostium simple, wide. Bursa curled, spined.

Herbariata, F. 2—1

Valva sides almost parallel, squared at apex, points at anal and costal angles. Uncus tapered. Gnathos broad, scobinate, spined. Ædœagus cylindrical, stout. Cornuti two, one long, straight, slender; the other shorter, curved at base. Saccus rounded.

Ostium large. Bursa spined.

Interjectaria, Bdv. dilutaria, Hb. 10—3

Valva almost square at apex, points at anal and costal angles. Uncus tapered. Gnathos broad, scobinate, hairy. Ædœagus stout. Cornuti two; one short, curved, bulbed; the other longer, straighter; these are united at the base, with long corrugations. Saccus pointed.

Ostium small. Ductus bursæ long, lined with short teeth. Bursa broader and spined.

Humiliata, Hufn. 2—1

Valva fused, rounded, pointed at the anal and costal angles. Uncus tapered, rounded. Gnathos squamous, hairy. Ædœagus long. Cornuti four graduated, bulbed, joined by corrugated base. Saccus bluntly pointed.

Ostium produced. Ductus bursæ spined in longitudinal lines.

Dilutaria, Hb. holosericata, Dup. 6—4

Valva fused, narrow; apex dentate, a strong spine at the anal angle. Uncus tapered. Gnathos broad, hairy. Ædœagus stout, long. Cornuti two, one broad pointed, with long corrugated base, the other long, spatulate. The latter we have found shed, or perhaps broken off during copulation. Saccus pointed.

Ostium weak, narrow. Ductus bursæ long. Bursa long, curled, spined.

Rusticata, F.

6—7

Valva fused below, rounded, point at apex, and a larger one below. Uncus tapered. Gnathos broad, squamous, hairy. Ædœagus stout. Cornutus fairly long, curved. Saccus pointed.

Ostium small, scobinate. Ductus bursæ not long. Bursa coiled, spined.

Degeneraria, Hb.

4—5

Valva fused, obliquely pointed. Uncus cygnate. Gnathos double pointed. Ædœagus long, stout. Vesica with rugose thickening at the junction of ductus ejaculatorious. Saccus bluntly pointed.

Ostium wide. Ductus bursæ long. Bursa curled, upper half spined, lower instrate.

Aversata, L.

6—6

Valva pointed; apex spined, also spined along a ridge on the outer margin. Uncus cygnate. Gnathos divided, forming two sacs, armed with spines. Ædœagus long. Cornuti from five to eight graduated, bulbed, and a broad corrugated patch on the vesica. Saccus widely pointed.

Ostium wide, with a pair of rounded guides. Ductus bursæ long. Bursa curled, spined above, instrate below.

Inornata, Hw.

6—6 ?

Valva fused, broader before apex. Uncus tapered. Gnathos weak, tips produced, scobinate. Ædœagus very short. Vesica of enormous length, armed with short cornuti. Saccus rounded.

Ostium produced. Ductus bursæ of great length in coils, spined. Bursa subglobular, instrate.

Caberinæ.

Valva rounded. Gnathos weak, atrophid. Bursa large, spined.

Cabera temerata, Hb.

8—4

Valva broad, simple, rounded. Uncus long, pointed; pads raised, hairy. Gnathos free, large, delicate. Ædœagus long, pointed. Cornuti three long, three short spines. Anellus bilobed, peaked. Juxta thin, knobbed at apex. Saccus pointed. Coremata on ninth segment, spring from curved bases, formed like scales. The anterior edge of eighth segment bears two rounded projections. There is every indication of a ventral plate.

Ostium small. Ductus bursæ long, ribbed, dentate. Bursa subglobular. Signum a tube with broad, spatulate, plate.

Bimaculata, Fb.

7—4

Valva broadly peaked; harpe free at tip, peaked. Uncus long, tapered; pads raised, hairy. Gnathos free, a delicate ring. Ædœagus small. Cornuti small in a patch, and a rugose band. Anellus strong, bilobed, peaked, scobinate. Saccus rounded. Coremata similar to preceding, but bases more numerous.

Ostium wide, with scobinate operculum. Ductus bursæ curled. Bursa long, narrow, cylindrical, ring of large, strong spines in middle.

Pusaria, L.

6—3

Valva rounded, simple; costa short, small rugose projection. Uncus long, tapered; pads hairy. Gnathos a delicate ring, atrophid. Ædœagus very large. Cornuti long, generally six. Cristæ hairs short. Saccus long, pointed.

Ostium wide. Bursa enormous, cylindrical, spined in longitudinal lines.

We can see no difference between this species and *rotundaria*, *Haw.* except in size.

Exanthemaria, Scop.

5—6

Valva peaked, curved; costa short, small rugose projection. Uncus long, tapered; pads hairy. Gnathos a wide ring,

atrophid. *Ædœagus* large. *Cornuti* fairly long, numerous. *Cristæ* absent. *Saccus* pointed.

Ostium wide, with small operculum. *Bursa* large, pyriform, spined longitudinally.

AGNATHOI.

Gnathos reduced to a mere thickening of chitine, or absent. *Anus* generally long, with spiny subscaaphium. Central area with labides, anellus lobes, or calcar. *Manica* well developed, often spiny.

Acidaliinæ.

This natural genus has peculiarities which we have not found in any other group of *Geometridæ*. The male features are found in the extreme fusion of the genitalia; the separation of the hard chitinous sacculus, from the considerably reduced valvula; the absence of uncus; the great development of the socii; the hard chitinous anellus; the large saccus; and the pencil of long, curved, plumed scales, springing from a circular base, at the articulation of the sacculus with the tegumen. This group also, is peculiar owing to the presence of a special development of the eighth sternite, consisting of a chitinous plate, internal for half its length, then coming to the surface, where it is continued in two pointed arms termed cerata. Covering these cerata is a loose, semi-circular flap, clothed with long, narrow scales, termed the mappa.

In the female, the mappa is represented by a loose flap, which in repose, covers the ostium. This we term the instita. Throughout the genus the signum is composed of a number of "pip" like spines, arranged in a patch.

Acidalia strigilaria, Hb.

1—1

Valvula fused; costa long, curved; sacculi asymmetrical, left, tapered, pointed; right, tip broad, pointed, protruding from which is a large lobe. Uncus obsolete; socii spined lobes. *Ædœagus* stout, tip pointed. *Cornuti* elaborate, large, curved, with long base, thickened in parts. *Anellus*

bifurcate, arms long. Saccus deep, rounded. Mappa long, rounded; cerata asymmetrical, left short, straight; right long, curved.

Ostium produced; instita rounded. Signum ovate mass of large pips.

Immorata, L.

3—2

Valvula fused, bluntly pointed; sacculus long, rounded. Uncus not produced obsolete; socii short. *Ædœagus* broad, dentate patch at orifice. Cornutus stout, pointed. Anellus asymmetrical, arms very long, left rounded, right truncate. Saccus broadly pointed. Mappa rounded; cerata asymmetrical, left short, well developed, foot shaped; right long, sigmoid, spines at apex in a long band.

Ostium large; instita large, indent. Bursa subglobular. Signum triangular, pips coalesced, obtusely serrated and spined.

Fumata, Steph.

4—2

Valvula fused, pointed; sacculus short, pointed. Uncus obsolete, chitine thickened; socii long, pointed. *Ædœagus* short. Anellus bilobed, peaked. Saccus rounded. Mappa rounded; cerata asymmetrical, left very short, stout; right long, broad.

Ostium produced, with instita rounded. Signum large mass of pips.

Ornata, Scop.

5—2

Valvula fused, apex rounded; sacculus broad, tapered, tip emarginate. Uncus obsolete; socii geniculate, which in the mount, causes them to cross each other. *Ædœagus* curved. Cornutus short. Anellus not produced, thickened. Saccus rounded. Mappa rounded, incurved above; cerata long, curved.

Ostium produced, strong. Bursa rounded. Signum ovate, central portion of pips coalesced.

Strigaria, Hb.

1—1

Valvula fused, pointed, spined; harpe tapered; sacculus curved, tapered. Uncus not produced; socii broad. *Ædœagus* short. Cornuti two sets, one stout pointed, the other tapered pointed. Anellus broad, bilobed. Saccus rounded. Mappa roundly drawn to a blunt point; cerata asymmetrical, right short, stout, pointed, spined; left long, curved, point curved, spined.

Ostium produced, strong. Ductus bursæ very short. Bursa pear shaped. Signum ovate, few scattered pips.

Immutata, L.

6—4

Valvula fused, small; sacculus pointed. Uncus not produced, chitine thickened; socii long, narrow. *Ædœagus* narrow. Anellus lobes fairly long. Saccus rounded. Mappa rounded; cerata asymmetrical, left very short, geniculate; right long, curved.

Ostium small; instita rounded, elongate. Bursa subglobular. Signum pips scattered, coalesced in centre.

Floslactata, Haw., remutaria, Hb.

10—4

Valvula fused, pointed, short; sacculus pointed. Uncus obsolete, chitine thickened; socii long, lobed towards apex. *Ædœagus* pointed. Anellus lobes peaked. Saccus bluntly rounded. Mappa sometimes slightly indent; cerata almost symmetrical, left shorter.

Ostium small; instita rounded. Signum small diamond-shaped patch of pips.

Imitaria, Hb.

15—7

Valvula fused, short, pointed; sacculus pointed. Uncus obsolete, chitine thickened; socii long, widely apart. *Ædœagus* pointed. Anellus lobes peaked. Saccus rounded. Mappa rounded; cerata asymmetrical, left long, slightly curved; right shorter, much curved. The only instance of right cerata being the shorter.

Ostium small; instita rounded. Signum ovate mass of pips.

Rubiginata, Hufn.

6—3

Valvula fused, socketed spine inserted at apex; sacculus very broad, short. Uncus obsolete; socii widely apart, short. Ædœagus long, narrow, broader at base. Anellus extended in a broad plate. Saccus bluntly pointed. Mappa broadly rounded; cerata short, stout.

Ostium broad. Bursa subglobular. Signum large mass of pips.

Emutaria, Hb.

6—4

Valvula fused, apex rounded; sacculus broad, tapered. Uncus obsolete, chitine thickened; socii long, widely apart. Ædœagus pointed. Anellus lobes rounded. Saccus rounded. Mappa long, rounded; cerata asymmetrical, left slightly shorter, stouter.

Ostium small; instita rounded. Signum large, ovate patch of pips, centre coalesced.

Marginipunctata, Göez.

10—4

Valvula fused, narrower before apex; sacculus strong, tapered. Uncus not produced; socii long, slender. Ædœagus narrow, broader at base. Anellus lobes broad. Saccus rounded. Mappa rounded; cerata just represented atrophid.

Ostium narrow, strong. Bursa subglobular. Signum large mass of scattered pips.

Cosymbiinae.

The *Cosymbiinae* form a complete group and seems to provide a place for the abnormal *Timandra amata*. The uncus, which is weak and evidently useless as a grasping hook, is attached to and forms the dorsal thickening of the anal tube. The saccus is curiously incurved. The signum is a deep ridge.

Rhodometra sacraria, L.

4—2

Valvula fused, small, rounded; the sacculus, occupying the greatest area, is spined with short, stout, spines at the

apex. Uncus tapered, hooded, naked. Socii pointed. *Ædœagus* with an angular plate at the orifice. *Cornutus* dentate. *Saccus* very large. The edge of the eighth segment is clothed with a single row of long hairs.

Ostium opens from a circular plate with a projection. *Ductus bursæ* thickened. *Signum* a deep ridge.

***Timandra amata*, L.**

7—3

Valva cardinate, fused, very complicated and unlike any other British geometer. *Costa* a strong, bowed arm, forked towards the apex, the outer arm being free; the inner arm carries the weak membrane of the *valvula*; *sacculus* emarginate, extends in a long tapered arm. *Uncus* large, spined and carries two scobinate flanges which may be a modified gnathos. *Ædœagus* long, sigmoid, scobinate thumb at the orifice. *Saccus* bilobed, centre indent.

Ostium produced; *instita* indent. *Bursa* subglobular. *Signum* a deep ridge.

***Codonia porata*, Fb.**

5—3

Valvula rounded; *costa* slightly incurved; *sacculus* free, base weak, extending in an arm, set with a few spines at its junction with a broad, pointed plate, emarginate on the outer edge. *Uncus* weak; pads raised hairy. *Ædœagus* pistillate, broader towards centre. *Saccus* incurved.

Ostium weak. *Signum* a deep ridge.

***Punctaria*, L.**

6—3

Valvula rounded; *costa* deeply incurved; *sacculus* free, base weak, extending in a rounded papilla, set with numerous spines at its junction with a squared plate which bears strong spines on the outer margin. *Uncus* weak, edge of upper half spined. *Ædœagus* pistillate, lobed on one side towards centre. *Saccus* incurved.

Ostium weak. *Signum* a deep ridge.

Linearia, Hb.

6—4

Valvula rounded; costa emarginate; sacculus free, base weak, extending in a rounded, projecting, papilla, set with a few long spines at its junction with a heavily spined, curled, plate. Uncus weak, edge spined. Ædœagus long, pistillate. Saccus incurved.

Ostium weak. Signum a deep ridge.

Cosymbia annulata, Schulz.

3—2

Valvula rounded, base spined; costa incurved; sacculus base weak, extending in a projecting papilla, set with stout, straight, spines at its junction with a long curved arm. Uncus weak, edge spined above. Ædœagus short, pistillate. Saccus incurved.

Ostium weak. Signum a deep ridge.

Pendularia, Clerck.

3—2

Valvula rounded, base spined; costa almost straight; sacculus base weak, extending in a projecting papilla, set with many fine spines at its junction with a long curved arm. Uncus weak, edge spined to the base. Ædœagus pistillate.

Ostium weak. Signum a deep ridge.

Orbicularia, Hb.

4—3

Valvula rounded; costa almost straight; sacculus base weak, extending in a projecting papilla, set with a few stout spines at its junction with a curved arm. Uncus weak, edge spined nearly to base. Ædœagus pistillate. Saccus incurved.

Ostium weak. Signum a deep ridge.

C. puppillaria the type of this genus may be distinguished by the junction of the sacculus with the curved arm being set with short, stout, spines.

Lythia purpuraria, L.

3—3

A difficult structure to read. Its position very doubtful.

Valvula reduced to a small lobe projecting from the

sacculus, joined to the articulation by the spined costal fold; costa produced in free tapered arm; sacculus very broad, tip scobinate. Uncus weak, atrophid, attached dorsally to the anal tube; pads slightly hairy. *Ædœagus* short. Cornuti two strong spines. Saccus squared, incurved.

Ostium bilobed. Bursa long.

Parascotia fuliginaria, L.

2—1

The genitalia appear to throw little light on the position of this species. I include it here because it has some characters which seem to justify my doing so.

Valvæ fused, pointed. There are three other projections; a hairy papilla near the base; a strong spine, and a weak spined papilla. Uncus broad spatulate with sharp point (? a *Noctuid* uncus). *Ædœagus* pistillate, apex set with one large and two smaller spines. Anellus scobinate. Saccus very large, deep.

Ovipositor tubular. Ostium strong. Ductus bursæ thickened. Bursa weak, small.

Astheninæ.

The *Astheninæ* form a complete group, the extension of the sacculus being a feature in the male. The female is even more characteristic, having a long evenly spined signum. *Obliterata* and *cambrica* are closely allied, and there is nothing in the genitalia to exclude them from this genus. The uncus is weak and entirely attached to the anal tube which bears a thickened subscaaphium.

Minoa murinata, Scop.

3—3

Valva fused; costa produced pointed; sacculus produced pointed. Labides long, curved. Uncus not produced, bluntly pointed. *Ædœagus* large. Cornutus strong, bulbed. Saccus very large, deep.

Ostium wide. Ductus bursæ thickened. Signum rosette of spines.

On the seventh sternite are a pair of small papillæ.

Asthena testaceata, *Don. sylvata*, *Hb.* 5—3

Valva pointed; costa thickened; sacculus produced, arm long. Labides long, pointed, curved. Uncus very weak, atrophid. *Ædœagus* orifice cleft. Juxta bilobed, hairy, base curves downwards deeply into the saccus. Saccus very long, wide, rounded.

Ovipositor tubular. Bursa rounded, finely scobinate. Signum ovate, long, spined.

Luteata, *Schiff.*

8—6

Valva rounded; costa thickened; sacculus produced, long tapered arm. Labides long, lobed. Uncus atrophid, pointed. *Ædœagus* long, orifice cleft. Juxta trifold, central arm long. Saccus deep, rounded.

Ovipositor tubular, not bilobed. Ostium weak. Signum ovate, spined.

Blomeri, *Curtis.*

10—4

Valva broad, rounded; costa short, arched; sacculus arm long. Labides very short, two papillæ. Uncus atrophid, very weak. *Ædœagus* long. Juxta bilobed, curves down deeply into saccus. Saccus long.

Ovipositor normal. Signum ovate, spined.

Candidata, *Schiff.*

8—5

Valva rounded; costa gibbose; sacculus arm short, pointed. Labides long, hairy. Uncus very weak, atrophid. *Ædœagus* short, cylindrical, tip scobinate. Vesica complicated. Cornuti one long strong spine with two or three smaller ones springing from its base.

Ovipositor normal. Ostium weak. Signum ovate, spines long, slender.

Obliterata, *Hufn.*

6—4

Valva rounded; costa short; sacculus arm extended. Labides pointed, long, hairy. Uncus very weak, atrophid. *Ædœagus* long, thumbed, scobinate at orifice. Juxta well developed, the plate projects upward. Cristæ eight long hairs at either side. Saccus rounded.

Ostium weak, bilobed. Bursa delicately scobinate. Signa two sets spined, one elongate pyriform, the other a triangular patch.

Cambrica, Curtis.

6—4

Valva rounded; costa gibbose; sacculus arm broad, spatulate. Labides stout, hairy. Uncus very weak, atrophid. *Ædœagus* long, subsigmoid. Saccus very large, rounded.

Ovipositor normal. Ostium weak. Bursa spined. Signa two sets, one ovate spined, the other a spined patch near the duct.

Oporiniinæ.

Valva rounded. Labides with heads united. Anal tube long, often decorated with fine spines.

Female usually with two scobinate signa.

Operophtera brumata, L.

12—5

Valva rounded, simple. Labides arched, hairy. Uncus fairly long, spatulate, tip rounded; pads hairy. *Ædœagus* narrow. Cornutus long, dentate. Juxta bilobed below. Cristæ hairs short. Saccus long, pointed.

Ovipositor rather long, retractile. Ostium encircled. Ductus bursæ cylindrical. Signa two, discoid, dentate.

Boreata, Hb.

6—3

Valva rounded, simple. Labides united, arched, hairy. Uncus long, spatulate, tip with hard point; pads hairy. *Ædœagus* pointed. Cornutus long, dentate. Juxta bilobed. Cristæ reduced to a single spine. Saccus long, pointed.

Ovipositor rather long, retractile. Ostium encircled. Ductus bursæ cylindrical. Signum discoid, dentate.

Oporinia.

The appearance of wing markings being somewhat alike, the genitalic differences become of great value. It would be well if collectors, when setting the males of these insects, would open the valvæ, when a hand lens would show to which group the individual belonged.

The valvæ with lateral hooked projections, show *dilutata* and *christyi*, which can again be separated, by brushing the eighth sternite to expose the octavals. If these lie close together, the specimen is *christyi*; if apart, *dilutata*. The valvæ without lateral hooked projections show *filigrammaria* and *autumnata*; those with a deep excavation between the octavals being *filigrammaria*.

In mounted specimens, the less numerous cristæ hairs will also clearly separate the latter species from *autumnata*.

Oporinia dilutata, Bork. 20—8

Valva peaked, hooked on outer margin; costa thickened. Labides head not wide. Uncus broad, tapered; pads hairy. Ædœagus long, curved, dentate above. Vesica scobinate. Cristæ of about seven hairs. Saccus pointed. Octavals wide apart.

Ovipositor long, retractile. Ostium encircled. Signa two, discoid, scobinate.

In the figure of this species, the ductus seminalis has been added.

Christyi, Prout. 12—5

Valva shorter than *dilutata*, hook more curved. Labides head wide. Octavals close together.

Signa two, small.

Filigrammaria, H.-S. 18—6

Valva peaked, sharp angle on outer margin in place of hook. Labides head not wide. Uncus broad, tapered. Ædœagus short, dentate above. Cristæ of about seven hairs. Saccus pointed. Octavals strong, divided by a deep excavation.

Ovipositor fairly long, retractile. Ostium encircled. Signa two, discoid, scobinate.

Autumnata, Gn. 12—4

Labides head wide. Cristæ of about nineteen hairs, and several at the base. Octavals smaller than *filigrammaria*, excavation not deep.

Signa two, distinctly smaller.

Perizoma didymata, L.

6—4

Valva rounded; costa strong. Labides united, forming a broad head clothed with short hairs. Uncus tapered, pointed, pads absent. Ædœagus short. Cornuti a band of long spines. Manica finely spined. Cristæ three or four spines. Saccus rounded. Anal tube spined throughout the genus.

Ostium not encircled, weak. Signum discoid, scobinate.

Minorata, Tr.

8—3

Valva rounded. Labides united, head pointed. Uncus tapered. Ædœagus scobinate above. Manica finely spined. Saccus rounded.

Ostium encircled. Signum discoid, ovate, scobinate.

Blandiata, Schiff. adæquata, Bork.

6—3

Valva rounded. Labides united, head bilobed. Uncus tapered. Ædœagus slightly scobinate. Manica finely spined. Saccus rounded.

Ostium encircled. Signum discoid, scobinate.

Bifasciata, Haw. unifasciata, Haw.

5—5

Valva rounded. Labides united, head ovate, only spined above. Uncus cylindrical, pointed. Ædœagus rounded above, scobinate. Manica finely spined. Saccus rounded.

Ostium encircled. Signum discoid, produced posteriorly, scobinate.

Albulata, Schiff.

6—4

Valva short. Labides head united, lunate. Uncus tapered. Ædœagus scobinate at orifice. Manica finely spined. Juxta indent. Saccus rounded.

Ostium encircled. Signum discoid, produced posteriorly, scobinate.

Flavofasciata, Thunb. decolorata, Hb. 8—4

Valva rounded. Labides head united, globular. Uncus tapered. *Ædœagus* rounded at tip, scobinate. Manica slightly spined. Saccus rounded.

Ovipositor retractile. Ostium encircled. Signum elongate, ovate, coarsely scobinate.

Alchemillata, L. 9—4

Valva short. Labides head united, bilobed. Uncus short, pointed. Vesica rugose. Juxta narrower above. Saccus rounded.

Ostium weak. Signum discoid, scobinate.

Affinitata, St. 4—3

Valva simple. Labides united, head globular. Uncus tapered, broad at base. *Ædœagus* simple. Juxta indent above and below. Cristæ a pair of hairs. Saccus rounded.

Ovipositor retractile. Ostium weak. Signa two sets, one elongate, ovate, spined; the other discoid.

Tæniata, St. 6—5

Valva rounded; costa slightly produced. Labides united in pointed head. Uncus very weak, spatulate, pointed, with a pair of hairs above. *Ædœagus* simple. Cornutus long, stout. Manica heavily spined. Saccus rounded.

Ostium encircled. Ductus bursæ strong, thickened. Signum a spined ridge.

Eupitheciinæ.

With the exception of *oblongata*, the group is without armature to the valvæ. The valvæ differ considerably in shape, and are generally large and full. The uncus is usually minutely hooded. The labides would probably form important organs for differentiation, but the peculiar curvature makes it impossible for one to mount them in a uniform position so as to render them easy for comparison, therefore little can be made of them. The papillæ that arise on the feet of the labides, afford to some extent a

differential character in closely allied species. The anal tube is always accompanied by the subscaphium, which is partly covered by small spines. The plate of the eighth segment varies considerably in shape and structure. It arises interiorly from the sternite, often as a free plate, and sometimes comes to the surface where it becomes highly chitinised; at other times it is fused to the skin of the sternite, and is a mere thickening of the chitine. Dr. Buchanan White appears to have been the first to call attention to this important character, and it has been subsequently used by Dr. W. Petersen in his monograph of the *Eupithecia*. The juxta is a hard, rounded, chitinous plate, with two arms projecting from above. The cornuti, of which there are often four sets, are of immense importance, but here again the difficulty of obtaining the same position renders them of less value than they would otherwise be. Coremata on the ninth segment. The female as a rule has good distinguishing characters.

Eupithecia oblongata, *Thnb.* 3—3

Valva emarginate on the outer edge; harpe raised, hairy. Cornuti weak, striated, and appear to consist of two pieces. Coremata short, hairs long. Saccus indent.

Ostium strong. Ductus bursæ elaborate. Bursa instrate.

Pusillata, *Fb.* 6—3

Valva emarginate on outer edge. Cornuti three sets, one long, scobinate above; one bulbed spine; one small spine. Coremata truncate, hairs few, long. Saccus slightly indent.

Ostium strong. Ductus bursæ short. Bursa pannicular, the upper teeth being large and strong.

Distinctaria, *H.-S.*

Constrictata, *Gn.* 2—2

Valva emarginate on outer edge. Cornutus long, delicate. Coremata globular, hairs long. Saccus rounded.

Ostium weak. Ductus bursæ weak. Bursa pannicular.

Insigniata, Hb.**Consignata, Bork.**

6—4

Valvæ asymmetrical, the point at the anal angle being considerably more extended on the right side than on the left. Papillæ on the labides' feet are of thickened chitine. Cornuti three sets, one scobinate; one bulbed; one small. Coremata short, hairs long. Saccus indent.

Ostium weak. Ductus bursæ thickened. Bursa elongate, cylindrical, panicular.

Abbreviata, St.

8—3

Valva strongly pointed at anal angle. Cornuti three sets, one very long pointed; one heavily bulbed; one irregular with base. Coremata weak. Saccus indent.

Ostium weak. Ductus bursæ long. Bursa elongate, cylindrical, a band of teeth across the middle.

Exiguata, Hb.

5—4

Valva emarginate on the outer margin. Cornuti three sets, two scobinate; one pointed, irregular, weak with base. Coremata globular, hairs long. Saccus indent.

Ostium weak. Ductus bursæ short. Bursa sub-globular, pannicular.

Denotata, Hb.**Campanulata, H.-S.**

9—4

Jasioneata, Crewe.

4—3

We can see no difference between these two forms.

Valva not strongly produced at anal angle. Cornuti two sets, one strong, pointed; one narrow plate with base. Coremata sessile, hairs long. Saccus rounded.

Ostium weak. Ductus bursæ short. Bursa elongate, cylindrical, a few teeth above, base spined.

Sobrinata, Hb.

11—7

Angelicata, H.-S.**Stevensata, Webb.**

We can see no difference between these three forms.

Valva truncate, sharp narrow point at anal angle.

Cornuti two sets, one very strong, long, bulbed; one plate with base. Coremata broad, hairs long. Saccus rounded.

Ostium weak. Ductus bursæ long, thickened. Bursa well covered with spines in the lower two-thirds, uppermost spines strong.

Nanata, *Hb.*

8—6

Valva scarcely produced at anal angle. Cornuti two narrow spines, and an irregular plate, with base. Papillæ large, thickly spined. Coremata globular, hairs long. Saccus rounded.

Ostium weak. Ductus bursæ short. Bursa lower half spined, ridges of spines continued upwards towards the ostium.

Fraxinata, *Crewe.*

8—3

Innotata, *Hufn.*

3—2

Tamarisciata, *Frr.*

2—1

We can see no perceptible difference between these three forms.

Valva hardly produced at anal angle. Cornuti one narrow spine, and a broad pointed plate with double base; vesica heavily scobinate. Papillæ long, thickly spined. Coremata sessile, hairy. Saccus rounded.

Ostium weak. Bursa three-quarter spined.

Dodoneata, *Gn.*

2—2

Valva sharply peaked, slightly elbowed at anal angle. *Ædœagus* large. Cornuti one narrow spine; one small, pointed, flattened plate; one very large, pointed plate with base. Coremata globular, hairs long. Saccus rounded.

Ostium large, weak. Ductus bursæ long. Bursa lower third spined.

Satyrata, *Hb.*

6—2

Curzoni, *Greg.*

3—2

Callunaria, *Sta.*

3—1

We can find no difference between these three forms.

Valva curved. Uncus sharply pointed. Cornuti four

of various size, scobinate, one with base. Coremata truncate, hairs long.

Ostium weak. Ductus bursæ short. Bursa pannicular, teeth strong.

Lariciata, Frr.

5—3

Valva large, broad, anal angle produced. Ædœagus small. Cornuti one narrow spine; one broad irregular plate. Papillæ long, narrow, sparsely spined. Coremata sessile, hairs long.

Ostium weak. Ductus bursæ small, short. Bursa double lobed, upper part with patch of scattered spines; lower lobe almost instrate.

Helveticaria, Bdv.

2—2

We can see little difference between this and *arceuthata*, but hesitate to express an opinion without more material.

Valva broad, short, pointed. Cornuti three, one strong, scobinate; one dentate; one indefinite plate with base. Coremata sessile, hairs scanty. Saccus rounded.

Ostium weak. Ductus bursæ short. Bursa with heavy fold, subcylindrical, basal half sparsely spined with irregular spines.

Arceuthata, Frr.

1—1

Valva broad, short, pointed. Cornuti two, possibly three, one broad, strong, scobinate; one dentate; one indefinite with base. Coremata sessile, hairs scanty, long.

Ostium weak. Ductus bursæ short. Bursa with heavy fold, subcylindrical, basal half spined with large irregular spines.

Scabiosata, Bork.

4—3

Valva long, rather narrow. Labides well spined. Cornuti two strong, with few heavy dentations; the larger one with about five teeth; the smaller one with about three, and a large base. Coremata globular, hairs long. Saccus rounded.

Ostium weak, narrow. Bursa subcylindrical, pannicular.

Extensaria, Frr.

4—3

Valva broad, narrows quickly to the tip. Cornuti five, one broad, scobinate; one small, scobinate; one plain, pointed; one long, scobinate; one plate with base. Coremata sessile, hairs short. Saccus rounded.

Ostium weak. Ductus bursæ long. Bursa elongate, cylindrical, spined above and on lower third, spines long.

Succenturiata, L.

6—3

Valva very pointed. Cornuti four, three large, thickly scobinate; one narrow, plain with base. Coremata long, extensile. Saccus rounded.

Ostium weak. Ductus bursæ short. Bursa very large, pannicular. Ductus seminalis wide, large.

Subfulvata, Haw.

6—3

Valva very pointed. Cornuti four, three large, coarsely scobinate, teeth large; one narrow, plain, with base. Coremata extensile. Saccus rounded.

Ostium weak. Ductus bursæ short. Bursa pannicular. Ductus seminalis large.

Expallidata, Gn.

2—2

Valva broad, narrows quickly to tip. Cornuti four, with few, coarse, scobinations and base. Coremata pedunculate, hairs long. Saccus pointed.

Ostium weak. Ductus bursæ short. Bursa large, pannicular.

Trisignaria, H.-S.

3—1

Valva pointed, emarginate at anal angle. Uncus tapered. Cornuti two, one scobinate, one large, heavily scobinate, with base. Coremata sessile, hairs long. Saccus rounded.

Ostium weak. Ductus bursæ short. Bursa pannicular, patches of spines above, lower two-thirds spined.

Goosensiata , <i>Mab.</i>	
Minutata , <i>Gn.</i>	12—6
Knautiata , <i>Greg.</i>	2—2
Absinthiata , <i>Clerk.</i>	8—4

We can see little difference in these three forms. We had considerable difficulty in obtaining reliable material for *knautiata*, many specimens sent as this species show only *assimilata* genitalia. There is little doubt it is only a variety of *minutata*.

Valva fairly large. Cornuti five, four scobinate, one plain with base. Coremata sessile, hairs many, long. Saccus rounded.

Ostium weak. Ductus bursæ short. Bursa pannicular.

Assimilata , <i>Gn.</i>	10—5
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Valva generally smaller than preceding species. Cornuti four, three scobinate, one with base. Coremata globular, hairs long. Saccus rounded.

Ostium weak. Ductus bursæ short. Bursa instrate.

Vulgata , <i>Haw.</i>	10—5
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Valva almost pointed. Uncus small, sharp, point. Cornuti three, scobinate. Coremata globular, hairs long. Saccus rounded.

Ostium weak. Ductus bursæ short. Bursa pannicular.

Valerianata , <i>Hb.</i>	3—2
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Valva rounded. Cornuti two, one broad scobinate; one small finely scobinate. Coremata pedunculate, hairs long. Saccus rounded.

Ostium weak. Ductus bursæ short. Bursa pannicular, a very distinct central patch of spines.

There appears to be a difference between our examples and that figured by Dr. Petersen.

Irriguata , <i>Hb.</i>	3—4
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Valva peaked. Uncus tapered. Ædœagus broad. Cornuti three, one scobinate; one scobinate with corrugated base;

one stout, semi-globular, scobinate. Coremata sessile, hairs few, short. Saccus rounded.

Ostium weak. Ductus bursæ short. Bursa pannicular.

Dr. Petersen seems to have described and figured this species from a single specimen, sent to him by Herr Dietze, this specimen evidently had a wrong body that of *linariata*, which he figures as that of *irriguata*.

Indigata, Hb.

10—6

Valva small, narrow, pointed. Cornuti appear to be fused with a dentate plate; there is a small base. Coremata sessile, hairs long. Saccus rounded.

Ostium weak. Ductus bursæ short. Bursa instrate, except a large patch of thickened chitine, forming the mouth of the ductus seminalis.

Pimpinellata, Hb.

6—3

Valva pointed. Uncus pointed. Cornuti four, one large horn-like; one small horn-like; one pointed with base. Papillæ large. Coremata sessile, hairs long. Saccus centrally indent.

Ostium weak. Ductus bursæ complicated, long, with a raised papilla. Bursa instrate.

Virgaureata, Dbl.

4—8

Valva broad, rounded. Cornuti three, two pointed; one indefinite. Coremata sessile, hairs many. Saccus rounded.

Ostium weak. Ductus bursæ short. Bursa pannicular, weak.

Petersen's figures and descriptions of the males of this species and *castigata* should be transposed, an evident mistake having occurred.

The Paisley Pug.

We have examined four specimens of the "Paisley pug" (W. H. Tugwell, *Entomologist*, Vol. xxv., p. 41, 1892), captured by "W. Watson, Paisley," and "Dunsmore, Paisley," and find they agree with *virgaureata*. Doubt was

expressed at the time as to whether the "Paisley Pug" was this species or *castigata*; and South, in "British Moths," 1908, p. 237, states: "A blackish form of *castigata* was formerly known as the 'Paisley Pug.'" It is as well to state that the specimens examined by us as *virgaureata*, have the antenna of the male sparsely clothed with long hair; that of *castigata* being thickly clothed with short hair.

Albipunctata, Haw.

3—2

Valva broad, slightly produced at anal angle. Uncus tapered, pointed. *Ædœagus* broad. Cornutus sharp, slender, point bulbed, corrugated to base. Coremata sessile, hairs very long. Saccus indent.

Ostium weak. Ductus bursæ small. Bursa with a broad spiny band round centre.

Subnotata, Hb.

9—6

Valva broad; costa widens towards tip. Uncus tapered. *Ædœagus* large. Cornutus long, irregularly emarginate. Vesica heavily scobinate. Coremata large. Saccus rounded.

Ostium weak. Ductus bursæ short. Bursa pannicular.

Tenuiata, Hb.

6—4

Valva peaked. Uncus short, pointed. Cornutus curved, base only. Coremata sessile, hairs long. Saccus rounded.

Ostium weak. Ductus bursæ long. Bursa reniform, pannicular.

Plumbeolata, Haw.

4—2

Valva broad, rounded. Uncus long, tapered. Cornuti three, one rounded, emarginate; one band and base. Coremata small, rounded. Saccus rounded.

Ostium weak. Ductus bursæ short. Bursa large, upper half spined.

Inturbata, Hb.**Subciliata, Gn.**

4—3

Valva curved. Uncus tip rounded, tapered. *Ædœagus* very narrow. Cornutus weak. Coremata sessile, hairs long. Saccus rounded.

Ostium weak. Ductus bursæ long, narrow. Bursa pannicular.

Castigata, Hb.

6—4

Valva broad, peaked. Uncus long, tapered. Cornuti small two, one curved and base. Coremata rounded. Saccus rounded.

Ostium weak. Ductus bursæ short, spined. Bursa subglobular, instrate.

Pulchellata, St.

8—3

Valva rounded. Uncus tapered. *Ædœagus* long, slender. Cornutus long, tubular. Coremata round, hairs long. Saccus rounded.

Ostium weak, very wide. Bursa subglobular, pannicular, spines fine and widely apart.

Linariata, Fb.

6—3

Valva peaked. Uncus tapered. *Ædœagus* shorter and more slender than *pulchellata*. Cornutus tubular, shorter. Coremata sessile, hairs long. Saccus rounded.

Ostium weak, very wide. Bursa subglobular, pannicular, spines fine and widely apart.

Pygmæata, Hb.

2—2

Valva broad, rounded. Uncus tapered, single point. *Ædœagus* very broad. Cornuti four, one large, double horn form; one smaller horn form; one long band and base. Coremata globular, hairs long.

Ostium weak. Ductus bursæ very short. Bursa irregularly spined, a second bursa below.

Togata, Hb.

4—4

Valva long, narrow. Labides are slightly differently mounted on their footstalks. The papillæ are appressed, very broad and are not extended as in other species. Uncus tapered to a single sharp point. Cornutus large, bulbous. Coremata sessile, hairs long.

Ostium fairly distinctly formed. Ductus bursæ strong. Bursa large, pannicular, spines strong.

Venosata, Fb.

8—4

Valva rounded. Ædœagus short. Cornutus a single flattened spine. Coremata large, hairs long, clavate. Saccus deep, bluntly pointed.

Ostium weak. Ductus bursæ short. Bursa pannicular.

Haworthiata, Dbd.**Isogrammaria, H.-S.**

8—4

Valva rounded. Uncus very weak, bifurcate. Cornutus indefinite. Coremata rounded, hairs long, clavate. Saccus deep, centre indent.

Ostium weak. Ductus bursæ short. Bursa elongate, with a broad longitudinal band of spines.

The uncus is unique as far as British species go.

Calliclystis rectangulata, L.

14—5

Valva rounded. Labides modified, their junction with the valva terminating in a free curved spine; papilla at base appressed. Uncus not produced. Ædœagus short. Cornuti many in band. Manica spined in comparatively large and few spines, two large curved spines being conspicuous. Anellus attached to the manica by a patch of strong spines.

Ostium weak, small. Ductus bursæ long. Ductus seminalis strong. Bursa subglobular. Signa two lunate, scobinate bands of spines, one larger than the other.

Debiliata, Hb.

8—5

Valva rounded. Labides modified. Papilla at base not appressed. Uncus not produced. Ædœagus short. Cornuti

many in band. Manica spined in comparatively many fine spines, two large curved spines being conspicuous. Anellus attached to the manica by a lunate band of strong spines.

Ostium weak. Ductus bursæ long. Ductus seminalis well developed. Bursa subglobular. Signum a weak, triangular, scobinate patch.

Chloroclystis coronata, Hb.

8—6

Valva narrow, wider below; costa arched. Labides with papilla at base appressed, spined, as in *Eupithecia togata*. Uncus single pointed, base extensive. Ædœagus simple. Juxta strong. Saccus rounded.

Ostium encircled. Ductus bursæ not thickened. Bursa pannicular, upper half spined.

Gymnoscelis pumilata, Hb.

14—8

Valva narrow, tapered to a point. Labides normal; no trace of papilla. Uncus single pointed, base extensive. Ædœagus small, narrow. Cornutus an agglutinated mass of fine spines. Juxta base triangular, usual arms above. Saccus squared, trilobed, bearing a non-extensile coremata of long slender scales at either side.

Ostium weak. Ductus bursæ short. Bursa pannicular.

Collix sparsata, Hb.

13—6

Valva broad, rounded, deeply incurved towards the base of the outer margin; costa incurved. Labides long, narrow, curved; papillæ at base appressed. Uncus hardly produced, short, wide, rounded, indent in centre. Anus decorated, base hardened chitine, upper edge set with long spines. Ædœagus tapered. Cornutus a long shaft, digitate at the apex, the number of spines varying from five to ten. Anellus double lobed heavily spined at the apex. Saccus small, pointed. Coremata long pencils of hair springing from either side of the seventh and eighth segments.

Ostium wide. Ductus bursæ short. Bursa elongate, cylindrical, irregularly spined in upper half; delicately scobinate below.

Eulype hastata, L.

7—3

Valvula broad, rounded; costa short, thickened; sacculus strong, produced, pointed. Labides long, lobed, united by a delicate membrane, with a central thickened rod. Uncus short, strong. *Ædœagus* stout, spined below the orifice. Cornuti usually two strong, bulbed spines with corrugated base, or there may be three or even a single spine. Manica delicately scobinate. Juxta bilobed, centre produced, lunate. Saccus small, rounded. Coremata on ninth segment.

Ostium strong. Bursa spined, semi-ovate patch of strong spines in thickened part. Signum a scobinate pointed patch.

Certata, Hb.

4—3

Valvula rounded; sacculus extended, tapered, curved. Labides long, united by a delicate membrane with a central thickened rod. Uncus short, strong. *Ædœagus* wider above. Cornuti four very heavy, long, spines. Manica delicately scobinate. Juxta broad above, narrow below, thickened centrally. Saccus very small. Coremata on ninth segment.

Ostium strong. Ductus bursæ short. Bursa with scobinate ridge above, and thickened on one side, having a triangular patch of spines where it joins the thinner membrane. Signum patch of long, slender, spines.

Undulata, L.

4—3

Valvula rounded; costa reduced; sacculus extended, branching into a lobe, and a long tapered arm. Labides long, united by a delicate membrane with a central rod. Uncus short, strong. *Ædœagus* orifice scobinate. Manica with strong, obtuse, spines. Juxta folded. Saccus small. Coremata long, extensile, on ninth segment.

Ostium strong. Ductus bursæ ovate, with ridge of spines. Bursa rounded. Signum arcuate, scobinate.

Sagittata, Fb.

7—3

This species seems to have always been included in the genus *Cidaria*, to which, however, it has little affinity. Its position appears to be close to this group, so that I place it here temporarily under the generic name *Eulype*.

Valvula short; costa thickened and produced beyond valvula; sacculus produced in a rounded prominence. Labides long, narrow, curved, hairy. Uncus not produced; pads raised, hairy. *Ædœagus* short, stout. Vesica squamous. Manica finely spined. Saccus broadly rounded.

Ostium encircled. Signum rounded, deep, scobinate.

Melanthiinae.

Valva well developed, complex. Labides. Uncus often weak, and not produced. Not a compact group, there being a considerable difference in the coremata.

Euphyia picata, Hb.

5—3

Valvula elongate; costa produced, foot shaped, heel uppermost. Uncus rounded. *Ædœagus* simple. Cornuti long band of spines. Manica strongly spined. Anellus slightly lobed. Saccus pointed, with a rounded, spatulate plate below. Coremata on seventh segment.

Ostium wide, strong. Signum discoid, scobinate, strong.

Unangulata, Haw.

6—3

Valvula rounded, emarginate and projecting towards the apex; costa produced, foot shaped, toe uppermost. Uncus rounded, indent. *Ædœagus* with rounded, spatulate plate at base. Manica strongly spined. Anellus slightly lobed. Saccus deep, rounded. Coremata on seventh segment.

Ostium wide, strong. Signum discoid, scobinate, slightly variable in size.

Melanthia procellata, Fb.

12—4

Valva rounded; costa incurved, thickened; sacculus extended in blunt point. Labides similar to *Eupithecia*

without papillæ. Uncus weak, peaked, spined. Ædœagus stout. Cristæ raised papillæ at the base of the juxta. Saccus large, deep, rounded.

Ostium wide, encircled. Ductus bursæ wide, crinkled, spined. Bursa spined. Signum ovate, scobinate.

Coenocalphe tersata, Hb.

3—3

Valva rounded; costa thickened; sacculus extended, tip tapered, curved. Labides similar to *Eupithecia*; papilla hairy. Uncus weak, not produced. Ædœagus narrow, branching towards the orifice into a blunt, tapered, point, base wide, squared. Manica scobinate. Saccus tapered, broad. Coremata on ninth segment.

Ostium wide. Ductus bursæ thickened. Bursa, upper part with ctenoid spines, lower half instrate.

Vitalbata, Hb.

3—3

Valva rounded; costa produced, slightly scobinate; sacculus produced, ending in a broad, deeply emarginate, plate. Labides similar to *Eupithecia*. Ædœagus, spoon shaped piece at orifice, base squared. Manica with strong, obtuse spines. Juxta broad. Saccus broad, rounded. Coremata on ninth segment.

Ostium broad. Ductus bursæ with ctenoid ridges of spines. Bursa instrate, upper spines strong.

Aquata, Hb.

2—2

This species is included on the strength of J. W. Tutt's article "Entomologist's record," Vol. xii., p. 35, 1900.

Valva rounded; costa thickened with hairy, triangular papillæ midway; costal fold terminates in free pointed plate; sacculus extended, ending in a peaked plate. Labides similar to *Eupithecia*. Ædœagus short, squared at base. Cornutus one broad spine, emitting a smaller one from the base. Vesica with long band of minute spines. Manica scobinate ventrally, squamous dorsally. Juxta bifid. Saccus broad, shallow. Coremata on ninth segment.

Ostium with broad plate. Ductus bursæ with long ctenoid ridge of spines. Bursa instrate.

Lapidata, Hb.

3—3

Valva very complex; valvula rounded; costa a free arm, pointed; harpe an ovate plate; sacculus produced in long hairy arm. Labides. Uncus weak; pads raised, hairy. Ædœagus squared below. Juxta broad. Saccus very large, pointed.

Ostium with operculum. Bursa small. Signa, several very stout spines.

Philereminae.

The immense valva seem to place these two species in a group by themselves, but the labides show them to be closely connected with the foregoing groups.

Philereme vetulata, Schiff.

5—3

Valva very large, ovate; costa reduced; sacculus extended, curved, spatulate. Labides fused into an angular plate. Uncus long, slender, tip hamulate. Subscaphium very long, not decorated. Ædœagus with row of short spines at orifice. Juxta wide. Saccus rounded. Coremata on ninth segment.

Ostium scobinate. Ductus bursæ thickened. Bursa simple.

Rhamnata, Schiff.

4—2

Valva very large, ovate; costa thickened; sacculus not produced. Labides narrow, tip hooked. Uncus long, slender, widened below, tip hamulate. Subscaphium very long, not decorated. Ædœagus bulbed above. Cornuti curved band. Saccus rounded. Coremata on ninth segment.

Ovipositor retractile. Ostium weak. Ductus bursæ weak. Bursa simple.

Lobophorinæ.

Valva emarginate or pointed. Tegumen dorsally clothed with long, flattened scales, these may represent coremata of the ninth segment.

Triphosa dubitata, L. 3—3

Valva rounded; costal arm produced, rounded; sacculus extended, branched. Labides short, without lengthy rods, rounded, hairy. Uncus long, pointed; pads hairy. Ædœagus simple. Manica thickly and minutely spined. Juxta broad. Cristæ hairs numerous. Saccus full, rounded.

Ostium strong. Ductus bursæ long, fluted. Bursa simple.

Berberata, Schiff. 6—3

This species which is usually included in the genus *Anticlea* seems to be distantly related to *T. dubitata*; as it can no longer be included in the genus *Anticlea*, I have temporarily placed it here.

Valva rounded; costa gibbose before the tip; sacculus extended in a rounded, spatulate plate. Labides short. Uncus slender. Ædœagus simple. Vesica spined. Cornuti two strong bands of toothed spines. Saccus pointed.

Ostium strong. Signum arcuate, scobinate.

Lobophora halterata, Hufn. 7—6

Valvula curved, sharply pointed; costa a long, spined arm. Uncus broad, tapered. Ædœagus narrow. Cornuti long band of short spines. Manica spined. Anellus chitinised, tubular. Juxta rounded. Saccus bluntly pointed.

Ostium wide, on either side there is a deep pocket, set in the skin of the seventh segment. Ductus bursæ long. Bursa cylindrical, ovate. Signa two large, ovate, patches of short, sharp spines.

Sexalisata, Hb. 6—3

Valvula curved, sharply pointed; costa a long, spined arm. Uncus broad, tapered, curved. Ædœagus narrow. Cornuti

long band of short spines, which bends over above. Manica without spines. Anellus tubular. Juxta rounded. Saccus rounded.

Ostium wide. Ductus bursæ fairly long. Bursa ovate. Signa two large ovate patches of short, sharp, spines.

Acasis viretata, Hb.

5—3

Valvula short; costa produced beyond the valvula; sacculus extended into a broad curved arm. Uncus narrow, curved, tapered. Ædœagus pointed. Cornuti band of short spines. Manica set with thick, short, spines. On either side of the juxta, at the base of the valvæ, is a patch of long slender spines. Saccus rounded.

Ostium with plate, strong. Ductus bursæ short. Bursa subglobular, with broad, circular band of short spines before the extremity.

Nothopteryx carpinata, Bork.

8—5

Valva deeply emarginate above; costa thickened; sacculus extended in a narrow curved arm. Uncus long, slender. Ædœagus tapered, scobinate before orifice. Manica finely spined. Saccus rounded.

Ostium wide. Ductus bursæ very long, ctenoid. Bursa globular, instrate.

Polycommata, Hb.

4—3

Valva deeply emarginate above; costa thickened; sacculus extended in long arm. Uncus long, narrow, slender. Ædœagus short, scobinate before orifice. Manica finely spined. Saccus broad, rounded.

Ostium wide. Ductus bursæ long, ctenoid. Bursa globular, instrate.

Entephrinæ.

Valva rounded; costa thickened. Manica thickly and minutely spined. Anellus lobes or calcar. A clearly separated group, yet unmistakably closely allied.

Entephria multistrigaria, Haw. 3—3

Valva rounded; costa strong. Uncus narrow, tapered. Ædœagus short, spined. Manica extended, thickly spined. Anellus lobes rounded. Juxta bearing, at either side, a papilla set with spines. Saccus rounded.

Ostium weak, encircled. Signum elongate, scobinate.

Cæsiata, Lang. 6—3

Valva rounded; costa short, strong, produced at tip. Uncus long, tapered. Ædœagus short. Anellus lobes small, hairy. Juxta narrow below and deeply cleft. Calcar produced in a long slender spined arm. Saccus large, rounded.

Ostium partially encircled. Signum elongate, scobinate.

Flavicinctata, Hb. 7—3

Valva rounded; costa widens out in a broad, flattened, peaked plate. Uncus long, slender. Ædœagus pointed. Manica finely spined. Anellus lobes extended on the costal fold. Calcar produced into long hairy arm. Saccus rounded.

Ostium weak. Ductus bursæ thickened. Signum elongate, scobinate.

Olivata, Bork. 6—3

Valva wide, short, rounded; a transparent space between the costa and centre of valva. Uncus long, tapered. Ædœagus stout. Cornuti two patches of spines, one fine, the other strong. Manica finely spined. Anellus lobes short. Saccus rounded.

Ostium weak. Signum irregularly ovate, scobinate.

Amœbe pectinataria, Gn., viridaria Fb. 5—3

Valva rounded; costa curved. Uncus very short, widely spread. Ædœagus curved. Cornuti two patches, one long, spines strong; the other shorter, spines weaker. Manica spined. Anellus lobes long. Juxta rounded,

extended above, a minute papilla on either side. Saccus rounded.

Ostium weak, encircled. Ductus bursæ very long, ribbed, scobinate towards the bursa. Signum a number of irregular spines in band.

Cidariinæ.

A rather compact group, composed of a few closely allied genera. The large simple valva, and the extended anellus lobes, often set with clavate scales, form the most distinctive characters. Manica finely spined. The signum, when it occurs, is of small size, scobinate.

Lampropteryx.

In this genus the tegumen clearly shows an articulation connecting the ninth and tenth segments by a hinge. The base of the upper half of the tegumen ring is constricted and produced in a pair of diverging lobes, these fit into a pair of patellæ, developed from the transtilla, which are united centrally in *suffumata* by a little orb or ring. Manica finely spined. Pads of uncus spined.

Salicata, Hb.

8—3

Valva long, narrow, rounded. Uncus long; pads with few hairs. Ædœagus sigmoid. Anellus lobes long, curved, tip hairy, surmounted by a single socketed, hamulate, spine. Saccus rounded.

Ostium encircled. Ductus bursæ scobinate. Signum raised, scobinate.

Suffumata, Hb.

6—4

Valva long, narrow; costa thickened. Uncus long, slender; pads hairy. Ædœagus short. Cornuti two long scobinate bands. Anellus lobes long, clothed with long hair at the head and base, and a single long, falcate, spatulate spine, terminating in a whip-like hair. Saccus rounded.

Ostium encircled. Ductus bursæ very long. Bursa subglobular, pannicular.

Ocellata, L.

8—3

Valva long, narrow; costa thickened. Uncus long, slender; pads of three or four hairs. *Ædœagus* sigmoid, orifice scobinate in ridges. Anellus lobes long, rounded, set with short hairs and a single heavy, curved spine. Saccus rounded.

Ostium broad. Signum a long, scobinate, wavy band, widening at one end.

Lygris.

In this genus the anellus lobes are long and set with long clavate scales. The cornuti in each case form a double band of teeth. Manica finely spined. Pads of uncus not spined.

Prunata, L.

5—3

Valva peaked, produced at anal angle. Uncus slender. *Ædœagus* stout, large. Cornuti large, heavy mass of long, strong spines. Anellus lobes long, rounded, head clothed with long, clavate scales. Saccus rounded.

Ostium wide. Bursa simple, upper half thicker chitine.

Testata, L.

8—3

Valva peaked; costa thickened. Uncus long. *Ædœagus* stout. Cornuti two bands of spines. Anellus lobes long, head clothed with long, clavate scales. Saccus rounded.

Ostium weak. Signum rounded, scobinate, deep.

Populata, L.

4—2

Valva peaked; costa thickened. Uncus long, slender. *Ædœagus* stout, short. Cornuti two bands of spines. Anellus lobes long, clothed above with clavate scales. Saccus wide, rounded.

Ostium weak. Signum rounded, scobinate, deep.

Associata, Bork.

3—4

Valva rounded, produced and hooked at anal angle; costa thickened. Uncus long. *Ædœagus* narrow. Cornuti two

patches of fine, short, spines. Manica finely spined, bilobed. Anellus lobes long, rounded, set with fine hairs. Saccus bilobed, centre indent.

Ostium well developed, scobinate. Ductus bursæ thickened. Bursa subglobular, upper half thickened, without signum.

Pyraliata, Fb.

Dotata, L.

5—3

Valva incurved along the costa, forming a projecting point. Uncus long, slender. Ædœagus simple. Cornuti bands of short spines. Vesica scobinate. Anellus lobes long, stout, wider above, set with long, curved, clavate scales. Saccus broad, trilobed.

Ostium weak. Signum rounded, scobinate.

Cidaria.

Valva broad, rounded. Pads of uncus not spined. Anellus lobes generally rounded, often set with broad, spatulate scales. Manica finely spined.

Siterata, Hufn.

6—3

Valva broadly rounded. Tegumen long, narrow. Uncus long, slender. Ædœagus narrow. Cornuti patch of short, slender spines. Anellus lobes peaked, set with fifteen or sixteen spatulate spines, tips knobbed. Saccus squared, slightly lobed at either side.

Ostium weak. Bursa subglobular. Signum long, irregular band of small scobinations.

Miata, L.

3—2

Valva rounded. Uncus narrow. Ædœagus short, stout. Cornuti large patch of short spines. Anellus lobes peaked, fifteen of sixteen falcate spatulate spines, tips pointed. Saccus slightly lobed at either side.

Ostium weak. Bursa subglobular, without signum.

Immanata, Haw.

23—3

Valva rounded; costa not thickened. Uncus narrow. Ædœagus stout. Cornuti very large patch of stout spines. Anellus lobes rounded, spines curved. Saccus broad, centre indent.

Ostium weak. Bursa elongate, upper half ridged. Signum ovate, entirely scobinate.

Truncata, Hufn.

19—4

Valva rounded; costa not thickened. Uncus narrow. Ædœagus stout. Cornuti narrow patch of fine spines. Anellus lobes rounded, spines curved. Saccus broad, centre indent.

Ostium weak. Bursa elongate, upper half ridged. Signum ovate, edge scobinate.

Concinnata, Steph.

8—1

Valva rounded; costa slightly thickened. Uncus rather stout. Ædœagus stout. Cornuti large patch of long, fine, spines. Anellus lobes rounded, spines strong. Saccus broad, centre indent.

Ostium weak. Bursa elongate, upper half ridged. Signum ovate, centre free from scobinations.

Silacea, Hb.

4—3

Valva peaked; costa not thickened. Uncus short. Ædœagus wide, short. Cornuti band of short, narrow spines. Anellus lobes rounded, hairs short. Saccus large, bluntly pointed. Coremata on ninth segment.

Ostium weak. Signum long, irregular, scobinate.

Reticulata, Fb.

3—2

Valva peaked; costa thickened. Uncus short, tapered. Ædœagus stout. Anellus lobes short, rounded, with short hairs. Saccus rounded.

Ostium weak. Signum rounded, scobinate.

Fulvata, Forst.

7—3

Valva broadly rounded; costa not thickened. Uncus fairly stout. Ædœagus curved, simple. Anellus lobes short, stout, clothed with strong spines. Saccus trilobed.

Ostium weak. Signum scobinate.

Plemyria bicolorata, Hufn.

7—4

Valva rounded; costa not thickened. Uncus tapered, tip hooked. Ædœagus stout. Cornuti short, many in patch. Anellus lobes peaked, spined along the edge. Saccus indent at base.

Ostium weak. Bursa subglobular, simple.

Corylata, Thnb.

5—4

Valva rounded; costa incurved, tip pointed. Uncus slender, tip rugose. Ædœagus large, stout. Vesica scobinate. Manica finely spined. Anellus lobes long, set with long fine hair along the edge. Saccus broad, rounded.

Ostium very wide. Bursa elongate, with patch of weak scobinations. Signum an angular plate.

Pelurga comitata, Schiff.

5—5

Valva rounded; costa produced, pointed. Uncus long, hardly pointed, few hairs at base. Ædœagus stout. Cornuti large patch of spines. Manica finely spined. Anellus lobes rounded, set with hairs. Juxta wide. Saccus rounded.

Ostium strong. Ductus bursæ thickened. Bursa subglobular. Signum long, irregularly scobinate band.

Therinae.

Valvula rounded; costa well developed; sacculus extended. Ædœagus ctenoid at the orifice. Anellus lobes strong, set with spatulate scales. *Firmata* is closely allied, the ctenoid spines on the ædœagus are, apparently in this species, removed to the vesica.

Thera juniperata, L.

5—3

Valva rounded; costa thickened, emarginate, forming a projection; sacculus extended, strong. Uncus slender.

Ædœagus surmounted by two, sometimes three strong thorns and some smaller ones. Anellus lobes spined. Saccus pointed.

Ostium with circular plate. Bursa small.

Cognata, Thnb. Simulata, Hb. 6—4

Valva rounded; costa thickened, gibbose at apex; sacculus extended, strong. Uncus slender, without pads. Ædœagus encircled by many slender, strong, thorns. Anellus lobes set with spatulate hairs, tips hamulate. Saccus pointed.

Ostium strong with bilobed, squamous plate. Bursa small.

Obeliscata. 23—4

Valva rounded; costa thickened, tip slightly produced, geniculate centrally; sacculus extended, spatulate, edge sometimes serrate, sometimes spined. Uncus slender, without pads. Ædœagus narrow, surmounted by ten to twelve strong thorns. Anellus lobes set with broad, curved, spatulate, hairs. Saccus pointed.

Ostium with bilobed plate. Bursa small.

Variata, Schiff. 10—3

Valva rounded; costa thickened, tip slightly produced, geniculate centrally; sacculus extended, edge jagged, point sharp, curved. Uncus slender. Ædœagus narrow, surmounted by a double row of many strong thorns. Anellus lobes set with curved, sharp, spatulate hairs. Saccus pointed.

Ostium with bilobed plate. Bursa small.

Firmata, Hb. 5—3

Although closely allied to four preceding species, *firmata* seems to form a separate genus.

Valva rounded; costa thickened, acutely pointed at apex; sacculus extended, strong, pointed. Ædœagus plain. Cornuti several strong thorns. Juxta squared. Cristæ a

single spine at either side. Anellus lobes set with fine, spatulate hairs. Saccus squared.

Ostium without plate, weak. Bursa small.

Hydriomena ruberata, *Frr.*

8—4

Valva rounded; costa thickened. Transtilla separated, forming slender arms set with few hairs. Uncus bilobed, wider above. Ædœagus simple. Cornuti many in band. Manica finely spined. Anellus lobes are represented by a raised fold arising near the base of the valvula, from which spring a number of clavate scales, also a slender spatulate spine; below this is a papilla emitting a curved spine. Saccus rounded.

Ostium weak. Ductus bursæ strong. Bursa hardened on one-third obliquely, and lobed.

Autumnalis, *Ström.* **Trifasciata**, *Bork.* 9—4

Valva rounded; costa thickened. Transtilla separate, forming slender arms set with few hairs. Uncus bilobed, narrower above. Ædœagus simple. Cornuti many, in band. Manica finely spined. Anellus lobes represented by a raised fold arising near the base of the valvula, from which spring a number of clavate scales, also a strong spatulate spine; below this is a papilla emitting a strong curved hook. Saccus rounded.

Ostium weak. Ductus bursæ strong. Bursa hardened on one-third not obliquely, and lobed.

Furcata, *Thunb.* **Sordidata**, *Fb.*

18—6

Valva rounded; costa thickened, produced, tip pointed. Transtilla separate, forming strong naked horns, dentate at base. Uncus spatulate, widest above, apex deeply emarginate. Ædœagus thickly set with heavy spines at the orifice. Manica spined. Cristæ hairs absent. Anellus lobes represented by a raised fold arising near the base of the valvula, from which spring a number of pointed hairs, also from a separate base springs an irregular, curved spine, considerably widened towards the tip; below this

is a papilla, emitting a strong geniculate spine, tip hamulate. Saccus bilobed.

Ovipositor extensile. Ostium weak. Ductus bursæ short, with thickened patch on either side.

Epirrhoinæ.

Valvula full, like a bag; costa produced, pointed. Calcar usually short, tongue shaped, clothed with specialised scales. Coremata on seventh segment spiracled, very elaborate, bearing pencils of hair and large tufts of scales. Bursa contains a thickened, chitinous tube. Signum discoid, scobinate.

Epirrhoe tristata, L.

5—3

Valva with projecting lobe at anal angle; costa produced beyond valva, pointed; harpe a circular, raised, spined pad. Transtilla separate, peaked, sparsely spined. Uncus tapered. Ædæagus surmounted by a sharp, broad, hook of hardened chitine. Calcar broad, hairy before the tip, which is pitted with transparent, circular gemmæ of varying size, possibly glands. Saccus pointed. Coremata on seventh segment spiracled, very elaborate. (Drawn too high on the figure.)

Ostium encircled. Ductus bursæ thickened. Bursa with thickened ridge. Signum scobinate, deep.

Rivata, Hb.

9—3

Valva with projecting lobe at anal angle; harpe raised, rounded, clothed with spines; below this nearer the base is a long ridge of spines; costa greatly arched, produced beyond valva, pointed. Transtilla peaked, hairy. Uncus long, slender. Ædæagus surmounted by a sharp, pointed, broad, flanged, hook of hardened chitine. Calcar broad, set with clavate scales and tipped with a falcate hook. Saccus broad, squared. Coremata on seventh segment spiracled, very elaborate.

Ostium broad, squamous. Ductus bursæ pitted. Bursa with thickened, scobinate, ridge. Signum deep.

Alternata, *Müll.*

Sociata, *Bork.*

15—4

Valva with projecting lobe at anal angle; harpe raised, rounded, clothed with spines; below this nearer the base is a long ridge of spines; costa hardly arched, produced beyond valva, pointed. Transtilla peaked, hairy. Uncus long, slender. *Ædœagus* surmounted by a sharp, pointed, broad, flanged, hook of hardened chitine. Calcar broad, set with clavate scales, and tipped with a falcate hook. Saccus broad, squared. Coremata on seventh segment spiracled, very elaborate.

Ostium wide, strong, squamous. Ductus bursæ fretted. Bursa with thickened, scobinate, ridge. Signum scobinate, deep.

Galiata, *Hb.*

5—3

Valvula rounded; costa arched, produced beyond valvula, pointed; harpe raised, spined; below this is a raised papilla emitting curved spines. Transtilla lobed, hairy. Uncus tapered, slender. *Ædœagus* short. Manica scobinate. Calcar broad, set with elongate, pointed, clavate scales, and tipped with a falcate hook. Saccus rounded. Coremata on seventh segment, spiracled, very elaborate.

Ostium broad. Ductus bursæ long. Bursa with thickened ridge. Signum scobinate.

Rubidata, *Fb.*

6—3

Valvula reduced; costa broadened out and extended beyond the valvula in a strong point. Transtilla separated, two hairy papillæ. Uncus slender. *Ædœagus* stout. Vesica with thickened folds. Cornuti short, stout, in band. Manica spined. Calcar short, rounded, head clothed with clavate scales. Saccus pointed. Coremata extensile on seventh segment, spiracled.

Ostium broad. Ductus bursæ with long, finely spined, ridge. Signum rounded, deep, scobinate.

Cucullata, Hufn.

7—5

Valvula indent on outer margin; costa broadened out and extended beyond valvula, dentate on its inner edge, dorsally. Transtilla separated, two hairy papillæ. Uncus slender. Ædœagus stout. Vesica with thickened folds. Manica coarsely spined. Calcar geniculate, head clothed with broad, spatulate, clavate scales. Saccus pointed. Coremata extensile on seventh segment, spiracled.

Ostium broad, strong. Ductus bursæ strong. Bursa with thickened, scobinate ridge. Signum rounded, deep, scobinate.

Larentia cervinata, Schiff.

7—5

Valvula rounded; costa strongly curved, produced beyond valvula, pointed. Transtilla lobed, hairy. Uncus tapered, pointed. Ædœagus rather long, curved. Cornuti long, rugose band. Manica finely spined. Anellus lobes represented by a raised peduncle on the costal fold, emitting a strong spine, and numerous long, curved, thickened hairs. Calcar wide above, and produced in a long curved groove, sparsely clothed with hair. Saccus rounded, produced upwards centrally.

Ostium strong. Ductus bursæ short. Bursa sub-globular. Signum irregular, strong, thickly scobinate.

Mesoleuca albicillata, L.

6—4

Valvula rounded; costa produced, pointed. Transtilla peaked, scobinate. Uncus long, slender; pads hairy. Ædœagus sigmoid, scobinate above. Anellus lobes represented by three very beautiful, finely scobinate, tapered, curved spines, springing from a projecting fold near the base of the valvula. Calcar curved, head set with barrel-shaped gemmæ. Saccus trilobed.

Ovipositor quadrilobed. Ostium broad. Signum pyriform, scobinate.

Xanthorhoinæ.

Valvula reduced; costa strongly developed. Calcar generally long, with geniculate head. Manica heavily clothed with strong spines. Signum elongate, pyriform, band of distinct spines, overlapping.

Xanthorhoe montanata, Bork. 8—5

Valvula short, very narrow; costa greatly extended, free, curved, pointed. Transtilla peaked, hairy. Uncus long, slender, tapered. Ædœagus simple. Manica set with broad, curved, short spines. Calcar geniculate, head set with short, curved hair. Saccus pointed.

Ostium wide, rugose. Ductus bursæ with two patches of spines. Bursa subglobular. Signum band of short spines.

Fluctuata, L. 8—4

Valvula peaked, small; costa not reaching tip. Transtilla peaked, hairy. Uncus long, broader towards centre. Ædœagus simple. Cornuti about four or five strong spines. Manica scobinate. Anellus with small canaliculus. Calcar geniculate, head clothed with curved hairs. Saccus pointed. Coremata on seventh segment, spiracled.

Ostium wide, strong. Signum long, spined band.

Ferrugata, Clerck. 20—4

Valvula reduced, peaked; costa thickened, produced, emarginate, pointed. Transtilla lobed, hairy. Tegumen hooded. Uncus falcate. Subscaphium a broad, tapered plate, toothed at the extremity. Ædœagus slender, with four or five stout spines at the orifice. Manica heavily spined. Calcar geniculate, hairy. Saccus narrow, pointed. Coremata extensile, on seventh segment, spiracled.

Ostium strong, with scobinate operculum. A small sac on either side of the ostium on the tergite. Signum an asymmetrical patch of long, slender spines.

Unidentaria, Haw.

19—4

Valvula narrow, peaked; costa thickened, produced, emarginate, dentate towards the tip. Transtilla lobed, hairy. Tegumen hooded. Uncus falcate. Subscaphium a broad plate, extremity toothed. Ædœagus slender, with three or four spines at the orifice. Manica spined. Calcar geniculate, hairy. Saccus pointed. Coremata extensile, on seventh segment, spiracled.

Ostium strong, with scobinate operculum. Signum a fairly symmetrical patch of slender spines.

Designata, Hufn.

8—5

Valvula rounded; costa thickened and produced into curved point. Transtilla lobed, hairy. Uncus long, slender. Ædœagus wide. Cornuti three sets, a patch and a row of spines on the upper part of the vesica, and a thick patch at the orifice. Manica spined. Calcar geniculate, hairy. Saccus narrow, with circular plate. Coremata extensile on seventh segment, spiracled.

Ostium weak. Ductus bursæ and upper part of bursa thickened, lower half scobinate. Bursa globular.

Munitata, Hb.

3—2

Valvula rounded, indent on the outer margin; costa thickened, considerably pointed below valva. Transtilla lobed, hairy. Uncus slender. Ædœagus scobinate at orifice. Cornuti about six or seven short spines. Manica strongly spined, also with two long, stout, spines. Calcar geniculate, head clothed with hair. Saccus pointed, the point extended. Coremata on seventh segment, spiracled.

Ostium with wide plate. Bursa simple, subglobular.

Polygrammata, Bork.

1—1

Valvula emarginate above; costa produced, pointed, projecting from midway is an angular fold, spined; sacculus produced, pointed. Uncus long, hastate. Ædœagus almost sigmoid, at the orifice are two small spines, that

do not appear to be cornuti. Calcar produced, scobinate. Saccus rounded, with basal lobe.

Ostium wide, thickened. Bursa simple.

Orthonama vittata, *Bork.*

10—4

Valvula small, squared; costa a free, pointed arm, transversely rimose; sacculus free, rounded. Transtilla raised papillæ, hairy. Ædœagus long, with rounded plate at the base. (This formation also occurs in *Xanthorhæ designata*.) Cornuti ovate patch of spines. Manica heavily scobinate and dentate. Juxta lobed. Saccus long, tapered.

Ostium very wide, with operculum. Bursa simple.

Ochyria quadrifasciaria, *Clerck.*

6—4

Valvula very small, rounded; costa short, thickly spined. Transtilla lobed, broad, hairy. Uncus slender. Ædœagus short, stout. Cornuti a number of long, slender, spines. Manica finely spined. Calcar rounded, hairy, producing centrally a thin, rounded, projecting plate. Saccus bluntly pointed. Coremata large, extensile, on seventh segment, spiracled, emitting from the upper part two strong, curved, spatulate, spines.

Ostium weak. Ductus bursæ narrow. Signum irregular. scobinate.

Anticlea nigrofasciaria, *Göze.*

6—4

Valvula rounded; costa thickened, peaked before the tip, which is produced and bluntly pointed. Transtilla rounded, hairy. Uncus long, slender; pads raised, hairy. Ædœagus sigmoid. Cornutus a rimose plate. Manica finely spined. Calcar very tapered, spined with short, hamulate, spines. Saccus rounded. Coremata absent.

Ostium broad. Ductus bursæ thickened. Signum rounded, deep, scobinate.

Earophila badiata, *Hb.*

6—4

Valvula rounded; costa thickened, and produced in a point beyond valva. Transtilla rounded, hairy. Uncus long,

slender; pads raised, hairy. *Ædœagus* stout. *Cornuti* numerous, long, thin in patch, bases corrugated. *Manica* finely spined. *Calcar* long, rounded, spined with hamulate spines. *Saccus* rounded. *Coremata* absent.

Ostium broad. *Ductus bursæ* thickened. *Signa* two, one small, pointed, scobinate; one rounded, with long spines.

***Camptogramma bilineata*, L.** 6—5

Valvula practically absent; *costa* a strong valve-like appendage, heavily spined at the rounded apex, which is free. *Sacculus* small, widely separated. *Transtilla* lobed, hairy. *Uncus* long, slender, tapered, base large, bulbed. *Ædœagus* slender, lipped at orifice. *Manica* set with short, heavy, spines. *Calcar* broad, tapered, curved, spined (tongue shaped). *Saccus* small, pointed. *Coremata* extensile on seventh segment, spiracled.

Ostium a series of skin folds. *Bursa* very small.

***Percnoptilota fluviata*, Hb.** 6—3

Valvula very small; *costa* a wide, ovate plate, heavily spined at the rounded apex, which is free; *sacculus* much reduced. *Transtilla* rounded, hairy. *Uncus* slender. *Ædœagus* narrow, lipped at orifice. *Manica* set with long spines. *Calcar* a thickened, chitinous, rounded plate, not hairy. *Saccus* broad, deep. *Coremata* extensile on seventh segment, spiracled.

Ostium narrow. *Bursa* simple.

***Mesotype virgata*, Rott.** 4—3

Valvula rounded; *costa* complex, scobinate above; *sacculus* extended, terminating in hairy *papillæ*. *Transtilla* divided, produced in two dentate curved arms. *Uncus* bifurcate with long, slender, central rod. *Ædœagus* stout. *Cornuti* about eight or nine long, slender spines. *Manica* with large spines. *Anellus* lobes rounded, hairy. *Saccus* rounded. *Coremata* on seventh segment, spiracled.

Ostium encircled. *Bursa* pannicular.

Ortholithinæ.

Valva very complex. Uncus is weak, with raised hairy pads. The principle features are the highly developed canaliculus, and the modification of the costa, which assumes the form of a broad plate. Coremata on seventh segment. The signum is discoid, scobinate, similar to that found in the *Cidariinæ*.

Ortholitha plumbaria, Fb.

5—4

Valvula rounded; costa produced, pointed; sacculus strong, produced, pointed. Uncus weak, pointed; pads raised, spined. Ædœagus with strong, scobinate cornutus. Manica heavily spined with short spines. Anellus lobes stout, hairy. Cristæ produced into hairy papillæ. Canaliculus a narrow curved groove. Saccus rounded.

Ostium wide. Ductus bursæ large, thickened, with strong hooked tube, spining strong. Bursa rounded.

Limitaria, Scop.

6—4

Valvula reduced, peaked; costa very short, set with ovate patch of spines; sacculus greatly extended, fused to central part of valva, terminating in a rounded plate of thin chitine. Uncus short, soft; pads raised, spiny. Ædœagus large, stout. Cornutus bulbed. Manica set with very strong, curved spines. Anellus lobes stout, hairy. Cristæ produced into hairy papillæ. Canaliculus a long, curved, groove. Saccus rounded. Coremata on seventh segment, spiracled.

Ostium wide. Ductus bursæ short, thickened, with a hook. Bursa thickened above. Signum ovate, scobinate.

Bipunctaria, Schiff.

9—5

Valvula reduced, rounded; costa very short, broad, produced, pointed; sacculus produced beyond the valva, pointed. Uncus weak, pointed; pads raised, hairy. Ædœagus large, stout. Cornutus long, dentate. Manica heavily spined. Anellus lobes separated into two arms,

clothed with long, clavate, scales. Canaliculus a long groove. Saccus rounded. Coremata on seventh segment.

Ostium large. Ductus bursæ short, with a hook. Bursa thickened in parts. Signum ovate, scobinate.

Chesiadinæ.

The remaining six species appear to form a distinct group, in which the chief characteristic is the acicular *Ædœagus*. The peculiar form of the female connects *plagiata* and *paludata* together, although the male organs show a great divergence. *Spartiata* and *rufata* are closely allied in both sexes. The formation of the canaliculus in these latter species is peculiar. It possesses at either side a hollow raised protuberance, which no doubt acts as a guide for the slender *ædœagus*.

Anaitis plagiata, L.

3—3

Valva very large, elongate, bifurcate at apex. Transtilla separated, naked, tips curled, rounded. Uncus tapered, very broad at base. *Ædœagus* acicular, sigmoid. Ductus ejaculatorius scobinate. Anellus lobes peaked. Juxta strong. Saccus broad, deep, rounded.

Ostium narrow. Ductus bursæ long, thickened, bifurcate, at the junction with the bursa.

(Carsia) paludata, Thunb.

5—4

Valvula short; costa broad, emarginate, produced in pointed arm from the centre of the valva; sacculus produced, very weak. Transtilla lobed, hairy. Uncus clavate; pads hairy. *Ædœagus* acicular, sigmoid. Ductus ejaculatorius broad, ovate, scobinate. Anellus lobes produced, hairy. Cristæ forming papillæ at the base of the juxta. Saccus very long, pointed.

Ostium small, weak. Ductus bursæ thickened and bifurcate at the junction with the bursa.

Chesias spartiata, Fues.

6—4

Valva rounded; costa incurved, pointed, not produced. Uncus long, widest towards centre; pads with three or four

hairs. *Ædœagus* acicular. Cornuti short band of very fine spines. Anellus lobes peaked, hairy. Canaliculus a long groove, with a pair of raised guides. Saccus bluntly pointed.

Ostium narrow. Bursa subglobular, pannicular, spines large.

Rufata, Fb.

6—4

Valva rounded; costa incurved, pointed, but not produced. Uncus long, widest towards centre. *Ædœagus* acicular. Cornuti long band of very fine spines. Anellus lobes peaked, hairy. Canaliculus a long groove, with a pair of guides. Saccus long, pointed.

Ostium weak. Ductus very long, lobed before reaching the bursa. Bursa instrate, spines very large and wide.

Lithostege griseata, Schiff.

4—4

Valvula rounded; costa fused to centre of valva, where it is toothed and produced in a long spined costal arm. Uncus short; pads hairy. *Ædœagus* acicular. Anellus lobes peaked, hairy. Juxta strong. Canaliculus hairy ridges at base. Saccus rounded.

Ostium wide. Bursa pannicular.

Odezia atrata, Dup.

14—5

Valvula very short; costa broad, produced; sacculus produced; harpe a raised papilla. Uncus short, stout, tapered, deeply set in the tegumen. *Ædœagus* acicular, with toothed plate before the orifice. Anellus lobes small, hairy. Saccus pointed.

Ostium wide. Ductus bursæ short. Bursa subglobular.

GLOSSARY.

The greater number of the terms used in this volume are taken from the following works:—"Explanation of terms used in Entomology," by John B. Smith, Sc.D., 1906 (abbreviated J.B.S.); "The Dictionary of Entomology," by N. K. Jardine, F.E.S. (Jar.); "Genitalia of British Noctuidæ," by F. N. Pierce, F.E.S. (Noc.). The remaining terms are those either used for the first time, or with a special meaning in this work (P.).

- Acicular:** needle shaped. J.B.S.
- Ædœagus:** (Gr. *aidoia*, secret parts) hard cylindrical part of penis. ?
- Agglutinate:** fastened closely together; welded. Jar.
- Anal angle:** the angle at the junction of apical and outer margins of the valva. Noc.
- Anellus:** (L. *anellus*, a little ring.) the projecting cone into which the ædœagus is withdrawn. P.
- Anelus lobes:** the projecting lobes at either side of the anellus. P.
- Apex:** the top; furthest point from base. P.
- Appressed:** closely applied to; pressed against. J.B.S.
- Arcuate:** bow-like. Jar.
- Arm:** a rod produced from a margin. P.
- Articulation:** the place where two parts are jointed. J.B.S.
- Asymmetrical:** not alike on two sides. J.B.S.
- Atrophid:** wasted away; unfit for use. J.B.S.
- Base:** the bottom; furthest from apex. P.
- Band:** in *cornuti* to indicate a linear series. P.
- Bifid:** once divided to base. P.
- Bifurcate:** once divided, but not to base. P.
- Bilobed:** bearing two lobes. J.B.S.
- Bluntly rounded:** more pointed than rounded. P.
- Bluntly pointed:** more rounded than pointed. P.
- Branched:** produced from a main stalk. P.

- Bulbed:** with base expanded into a bulb. Noc.
- Bursa—bursa copulatrix:** sac in female; receptacle of male sperm. P.
- Calcar:** a spur, J.B.S. An arm projecting from the juxta, formed by the union of the anellus lobes. P.
- Canaliculus:** (L. canaliculus, a gutter) the central projecting lip or groove of the juxta. P.
- Cardinate:** (L. cardo, a hinge) hinged. P.
- Cerata:** (Gr. keras-ata, a horn) lateral arms produced from eighth sternite. P.
- Chitine:** material forming harder parts of insect's body; a secretion of the eperdermis differing from horn by its insolubility in boiling liquor potassæ. J.B.S.
- Clavate:** knobbed; clubbed. Jar.
- Cleft:** split. J.B.S.
- Coalesced:** grown together. J.B.S.
- Corema-ata:** (Gr. corema, a brush) lateral extension of pleura of segment. Haartsac of Zander. P.
- Cornutus-ti:** (L. cornutus, a horn) a spiny armature of vesica. Noc.
- Corrugated:** alternate ridges and channels. J.B.S.
- Costa:** (L. costa, a rib) the upper edge of the valva, generally thickened, occasionally free. P.
- Costal fold:** the margin of the valvula springing from the articulation, generally fused to the costa. P.
- Crinkled:** of the form of crushed paper. P.
- Cristæ:** (L. crista, a tuft) the patch of hairs at either side of the juxta. P.
- Ctenoid:** (Gr. kleis-ktenos, a comb) comb-like. P.
- Cygnate:** like a swan's head. Noc.
- Dentate:** toothed. J.B.S.
- Digitate:** finger-like. J.B.S.
- Discoid:** rounded, flattened. P.
- Dorsal:** the upper surface. J.B.S.
- Ductus bursæ:** the tube connecting the ostium with the bursa. P.

- Ductus ejaculatorius** : the tube through which the seminal fluid is ejected into the bursa. J.B.S.
- Emarginate** : a piece cut out of margin. Jar.
- Encircled** : used when sides of ostium connect directly with the rods of eighth segment and with the segmental division. P.
- Extended** : used when the sacculus or other organ is lengthened and free. P.
- Falcate** : sickle-shaped. Jar.
- Femur** : the thigh. J.B.S.
- Floricomus** : (L. flos, flower; coma, hair) used to denote ovipositor when elaborately set with flattened spines and hairs. P.
- Footstalk** : used to denote the rods supporting the labides. P.
- Free** : used when parts that are usually fused are separated. P.
- Furca** : (L. furca, a two-pronged fork) the forked organ arising below the juxta. P.
- Fused** : welded together. P.
- Fusiform** : spindle-shaped. J.B.S.
- Geniculate** : elbowed. Jar.
- Gemmae** : buds. P.
- Gibbose** : hump-backed. Jar.
- Gnathos** : (Gr. gnathos, the lower jaw) lower jaw of uncus, which encloses the anus. P.
- Hamulate** : having an end hooked. P.
- Harpe** : (Gr. harpe, a scimitar) (a grappling iron, Gosse). used in this work for armature of valva. Equivalent to harpe of Gosse and Clasper of Noctuidæ.
- Heavily** : used when spines, scales or hairs are abundant. P.
- Hooded** : bent over in the form of a hood. P.
- Hastate** : scimitar shaped. P.
- Indent** : with edge notched centrally. P.
- Instita** : (L. instita, a flounce) a free apron at the ostium. P.

- Instrate:** (L. *insterno*, to spread over, to cover) used when the bursa is completely covered with spines. P.
- Intortate:** twisted. P.
- Jagged:** edge irregularly broken into points. P.
- Juxta:** the thickened ventral plate of the anellus. P.
- Knobbed:** with a rounded head on a neck. P.
- Labis, Labides:** (Gr. *labis*, a pair of tongs) organs arising from the transtilla. P.
- Lobe:** prominent rounded process or excrescence on a margin. J.B.S.
- Lunate:** crescent shaped. Jar.
- Manica:** (L. *manica*, a long sleeve) the introvertable skin uniting the *ædœagus* with the anellus. P.
- Mappa:** (L. *mappa*, a napkin) apron covering *cerata* on the eighth segment. P.
- Obtuse:** with rounded termination, blunt, not pointed or acute. Jar.
- Octavals:** terminals on anal edge of eighth sternite. P.
- Operculum:** a lid, small valvular appendage. Jar.
- Orifice:** opening of *ædœagus* at its junction with the vesica. P.
- Ostium:** (L. *ostium*, a door) opening which receives the penis in copulation. P.
- Ovate:** egg shaped or oval. J.B.S.
- Ovipositor:** the female organ from which the eggs are extruded. P.
- Pads:** used for hairy parts at base of *uncus*. P.
- Pannicular:** (L. *panniculus*, a little patch) locally covered. P.
- Papilla:** raised protuberance. P.
- Patella:** plate-like part of a joint. P.
- Pedunculate:** stalked. Jar.
- Penis:** the whole intromittent organ of male. P.
- Peaked:** tapered, attenuated. P.
- Peniculus:** (L. *peniculus*, a little brush) the hairy pads at either side of the *tegumen* below the *uncus*. Noc.
- Pips:** markings like apple seed. P.

- Pistillate:** (L. *pistor*, a pounder) in the form of a pestil. P.
- Plate of ostium:** flattened chitinous plate surrounding the ostium. P.
- Produced:** extended beyond. P.
- Pyriform:** pear-shaped. Jar.
- Quadrilobed:** four lobed. P.
- Reniform:** kidney shaped. P.
- Retractile:** capable of being extended and withdrawn. Jar.
- Ribbed:** with longitudinal ridges. P.
- Ridged:** with blade-like strengthening of a surface. P.
- Rimose:** bark-like. Jar. Full of cracks. J.B.S.
- Ringwall:** a term used by Zander indefinitely for membranous surround of penis.
- Rose thorn:** like the flattened angular spine on the stem of a briar. P.
- Rugose:** wrinkled. Jar.
- Sacculus:** (L. *sacculus*, a little bag) the lower part of the valva. Noc.
- Saccus:** (L. *saccus*, a bag) the sternal portion of the tegumental ring—vinculum of Noc. Baker.
- Scobinate:** (L. *scobis*, filings). Surface covered with small rasp-like teeth. Noc.
- Serrate:** saw-toothed, teeth set towards one end. J.B.S.
- Sessile:** closely seated. J.B.S.
- Scephium:** (Gr. *skaphe*, a boat) dorsal armature of anus. (Wrongly applied by others to gnathos.) Gosse.
- Sigmoid:** S. shaped. J.B.S.
- Signum:** (L. *signum*, a sign, a token) an internal armature of the bursa. P.
- Simple:** used when no complications are present. P.
- Sinuuous:** curved in and out. J.B.S.
- Socli:** (L. *socius-i*, a companion) the extended hairy pads of the uncus. P.
- Spine:** a sharp process. J.B.S.
- Squamous:** scaly. J.B.S.

- Spoon-shaped:** used of concave projections of ædœagus. P.
- Spatulate:** broad, flat. P.
- Stellate:** star shaped. J.B.S.
- Sternite:** ventral plate of segment. P.
- Stout:** strong, broad. P.
- Sub-cylindrical:** not completely cylindrical. P.
- Subglobular:** not completely globular. P.
- Sub-ovate:** not completely ovate. P.
- Subscaphium:** ventral thickening of anus. Noc.
- Tapered:** gradually diminishing in width. P.
- Teeth:** single widened spines attached to surface. P.
- Tegumen:** (L. tegumen, a cover). See introduction. B. White.
- Tergite:** dorsal plate of segment. P.
- Thumbed:** used for lobed projection from the orifice of the ædœagus. P.
- Tibia:** the joint of the leg between the femur and tarsus. P.
- Thorn-like:** as a tapered spike. P.
- Tip:** the extremity.
- Transtilla:** (L. transtilla, a small cross beam) the internal extension of the costa. P.
- Trifid:** twice divided to base. P.
- Truncate:** shortened. P.
- Uncus:** (L. uncus, a drag hook) terminal organ of male body. Gosse.
- Valva-æ:** (L. valva, a folding door) the whole lateral flange-like process articulated by the tegumen. =Harpe of Noc.
- Valvula:** the thin part of the valva, lying between the costa and sacculus. P.
- Ventral:** the under surface. P.
- Vesica:** (L. vesica, a bladder) the extrovertable portion of the ductus ejaculatorius. P.

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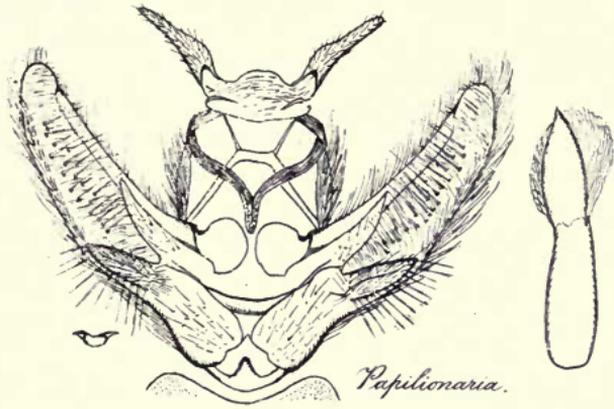
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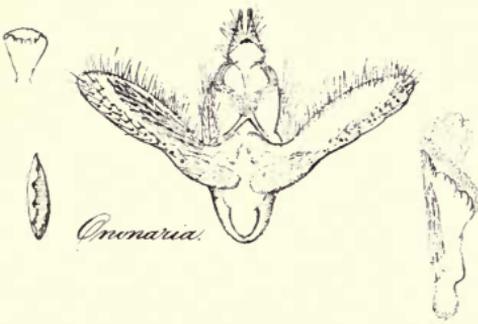
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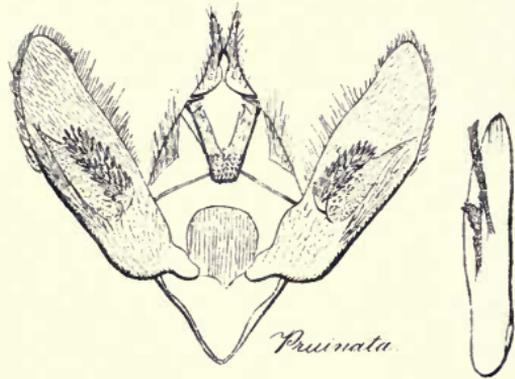
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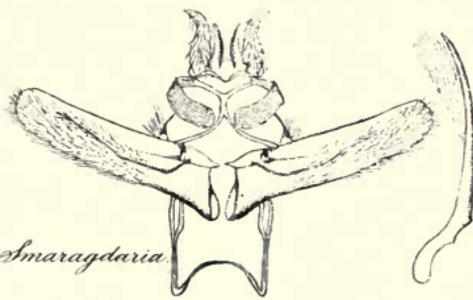
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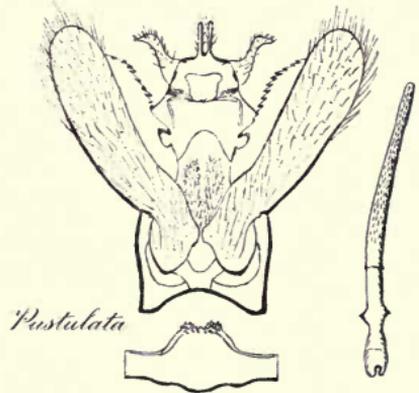
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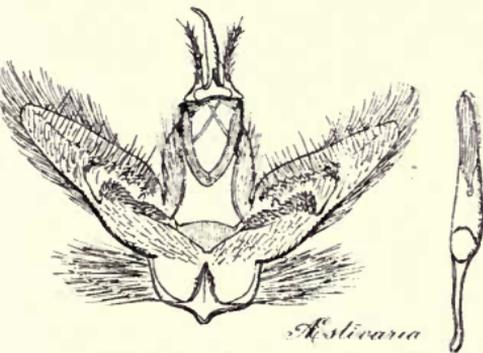
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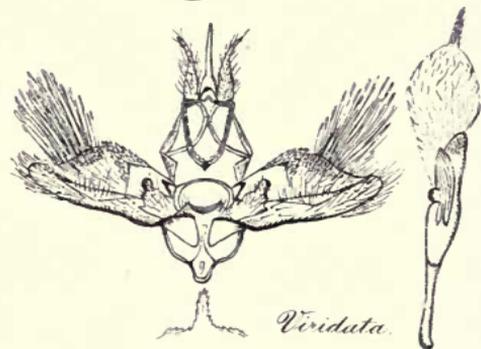
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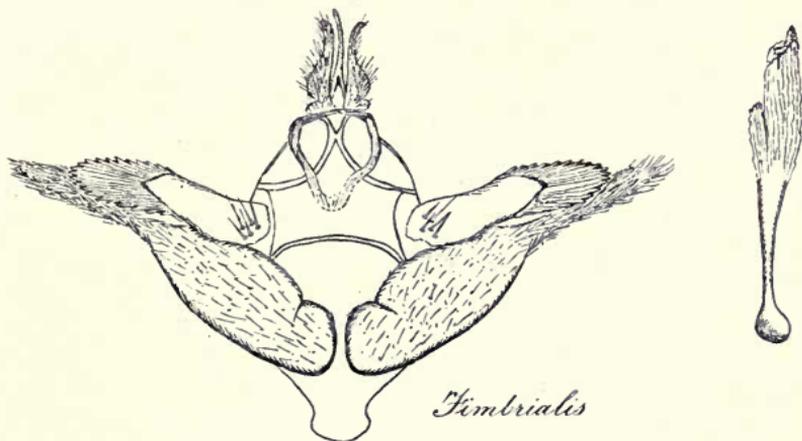
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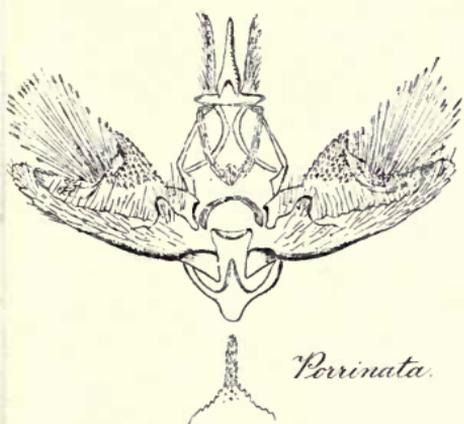
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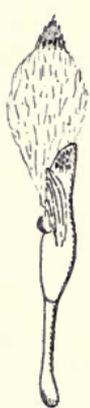
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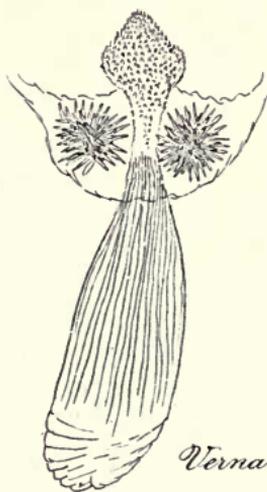
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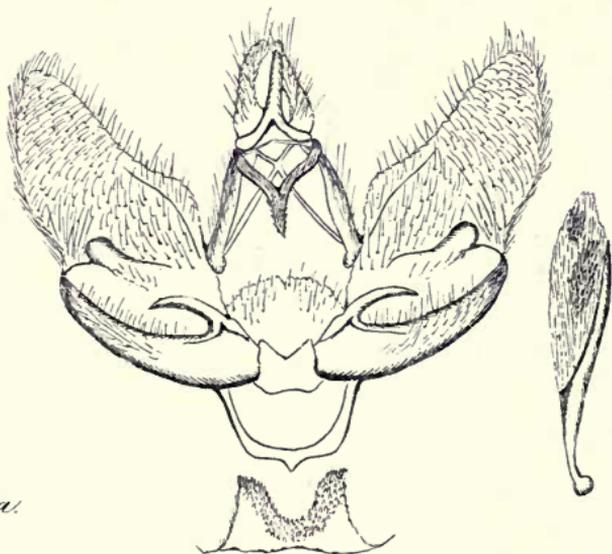
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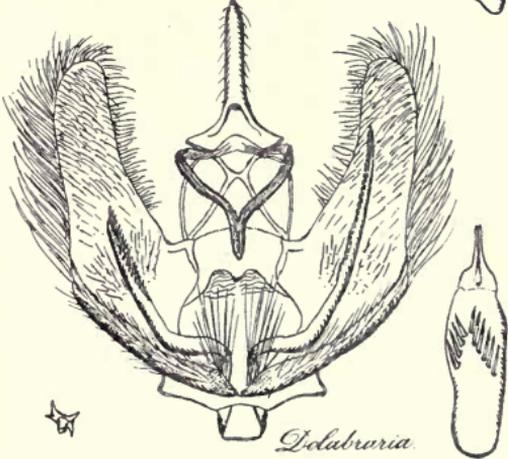
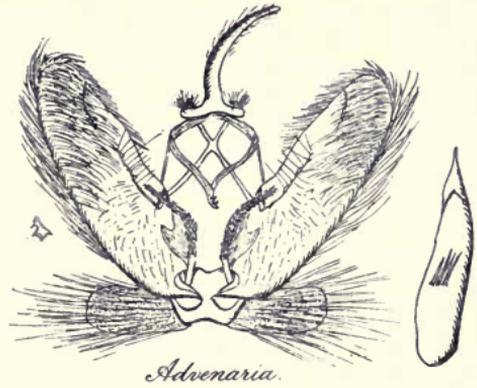
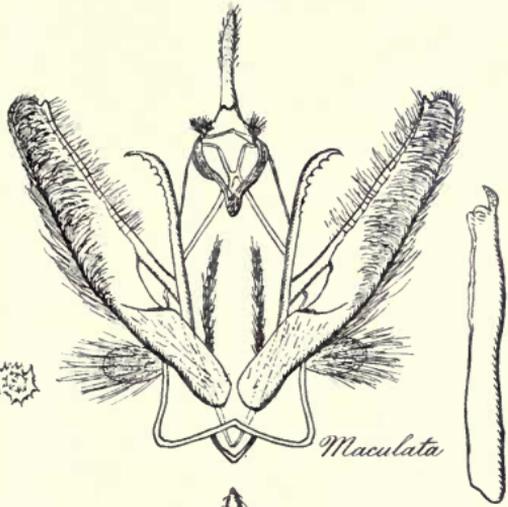
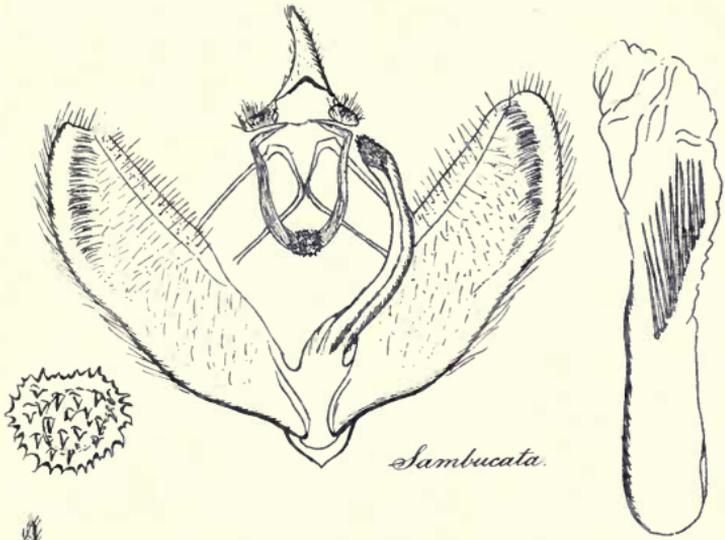


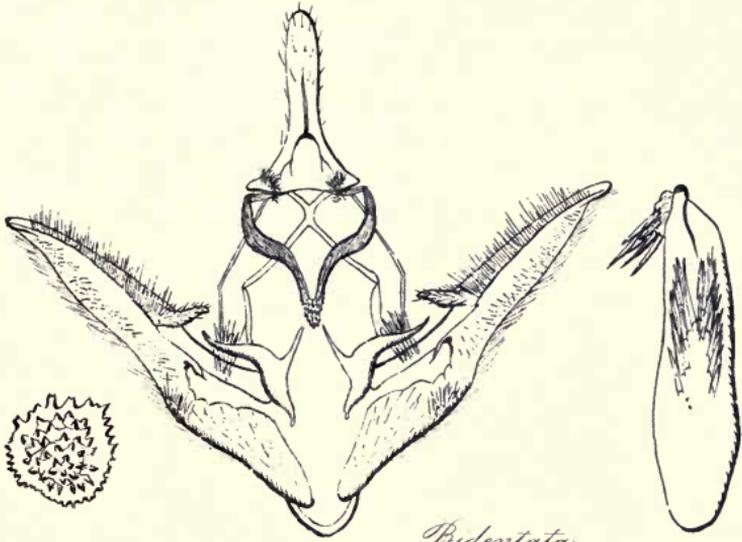
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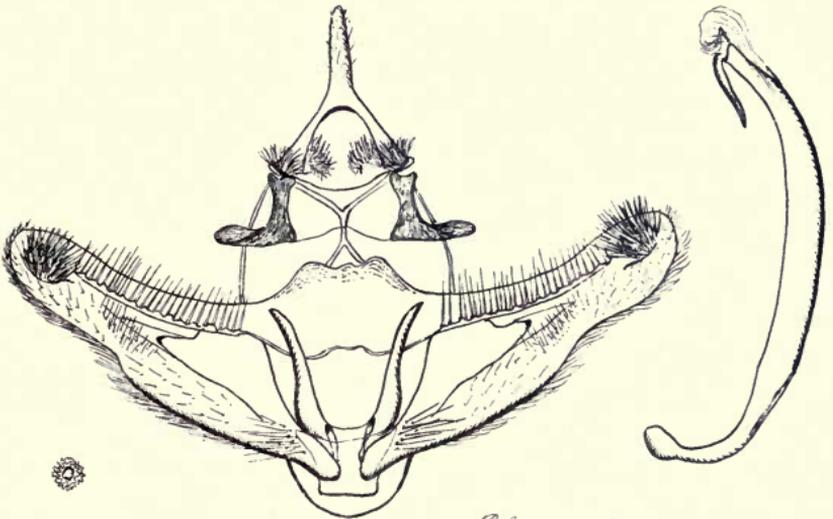
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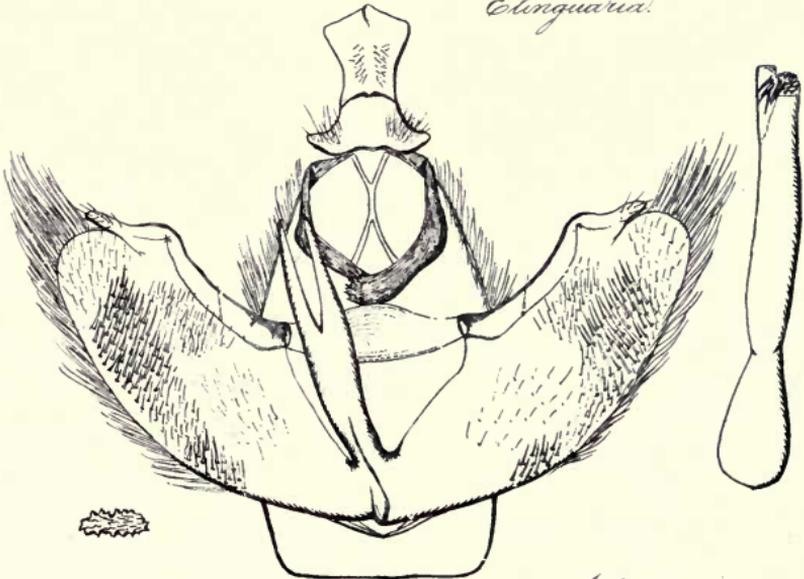




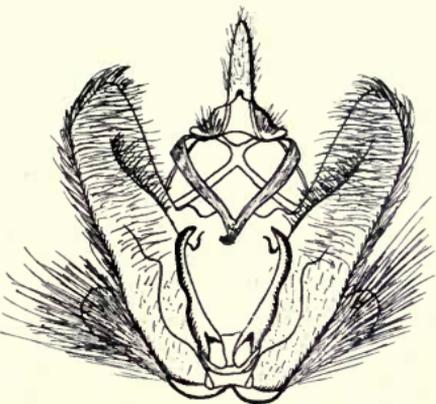
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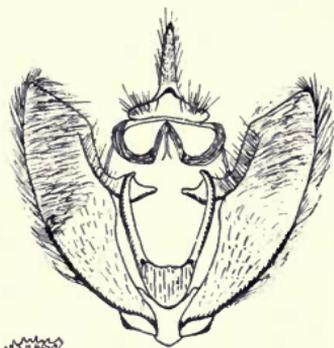
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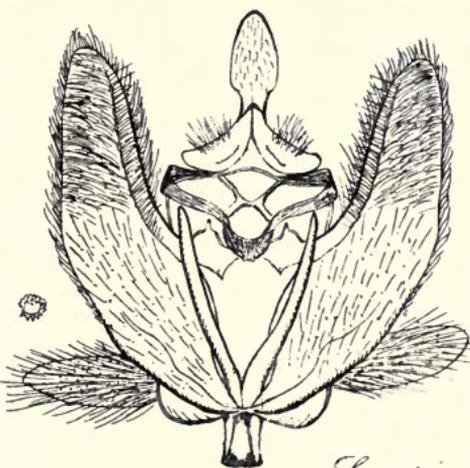
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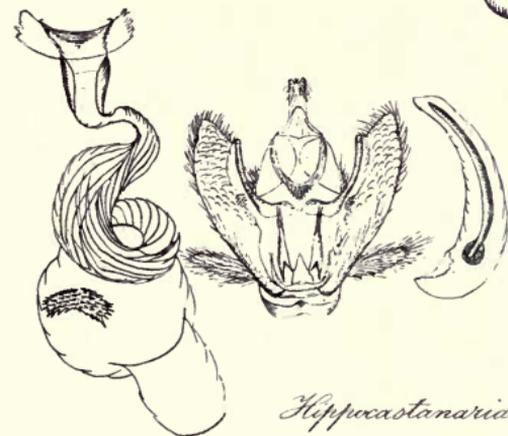
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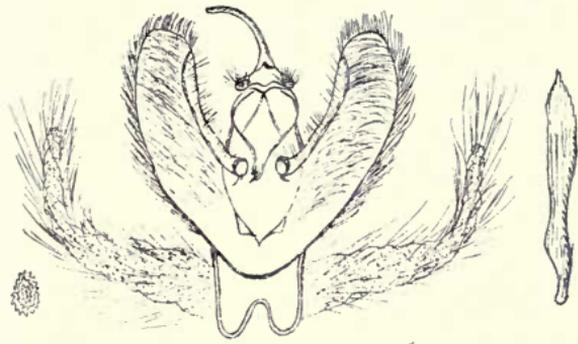


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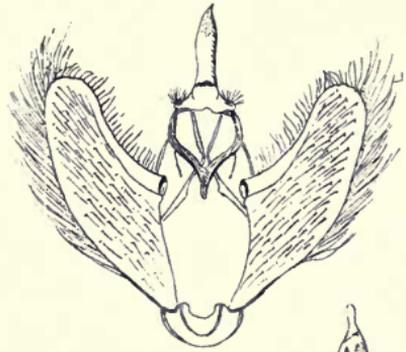


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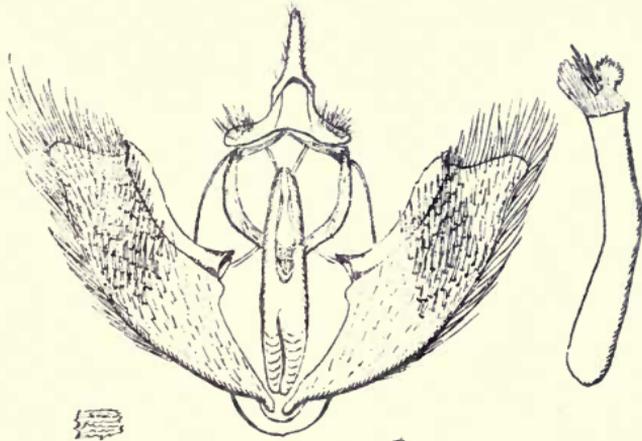




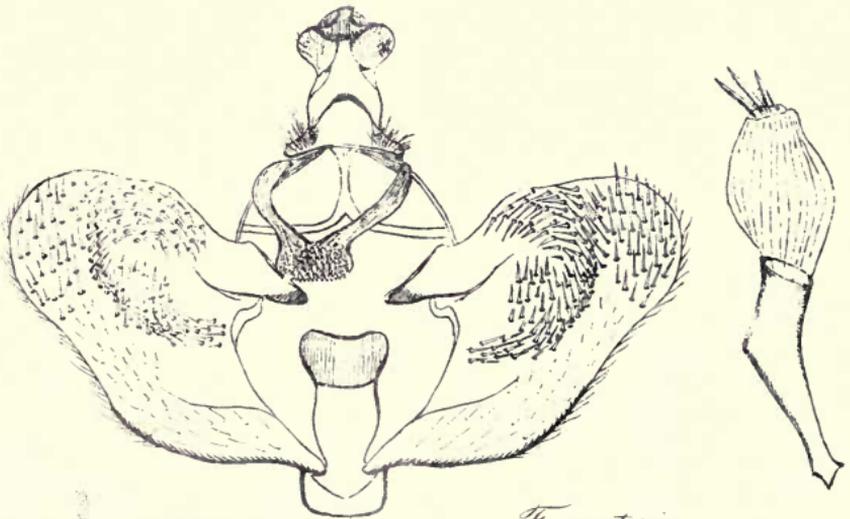
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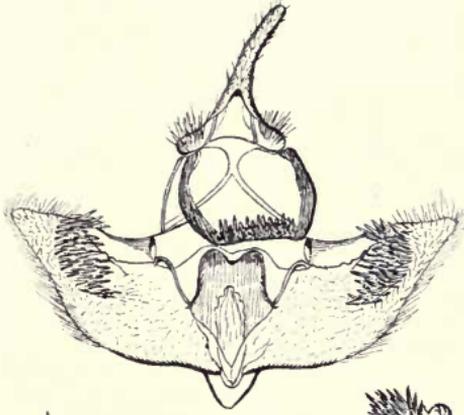
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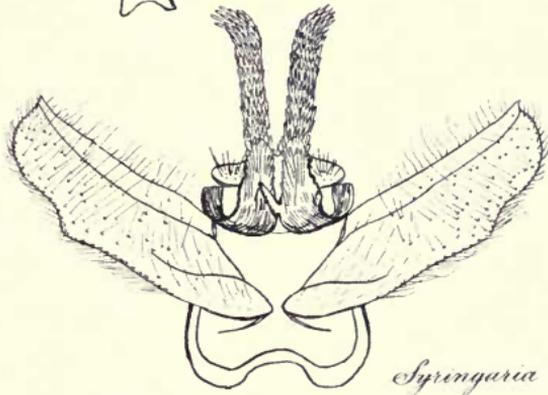
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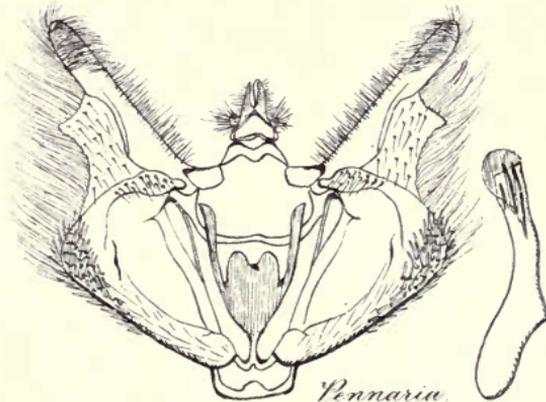
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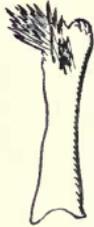
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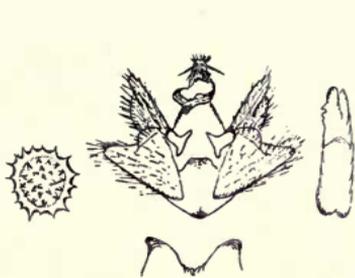


Syringaria



Pennaria

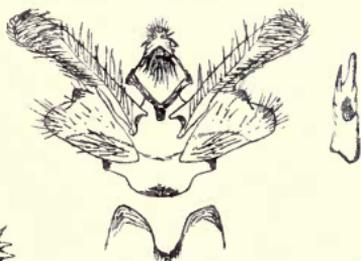




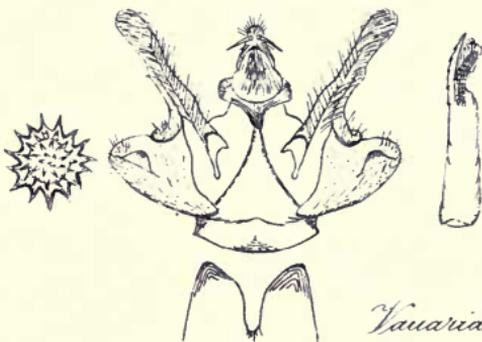
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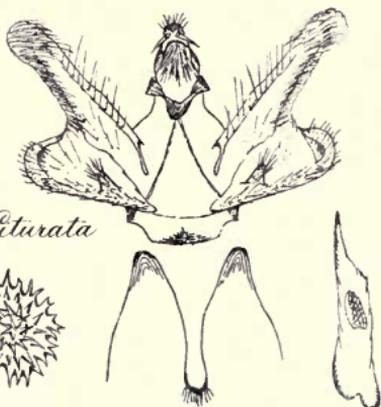
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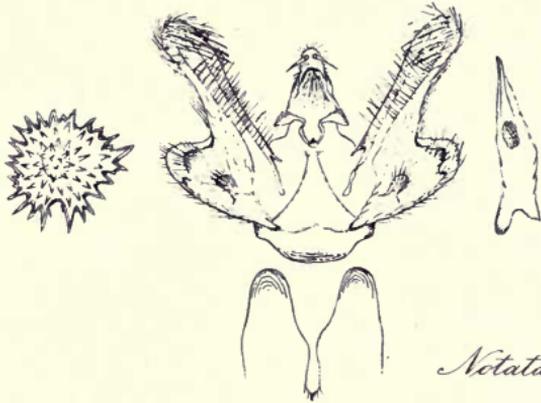
Brunneata



Vauaria



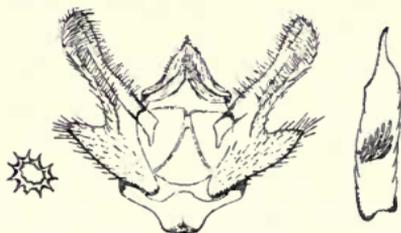
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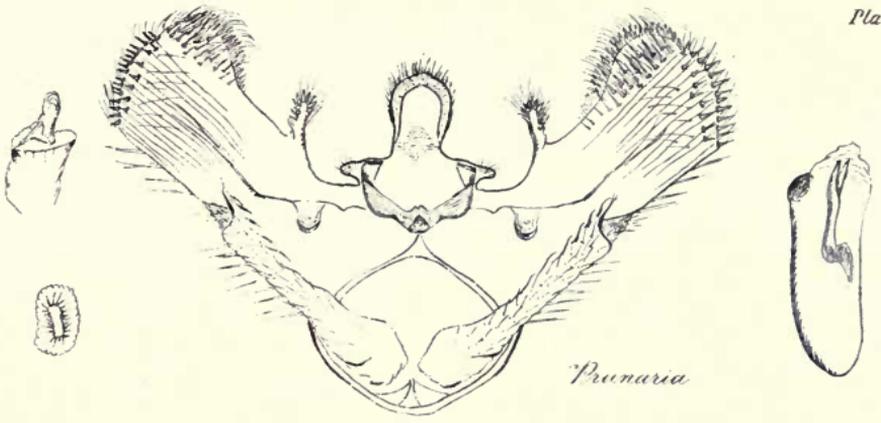
Notata



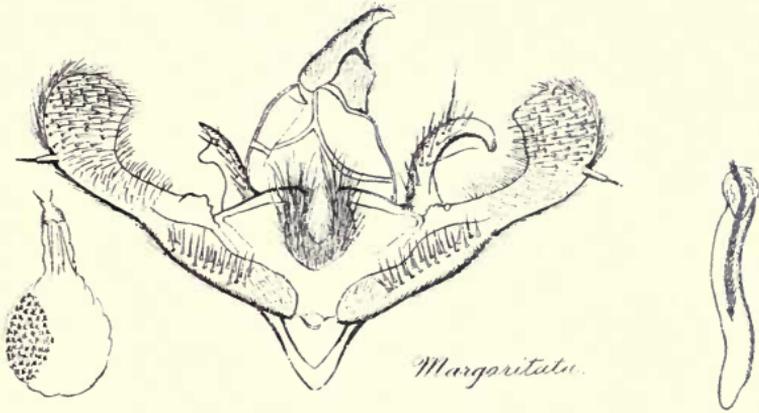
Alternata



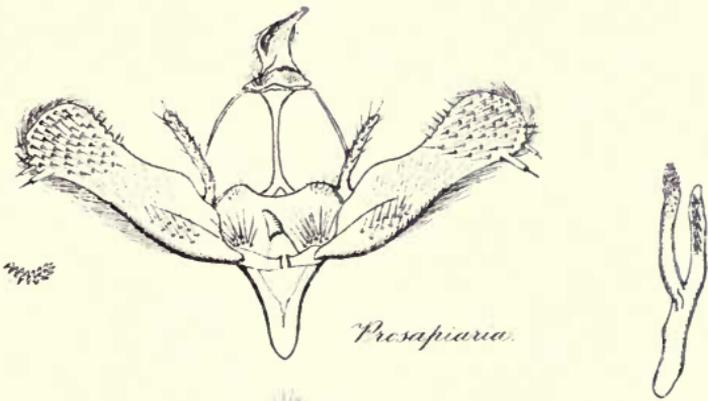
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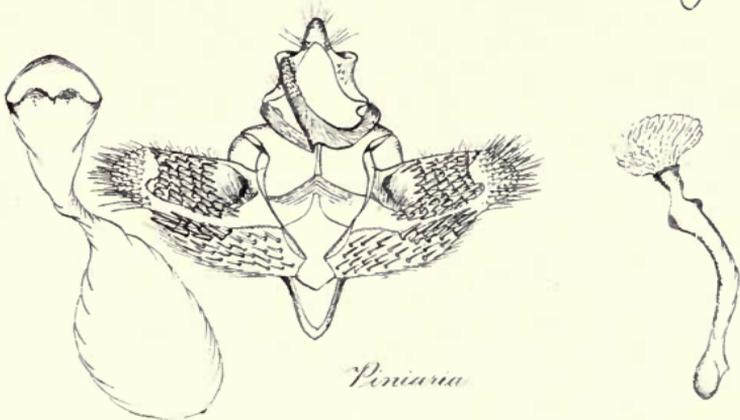
Prunaria



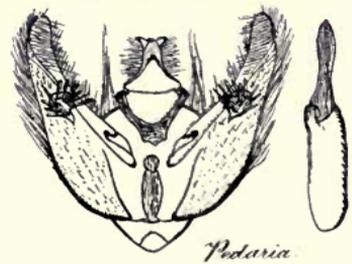
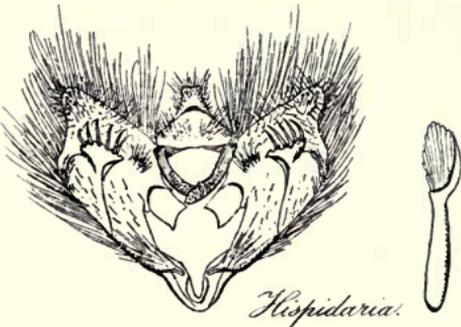
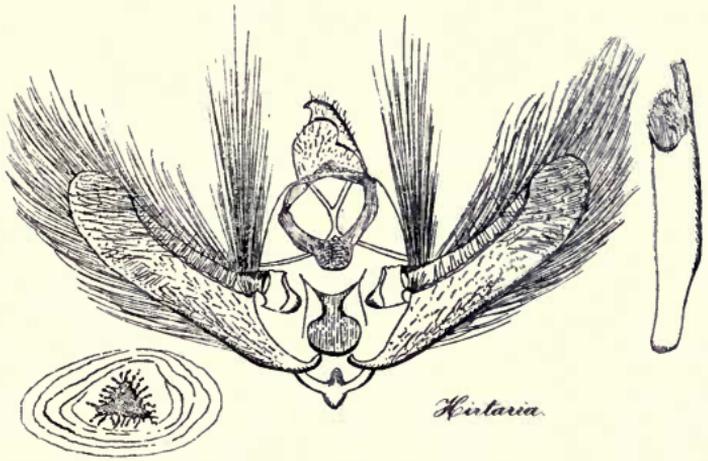
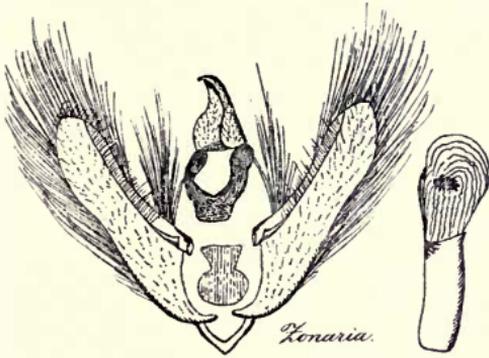
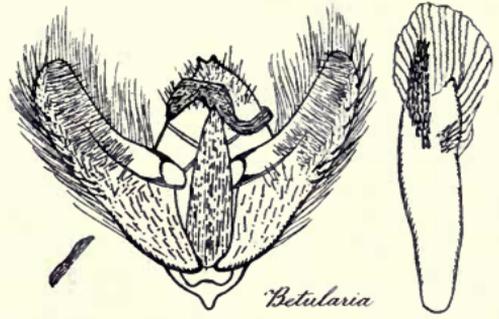
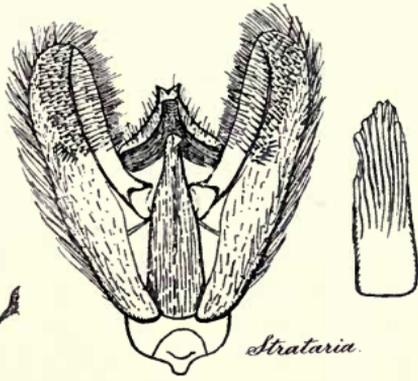
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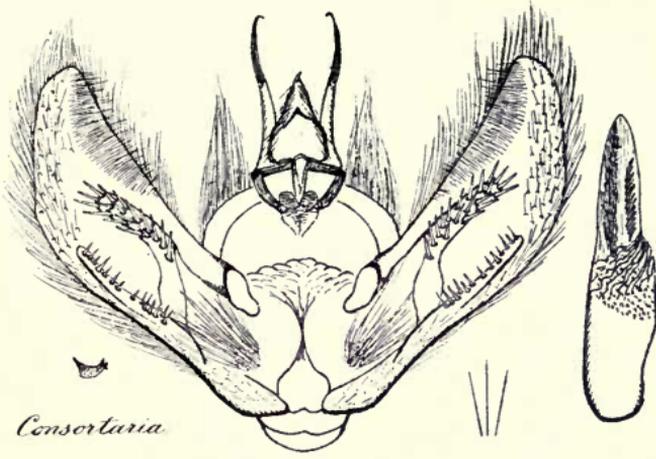
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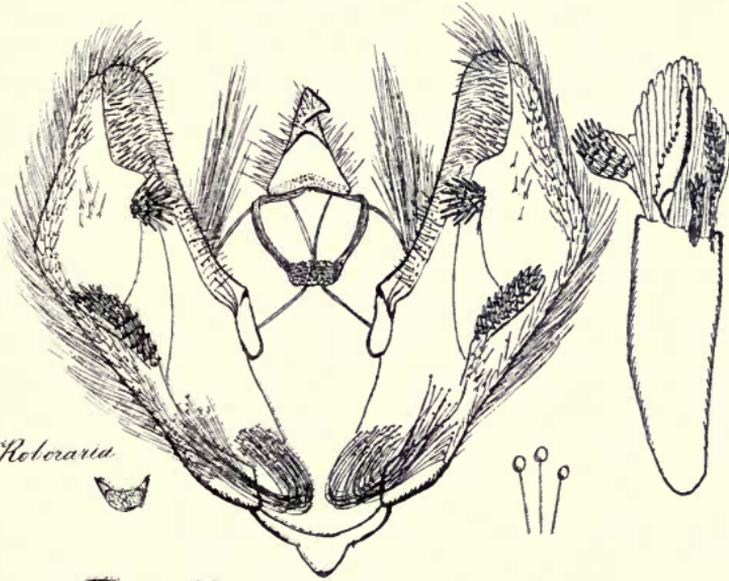
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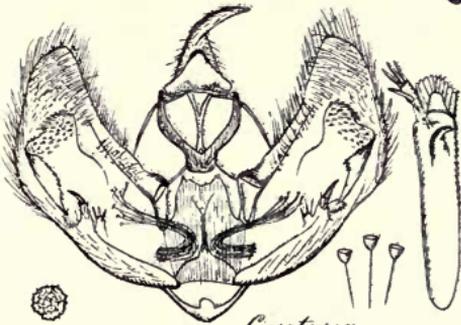




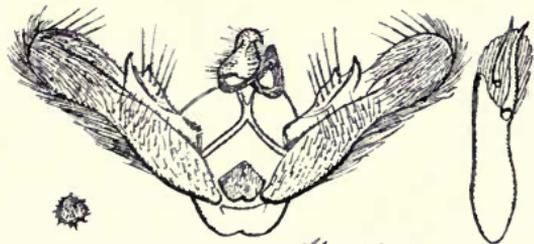
Consortaria



Holocaria



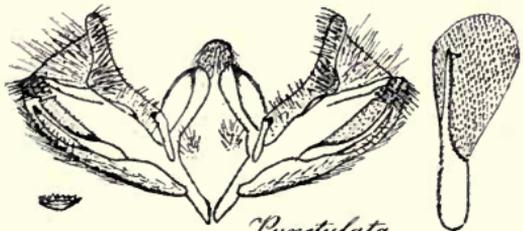
Cinctaria



Abruptaria

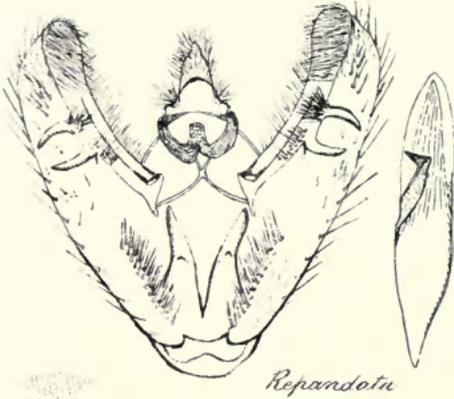


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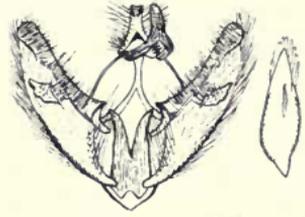


Punctulata

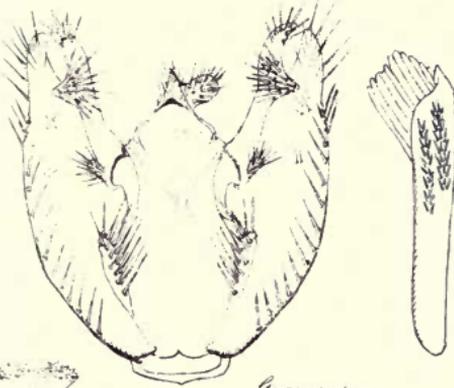




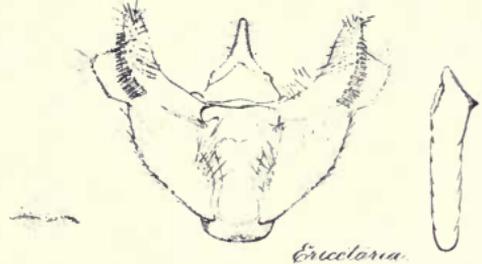
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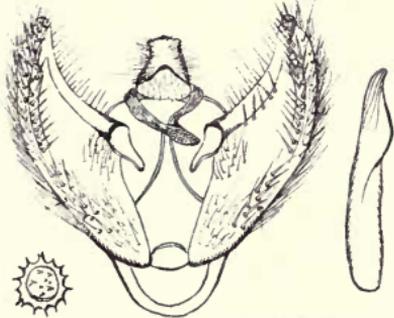
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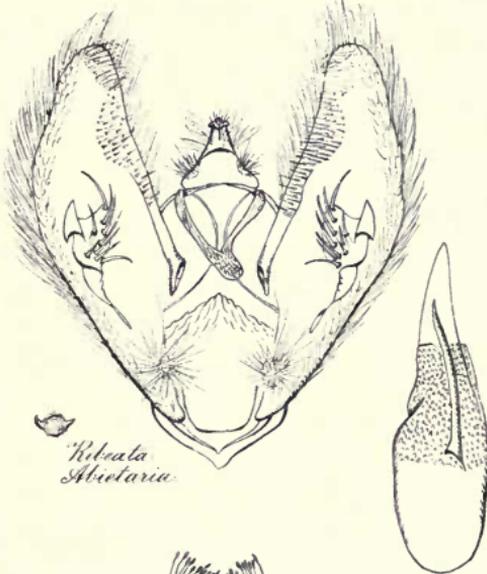
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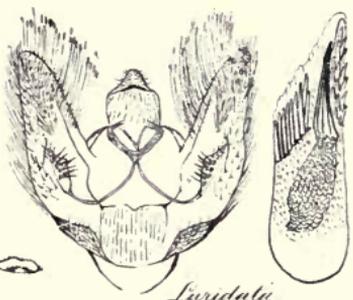
Ercoloria



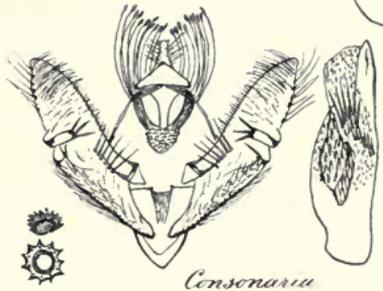
Angularia



Ribata Abularia



Luridula

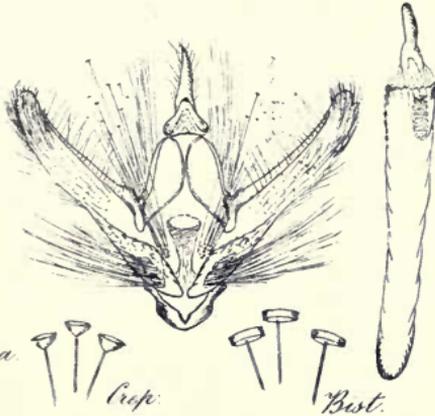


Consonaria

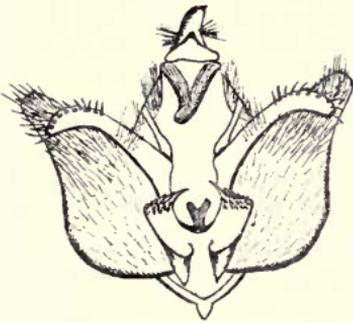
Bistortata.



Crepuscularia.

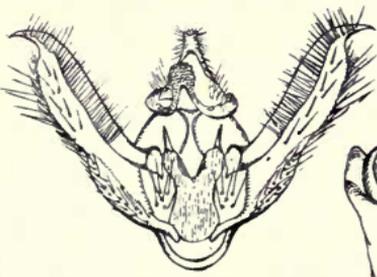
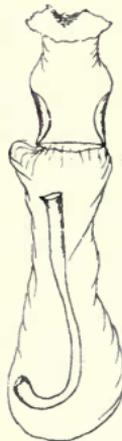
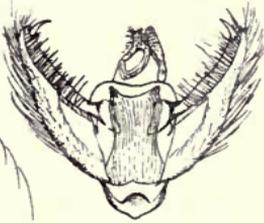


Atomaria.



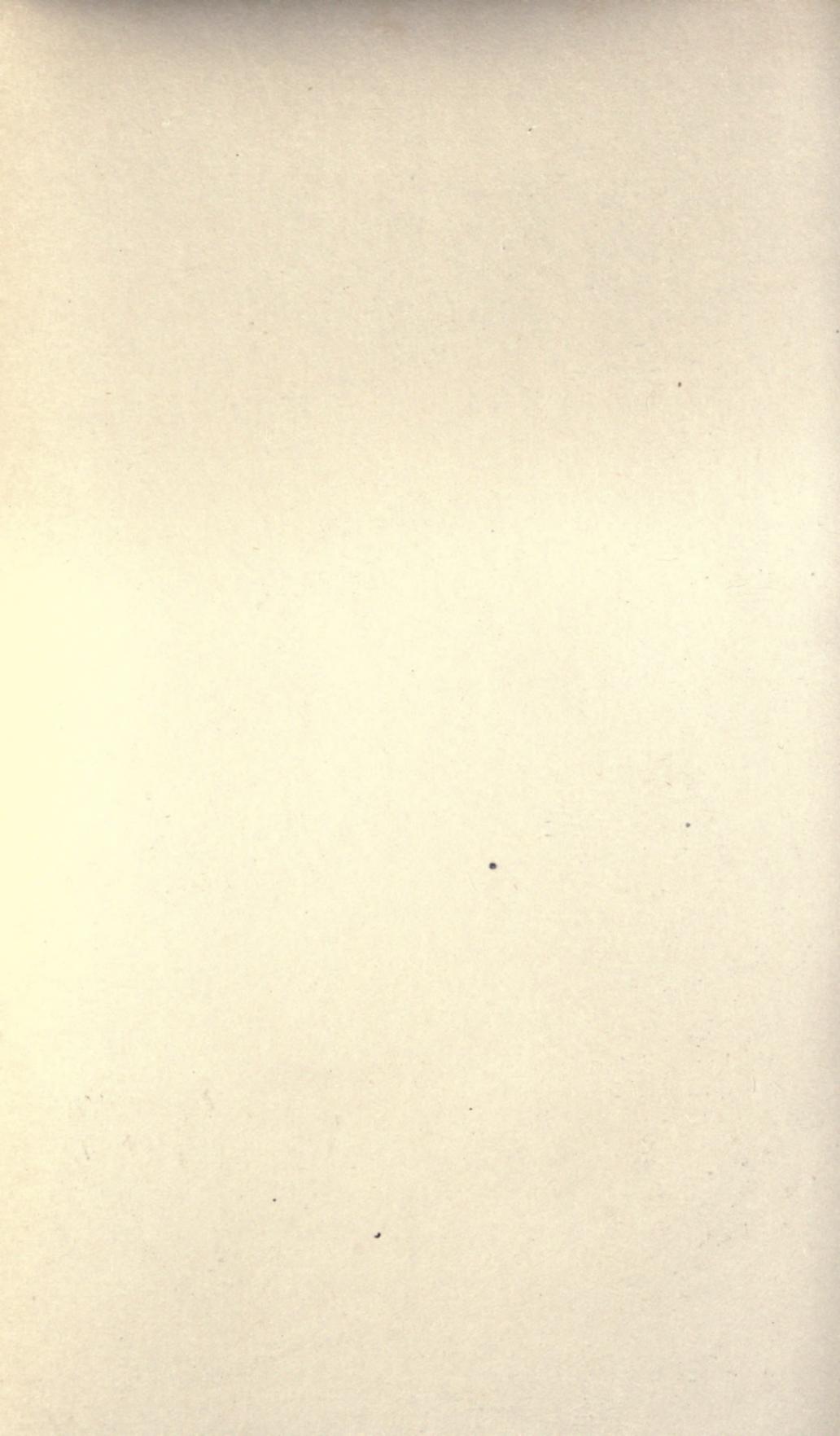
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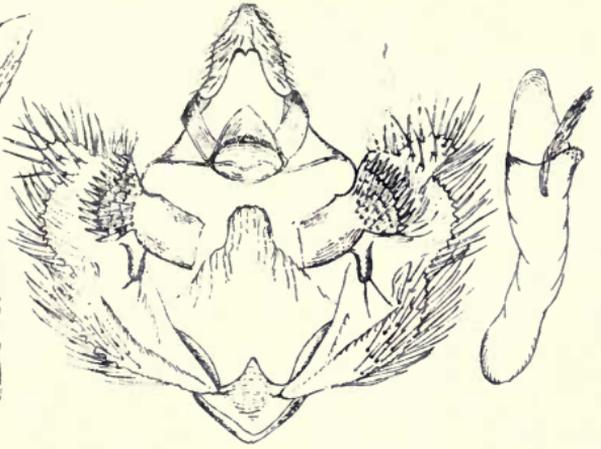
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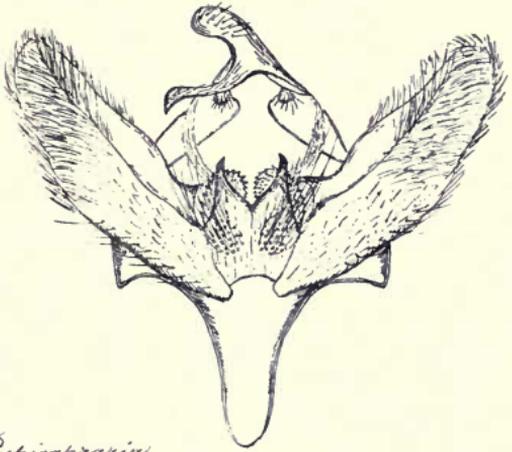
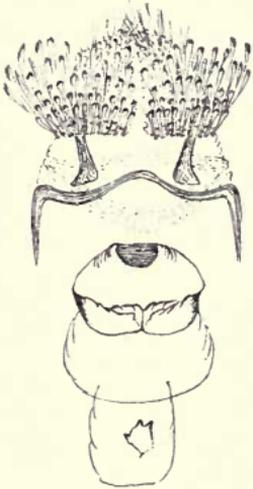
Marginaria.

Aurantiaria.

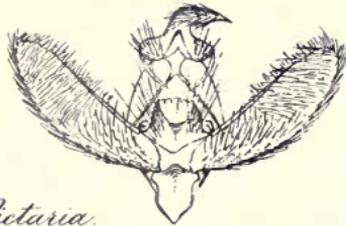
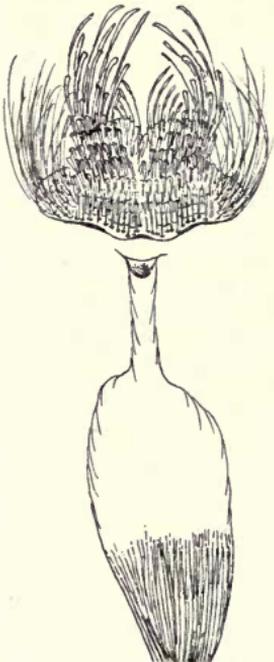




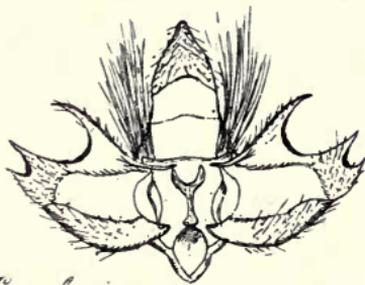
D. foliaria.



R. picipraria.

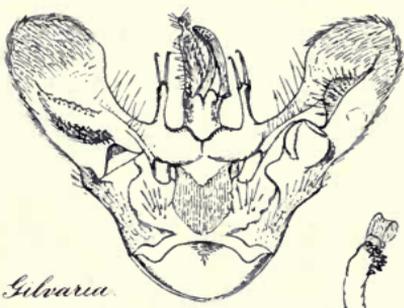


P. taria.

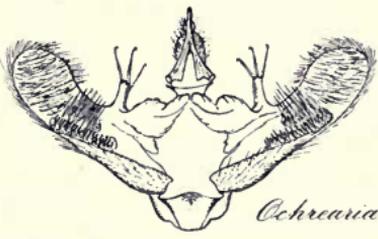
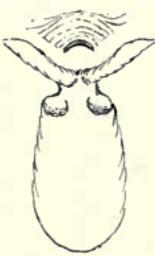




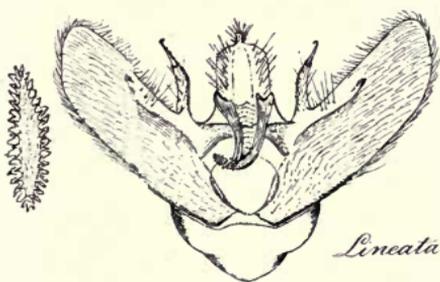
Strigillaria.



Silvaria.



Cochrearia.

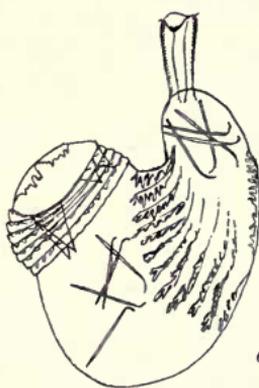


Lineata.

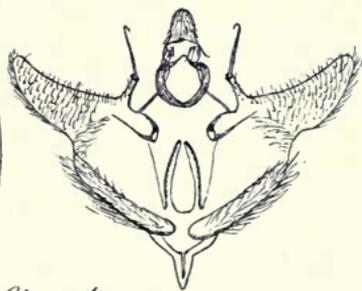


Myrtillata

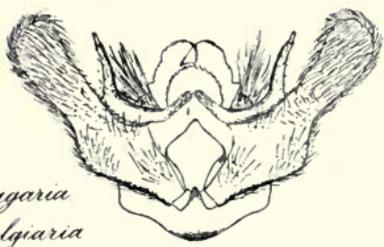
Obscurata

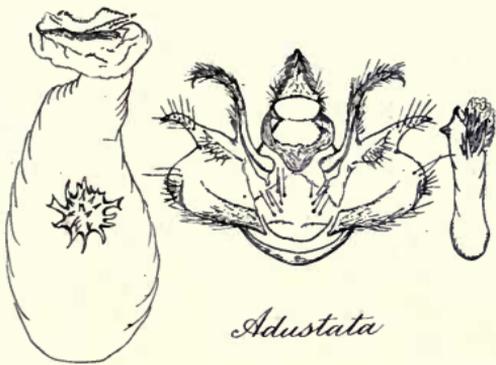


Obscurata

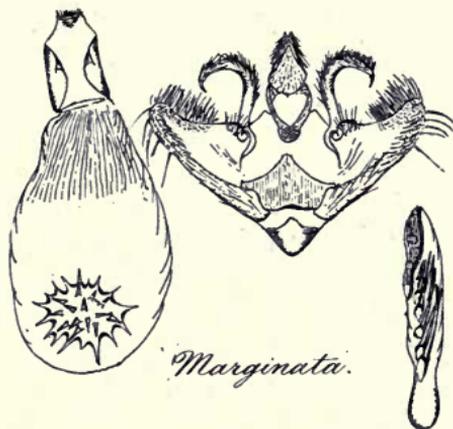


*Fagaria
Belgiana*

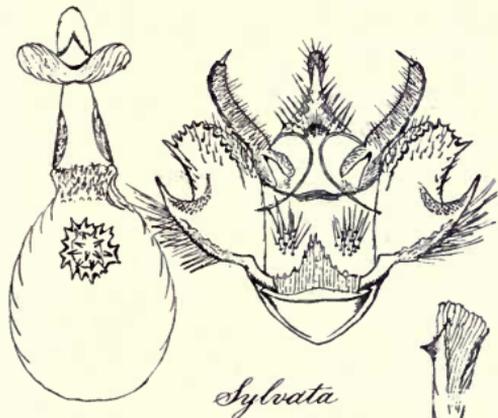




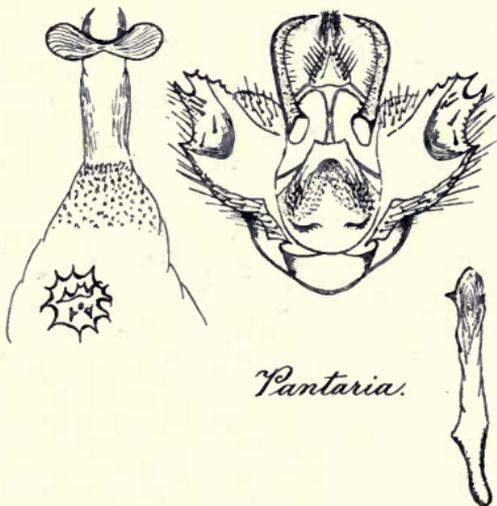
Adustata



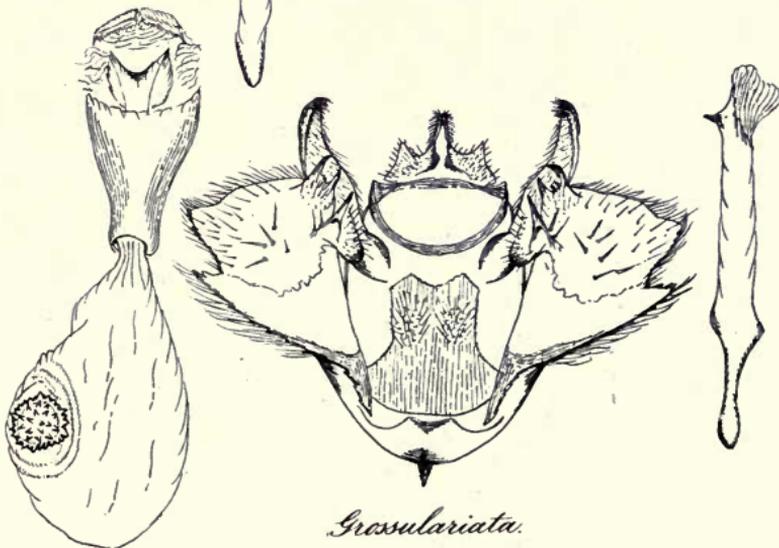
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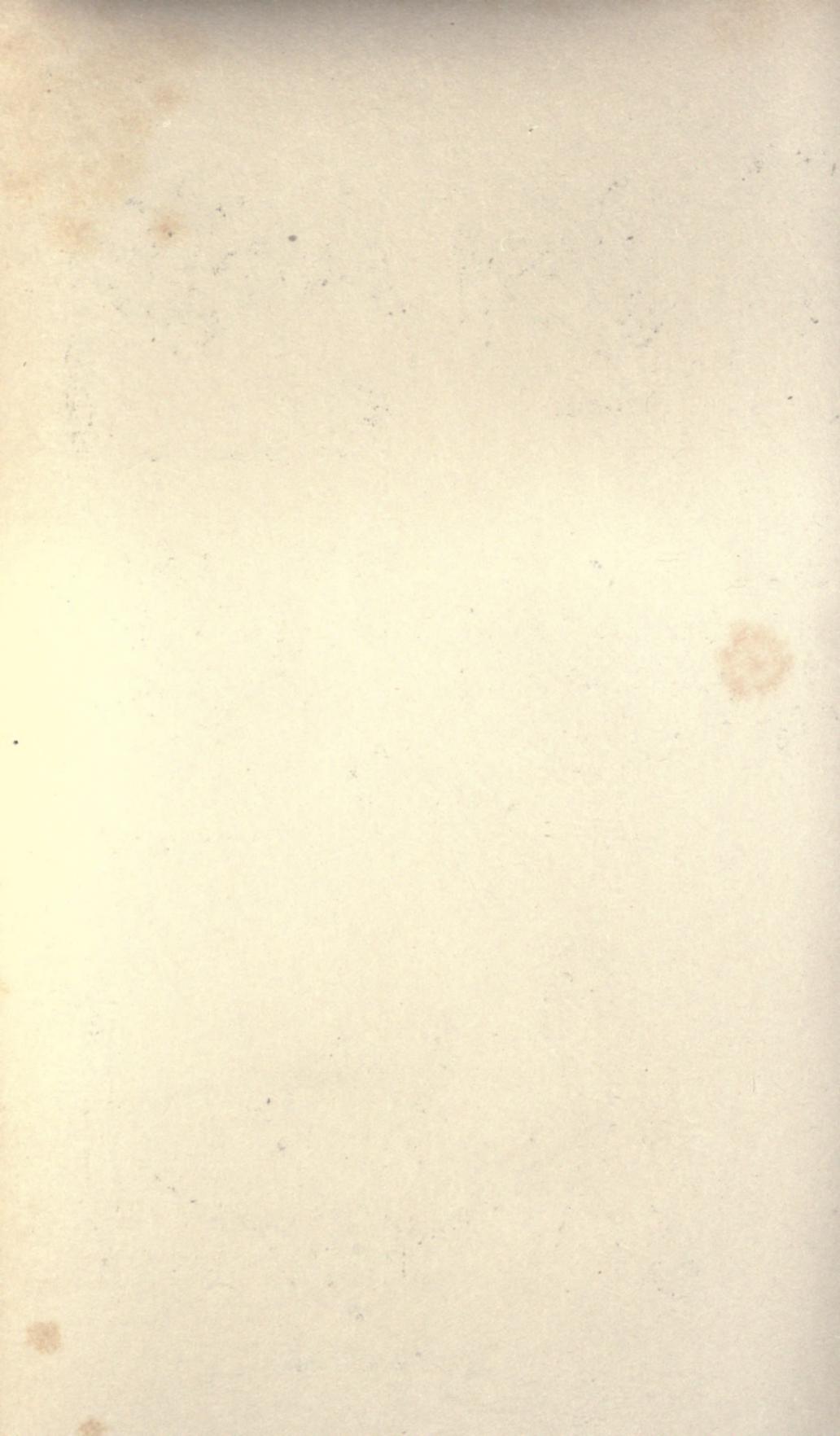
Sylvata

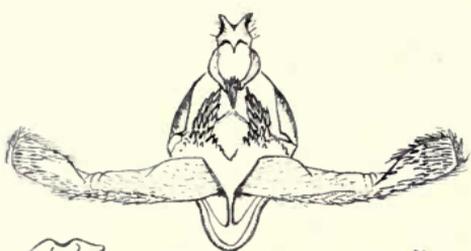


Pantaria.

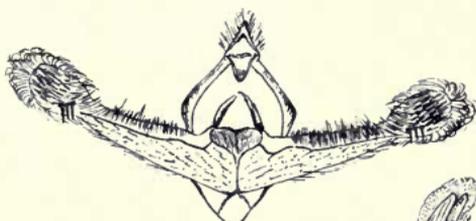


Grossulariata.

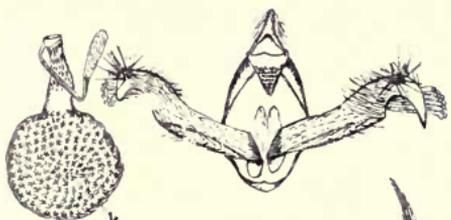




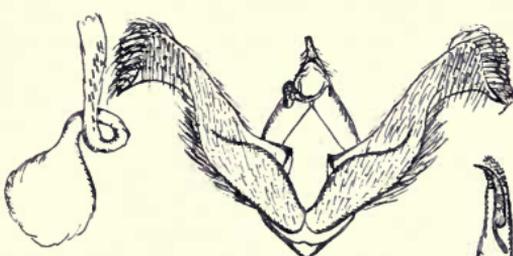
Muricata.



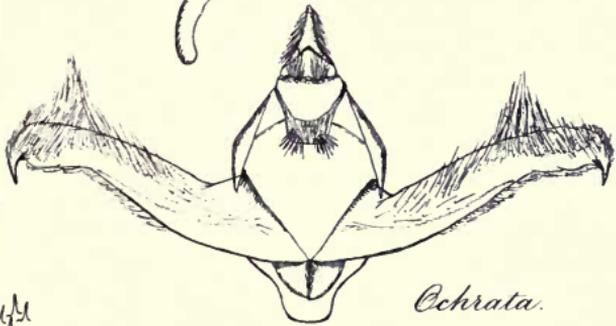
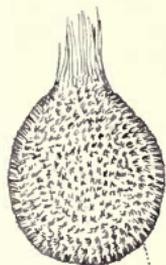
Bisetata.



Limidiata.



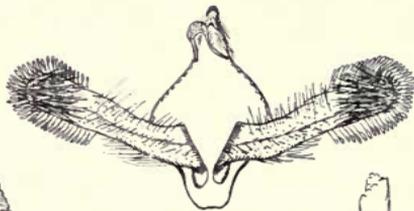
Trigeminata.



Ochrata.

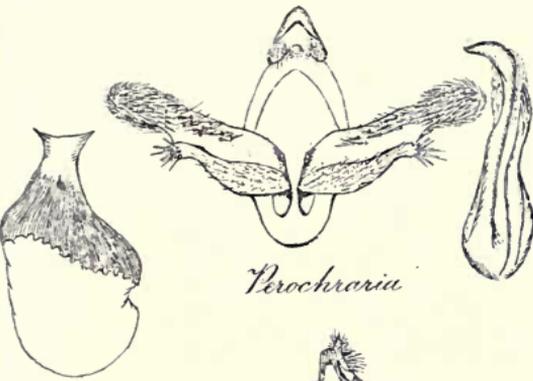


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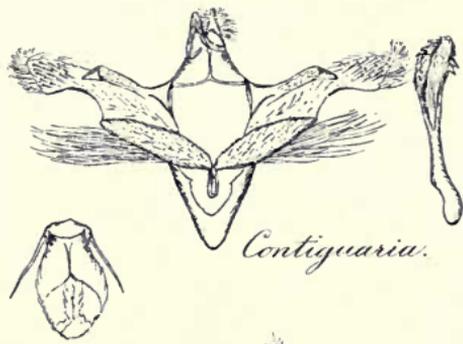


Sulsericcata.

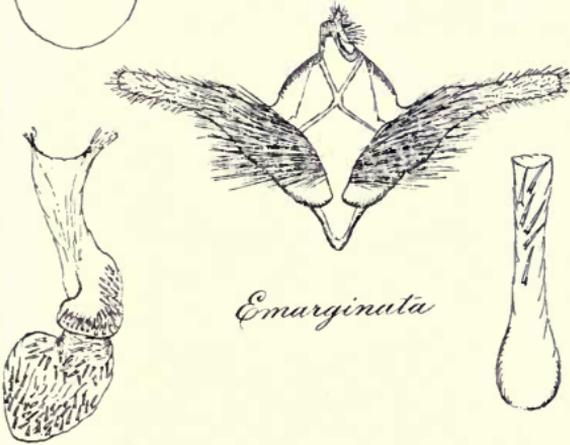




Perocraria.



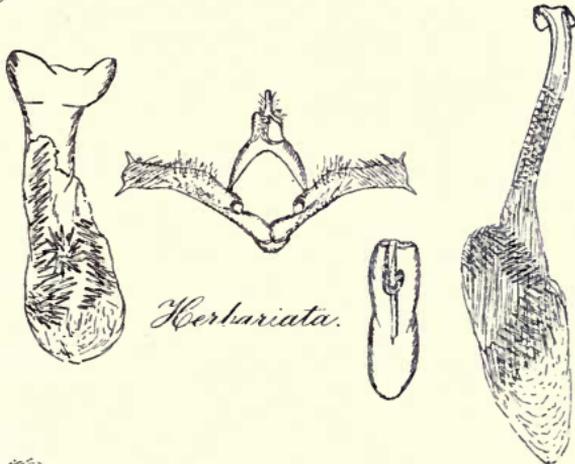
Contiguaria.



Emarginata.



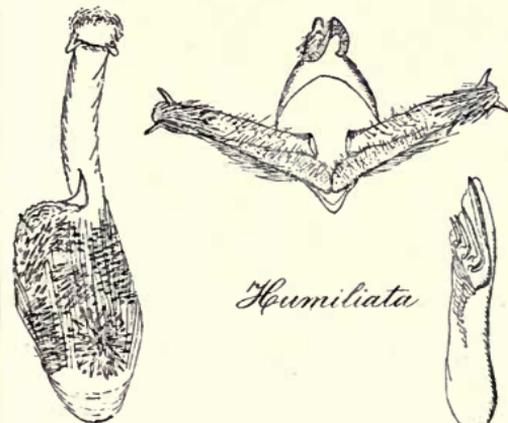
Virgularia.



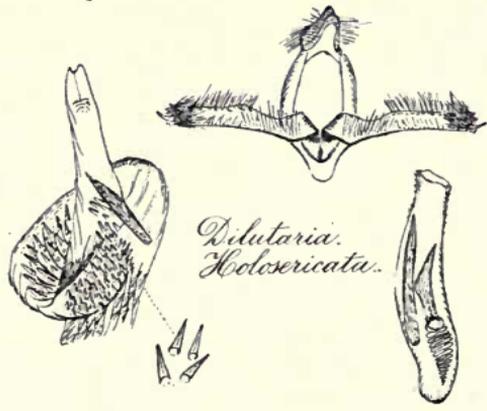
Herbariata.



Interjectaria.



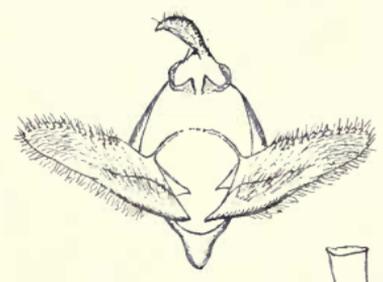
Humiliata.



*Dilutaria.
Holosericata.*



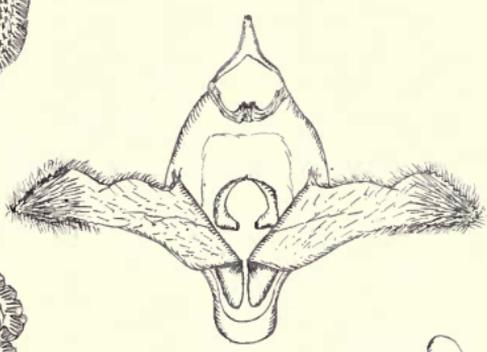
Rusticata



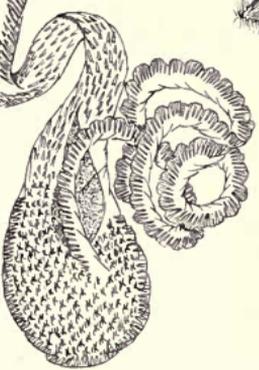
Regeneraria.

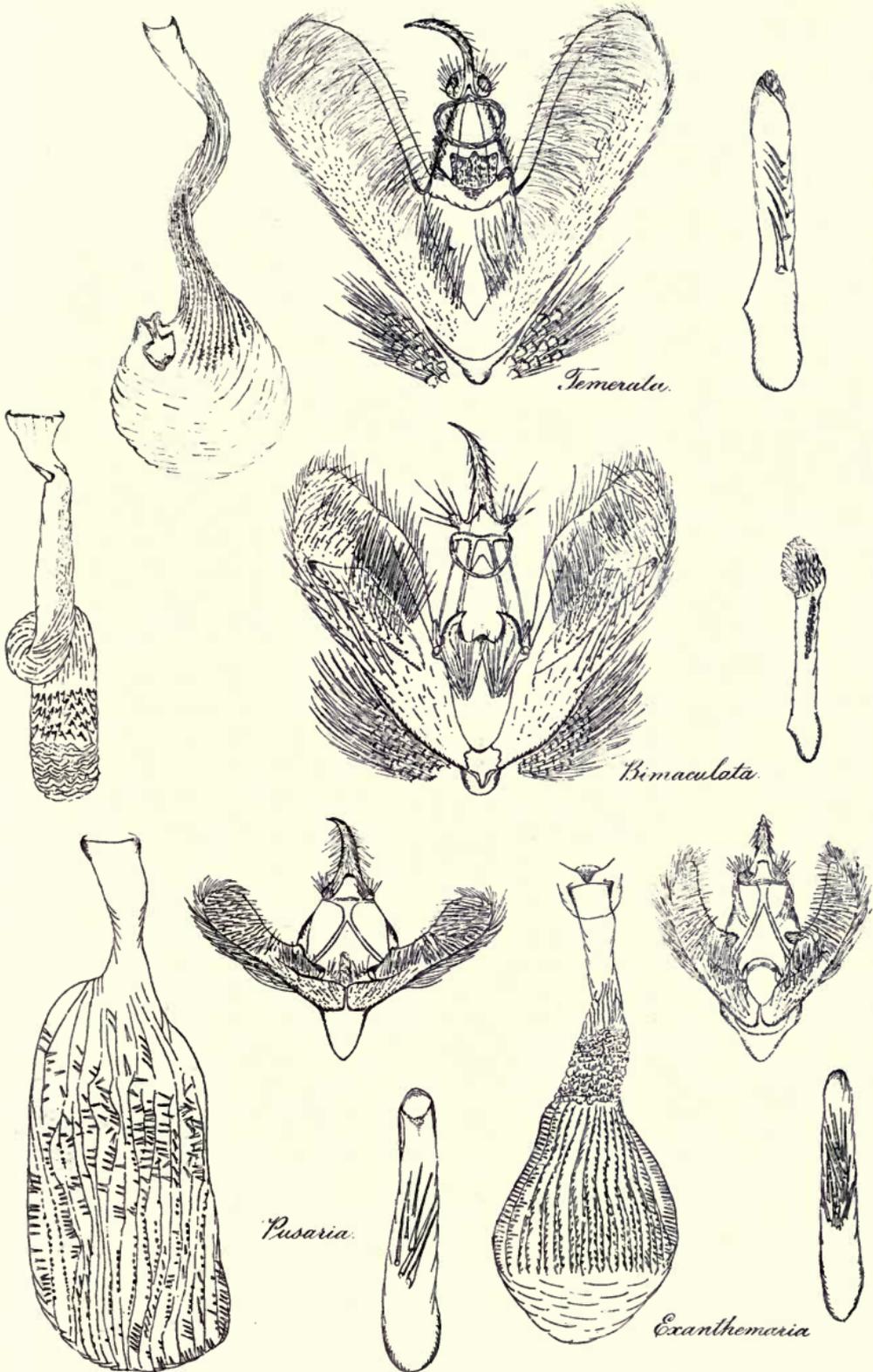


Aversata.



Inornata.



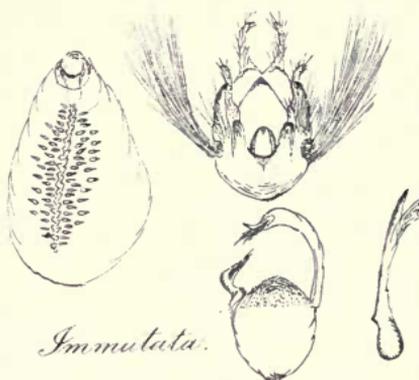
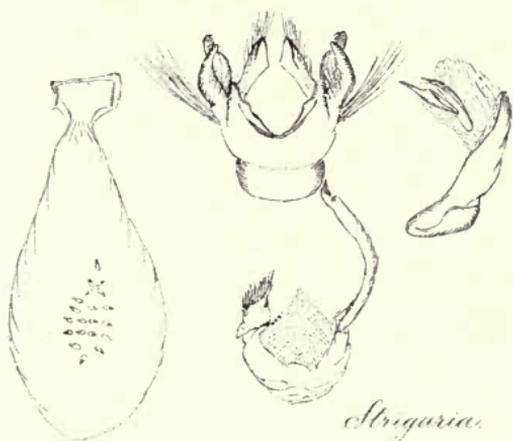
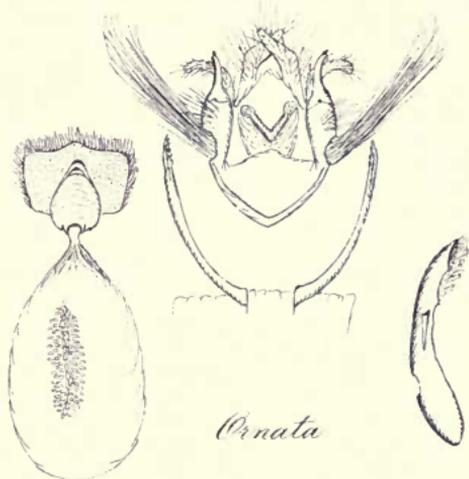
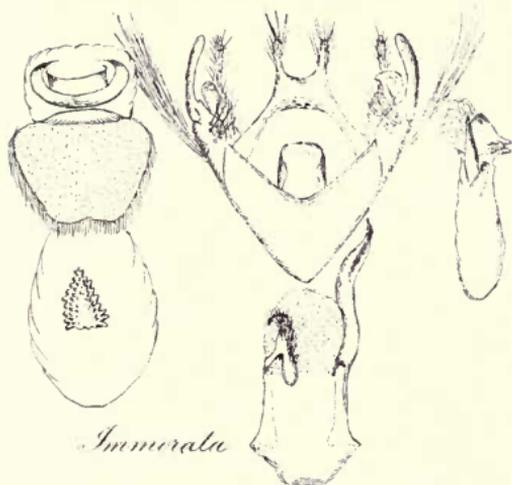
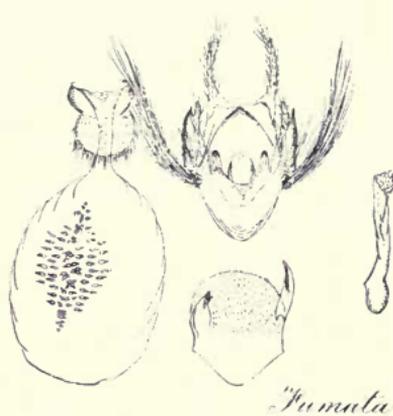
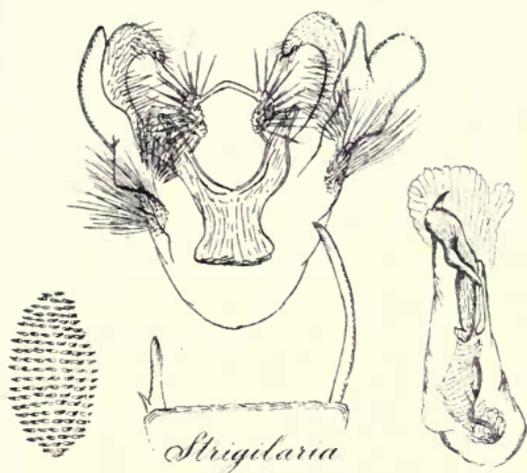


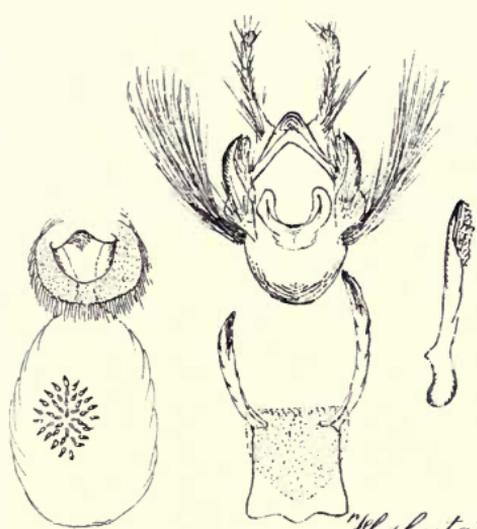
Temerata.

Bimaculata.

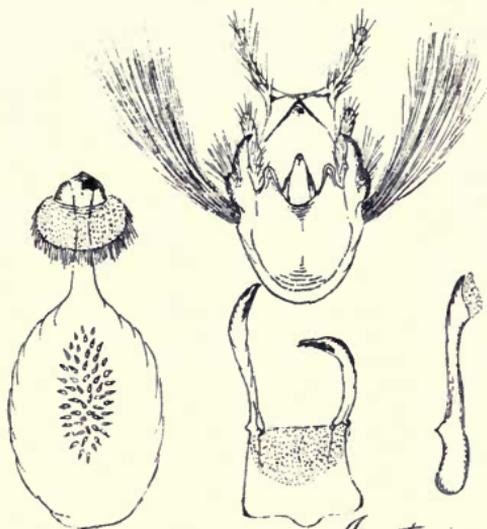
Pusaria.

Exanthemaria.

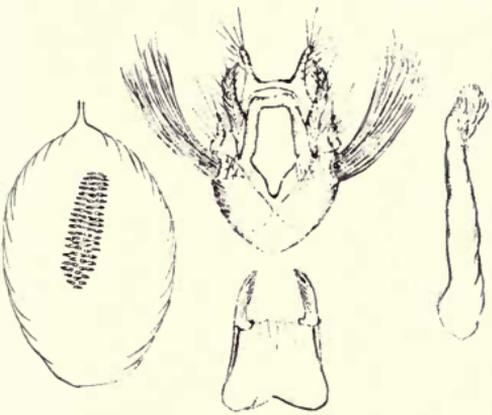




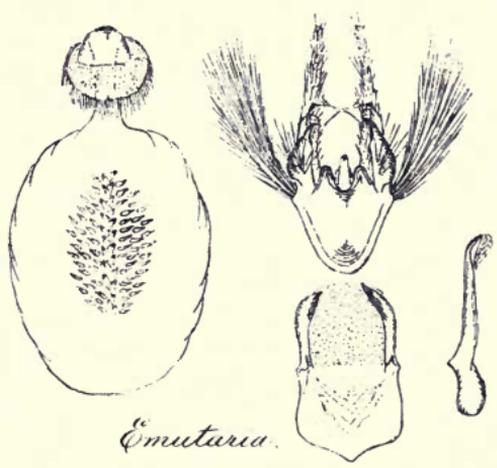
Hoslactata hemulata



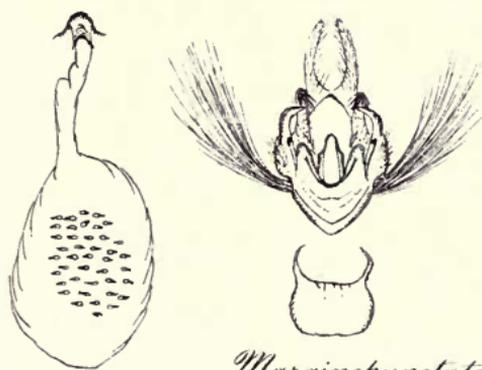
Imitaria



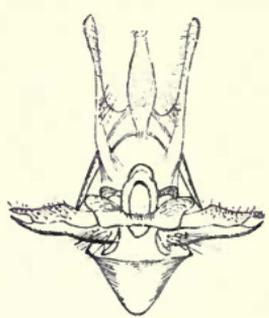
Rubiginata

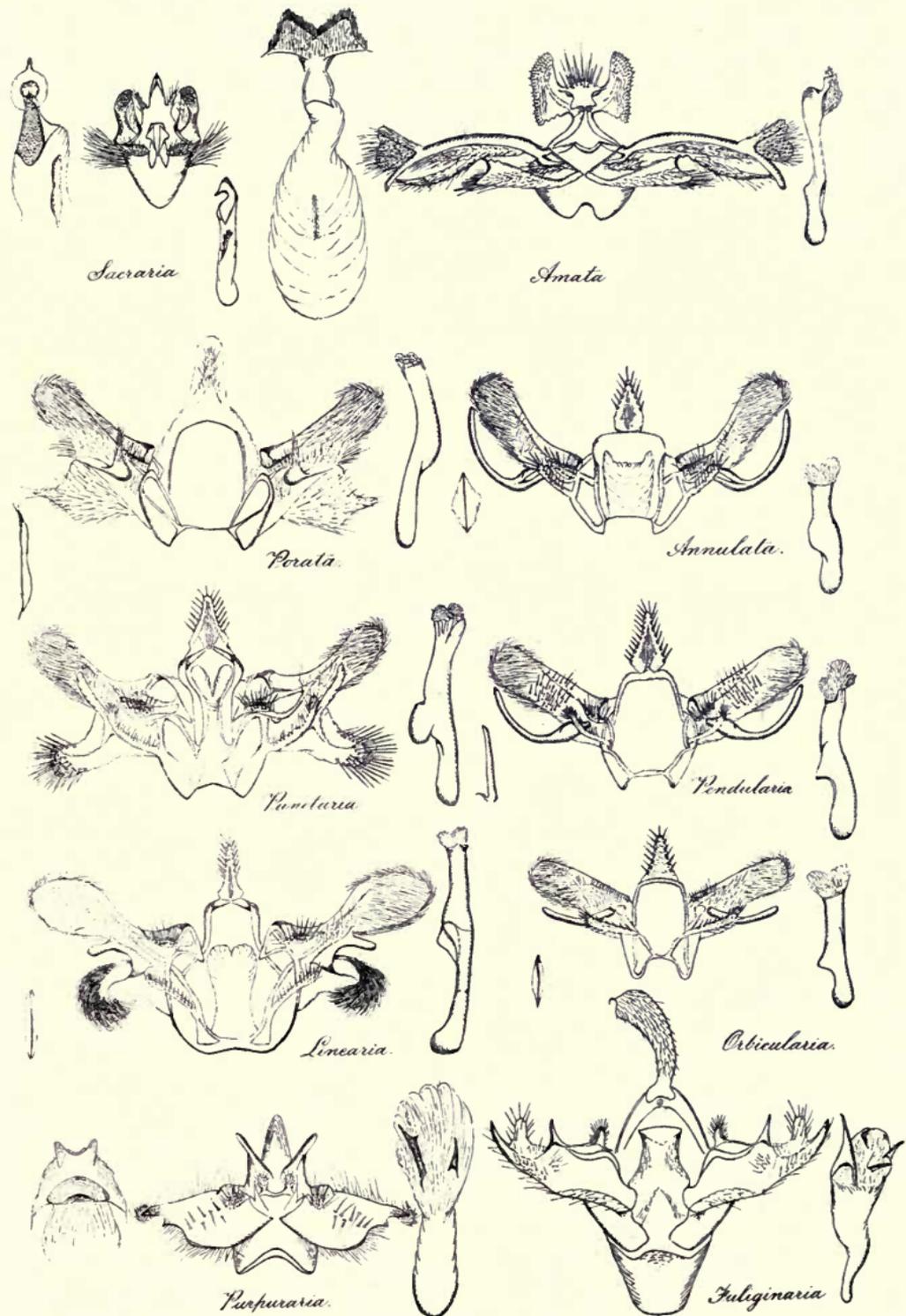


Emutaria



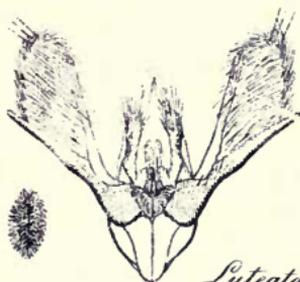
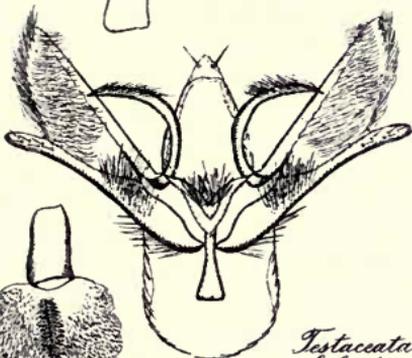
Marginepunctata







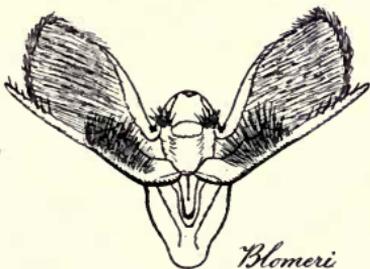
Murinata.



Luteata.



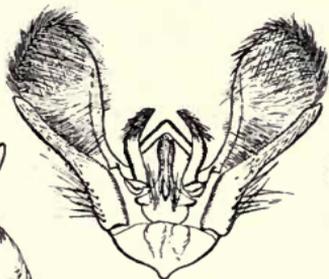
*Festucata
Sylvata.*



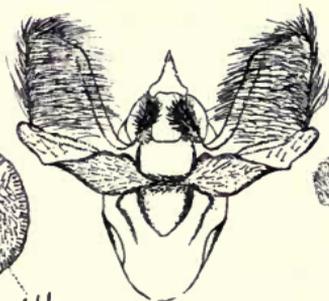
Blomeri.



Candidata.

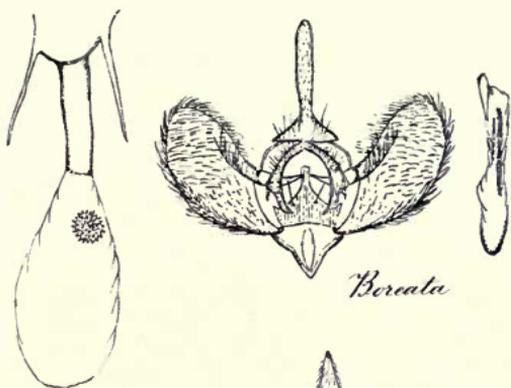


Obliterata.

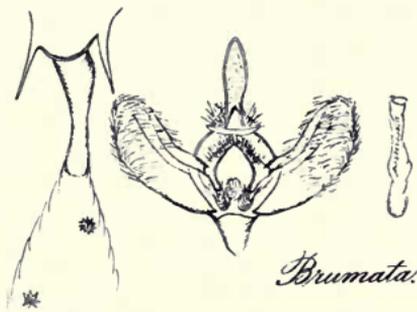


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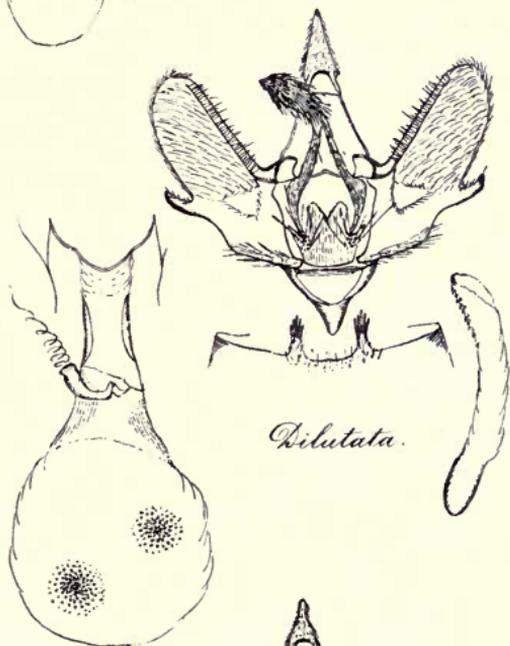




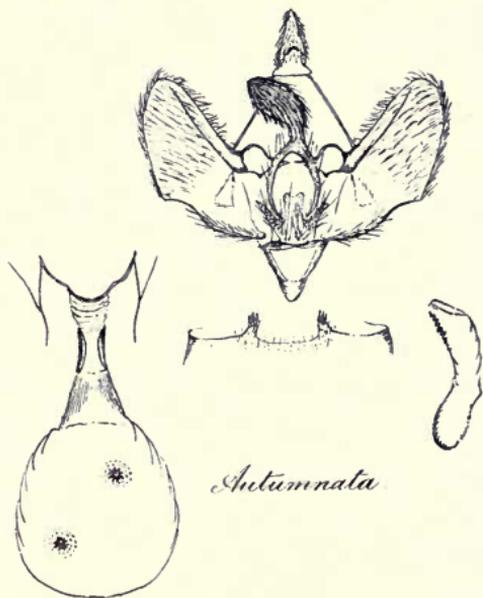
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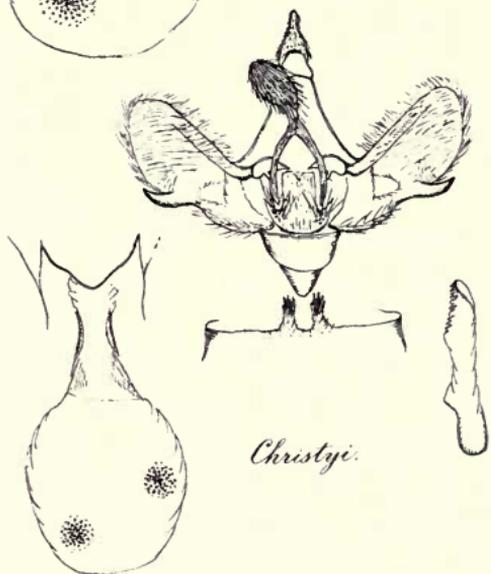
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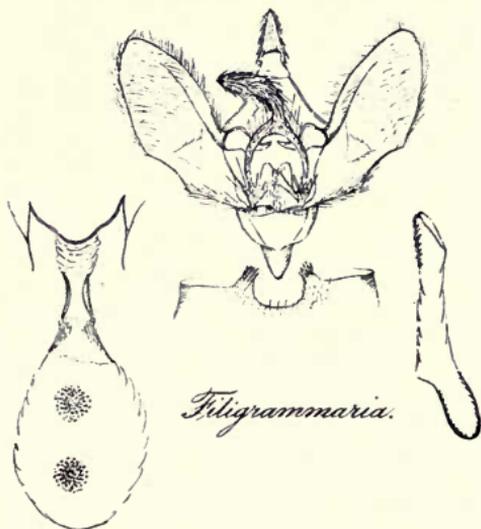
Dilutata.



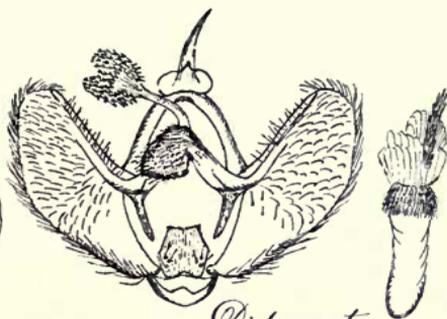
Autumnata



Christyi.



Filigrammaria.



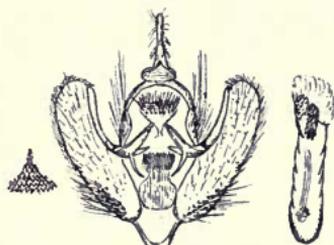
Didymata.



Mincrata.



Blandiata.



Bifasciata.



Albulata.



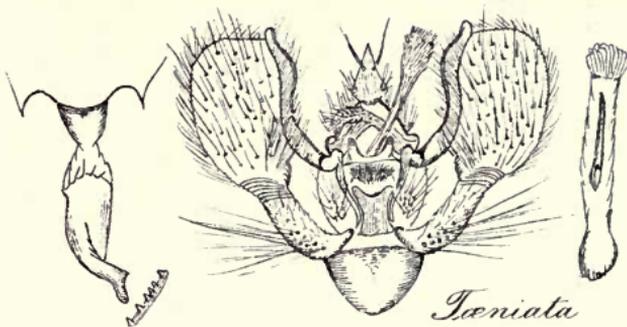
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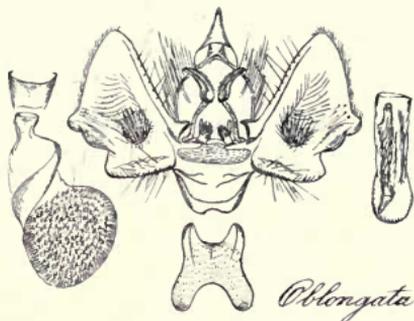
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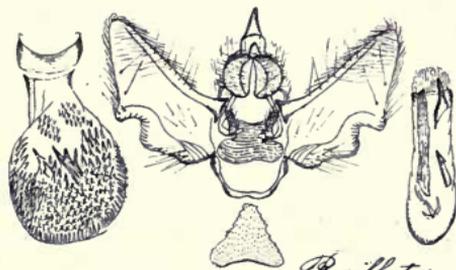
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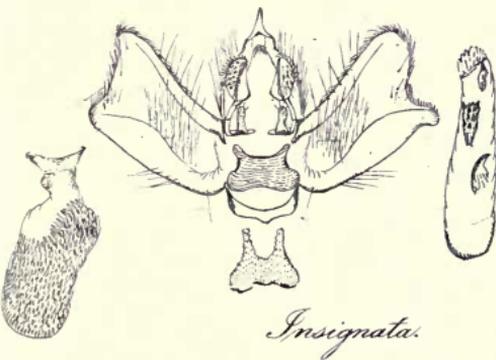
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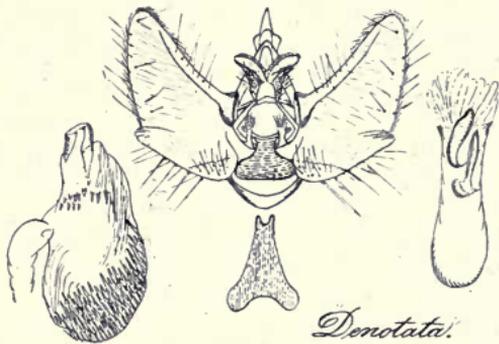
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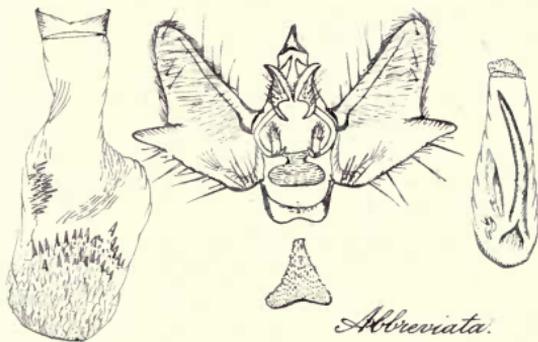
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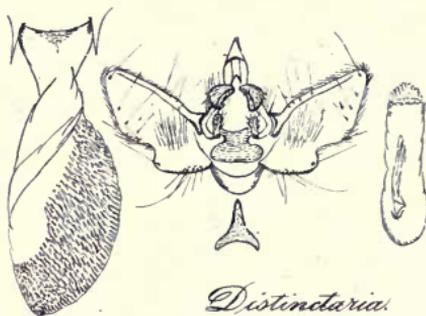
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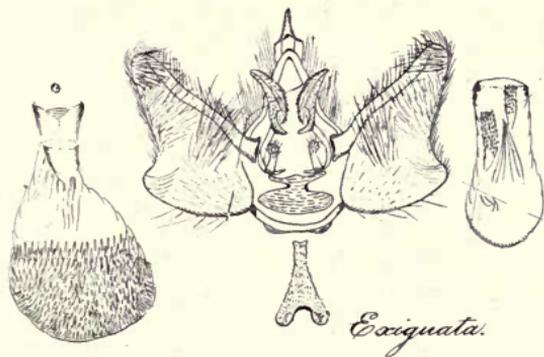
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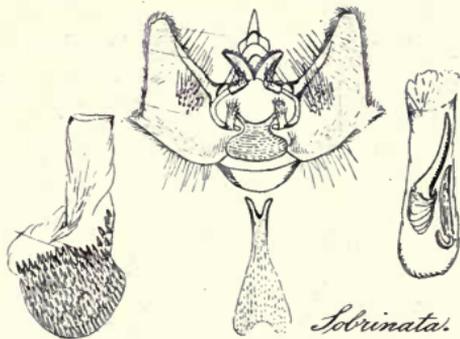
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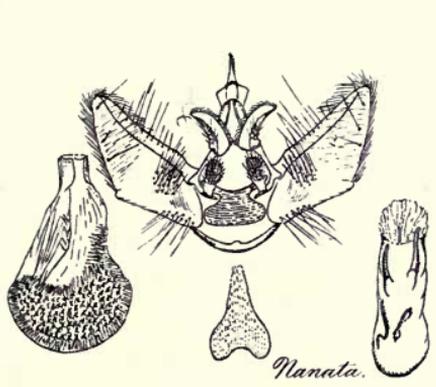
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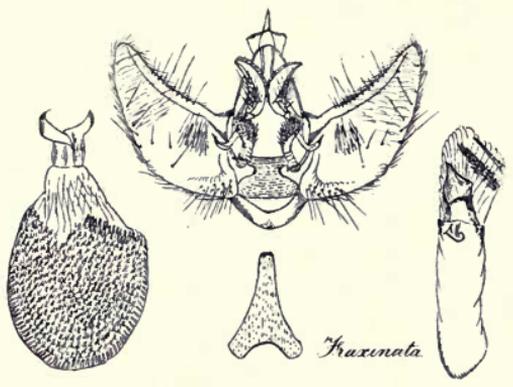
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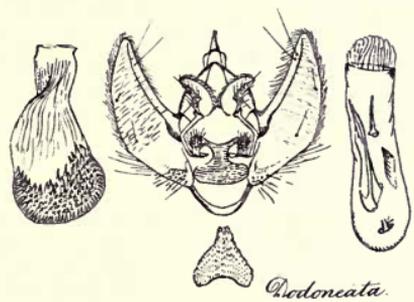
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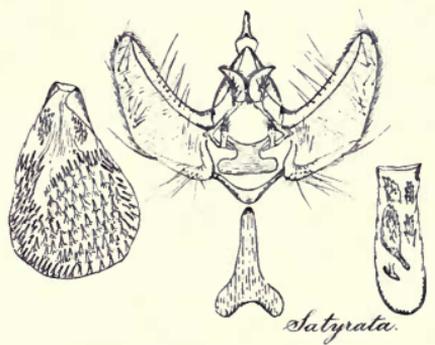
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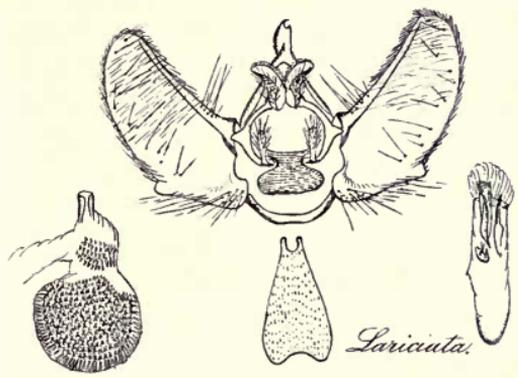
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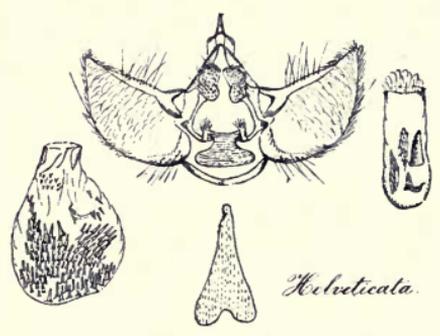
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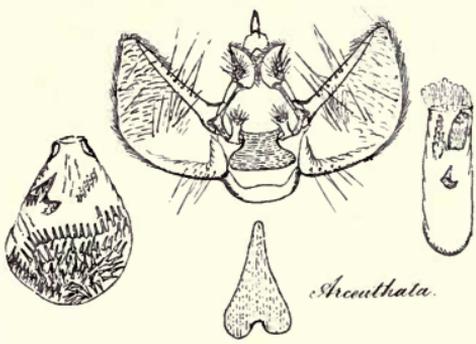
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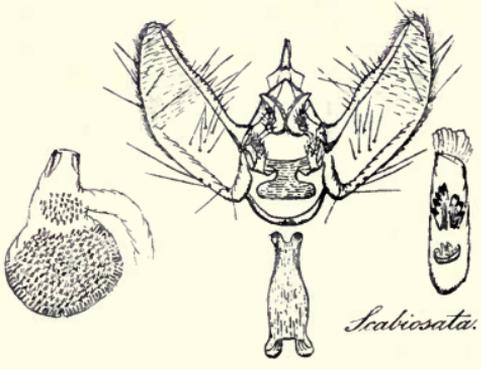
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Helveticata.

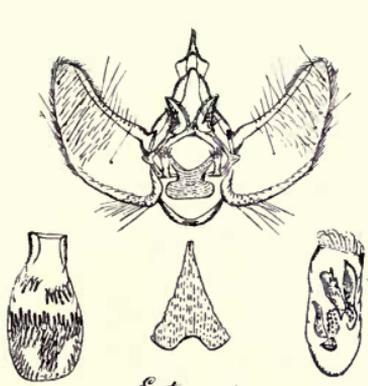


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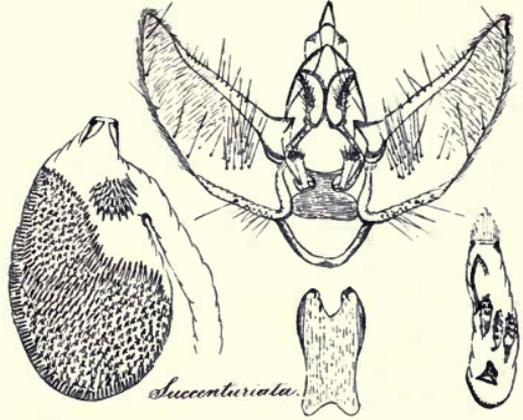


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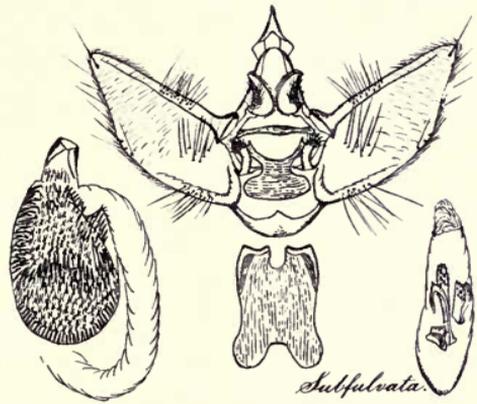




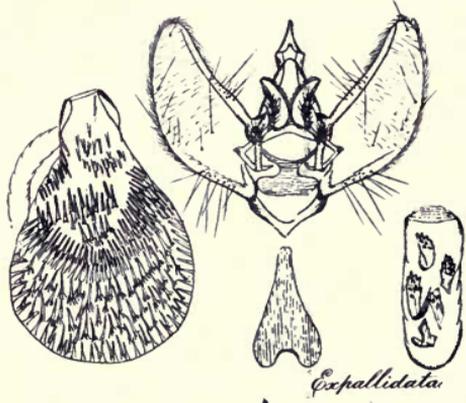
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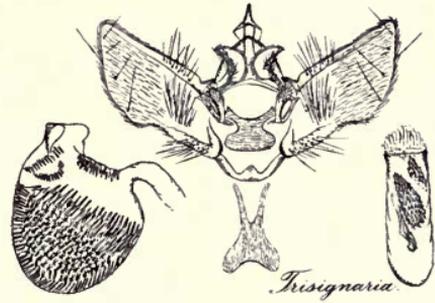
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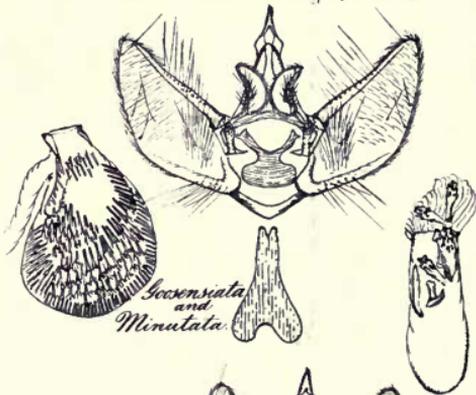
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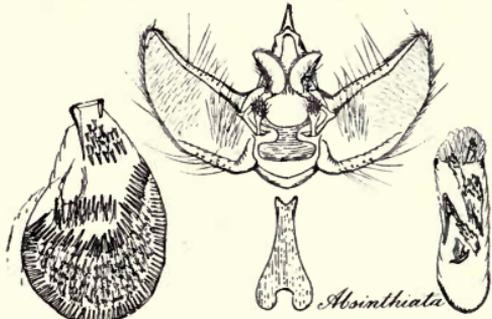
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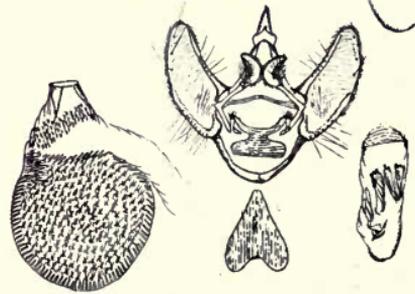
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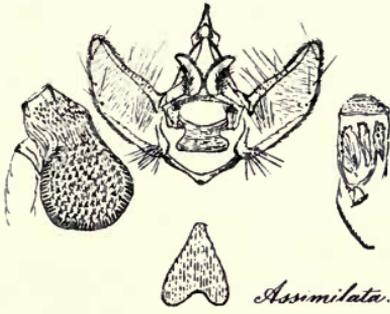
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and
Minutata*



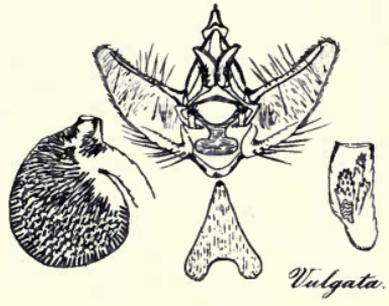
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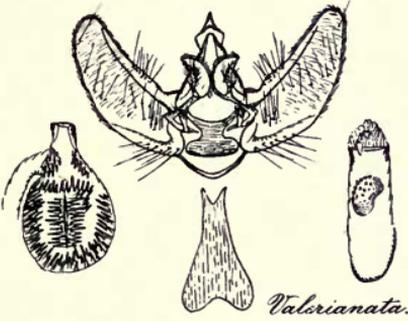
V. Knautiata - Assimilata



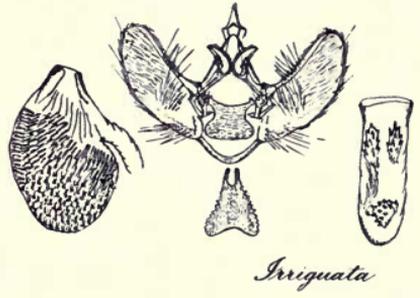
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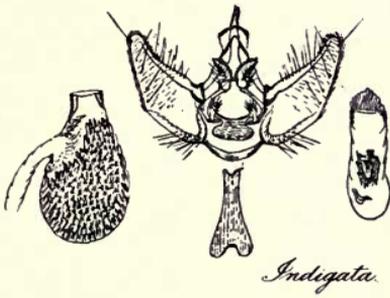
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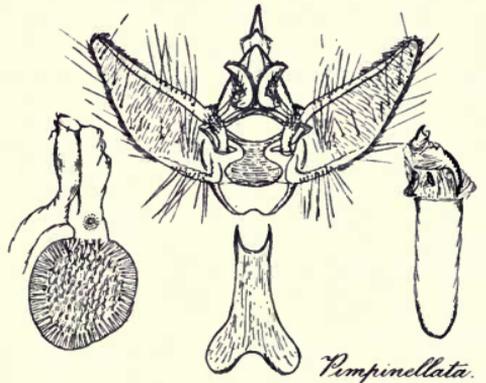
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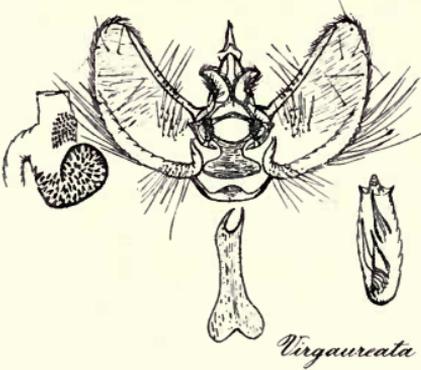
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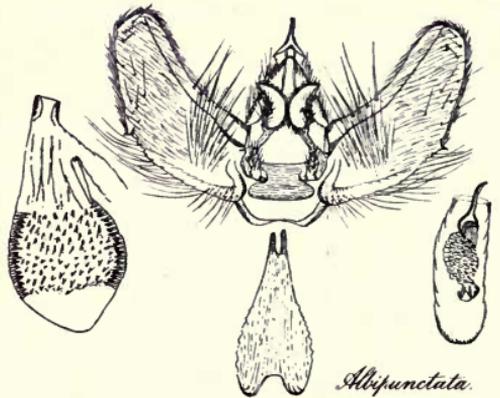
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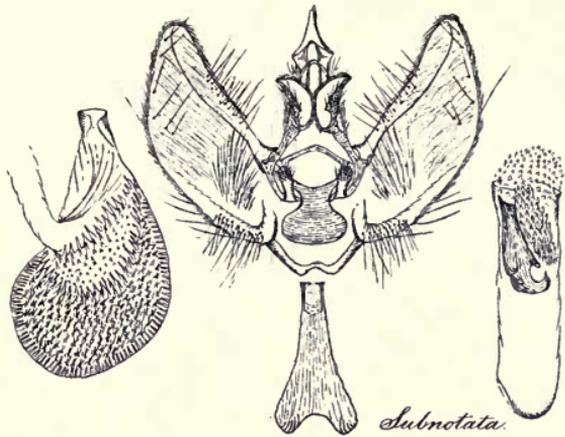
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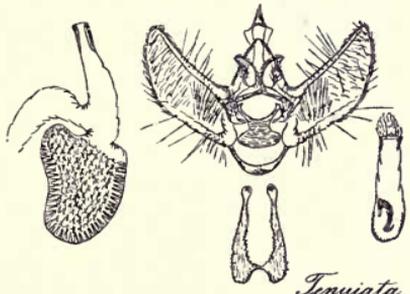
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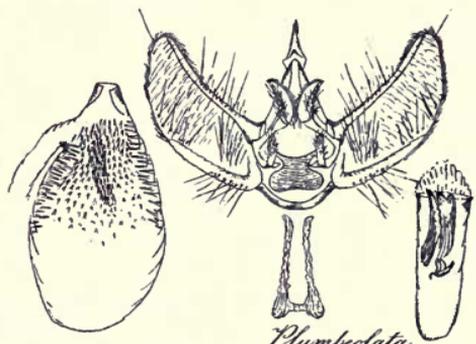
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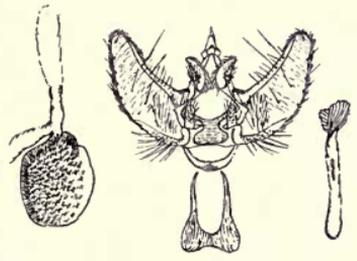
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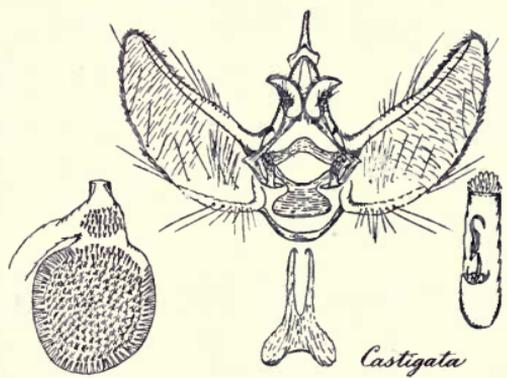
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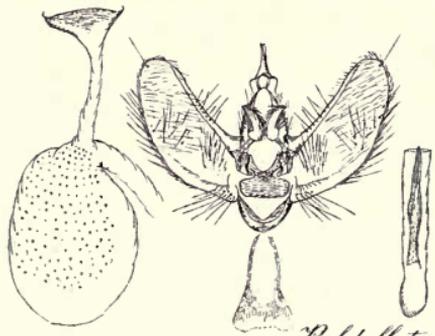
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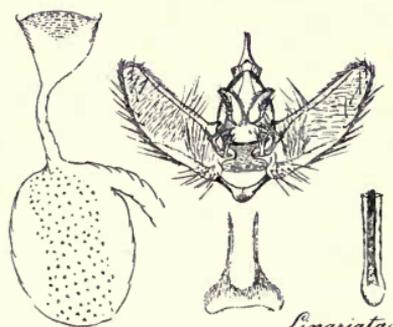
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Subulata.*



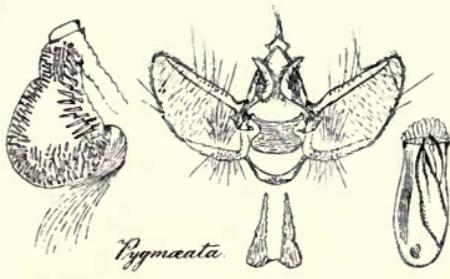
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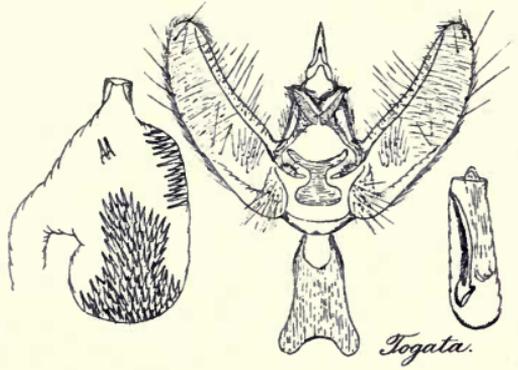
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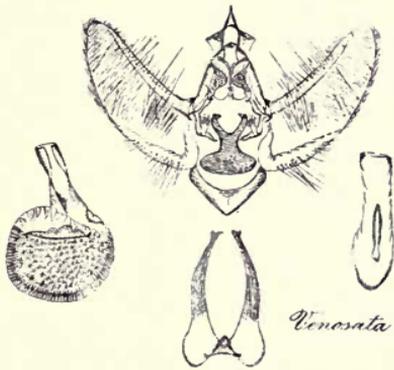
Linariata



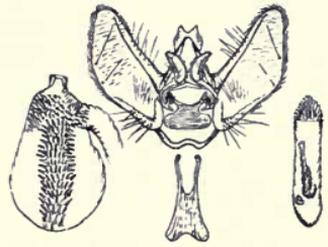
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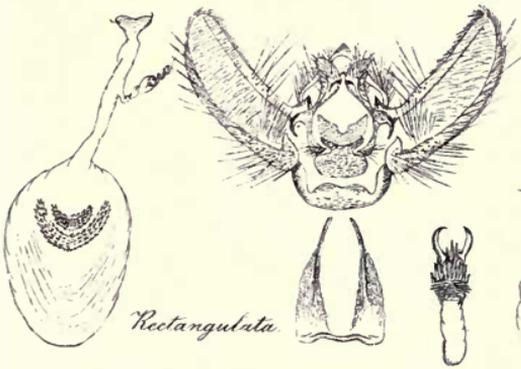
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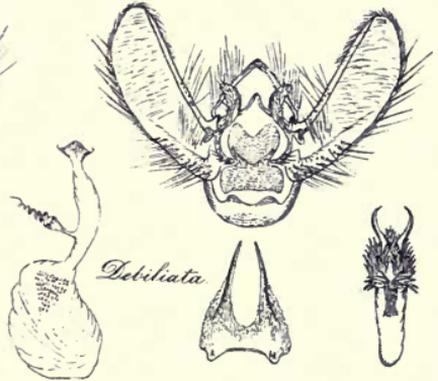
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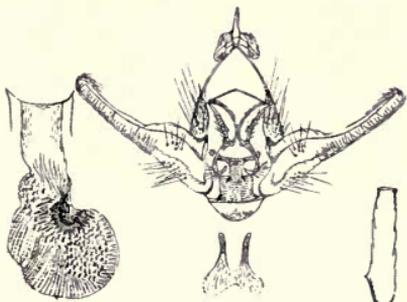
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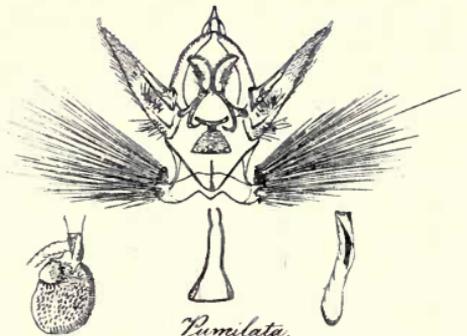
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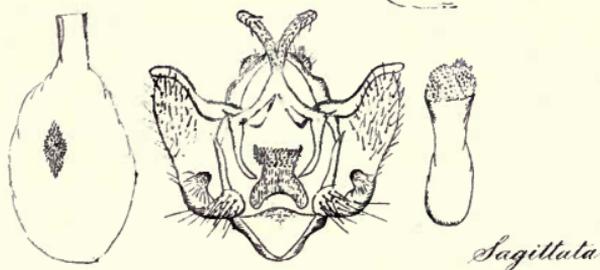
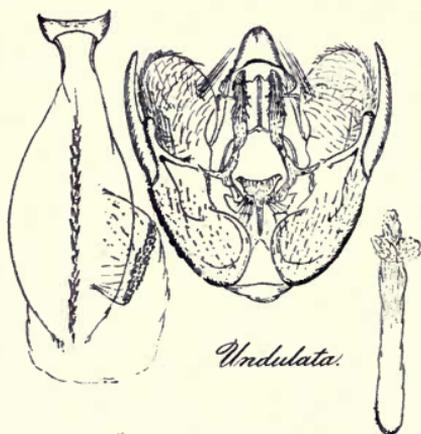
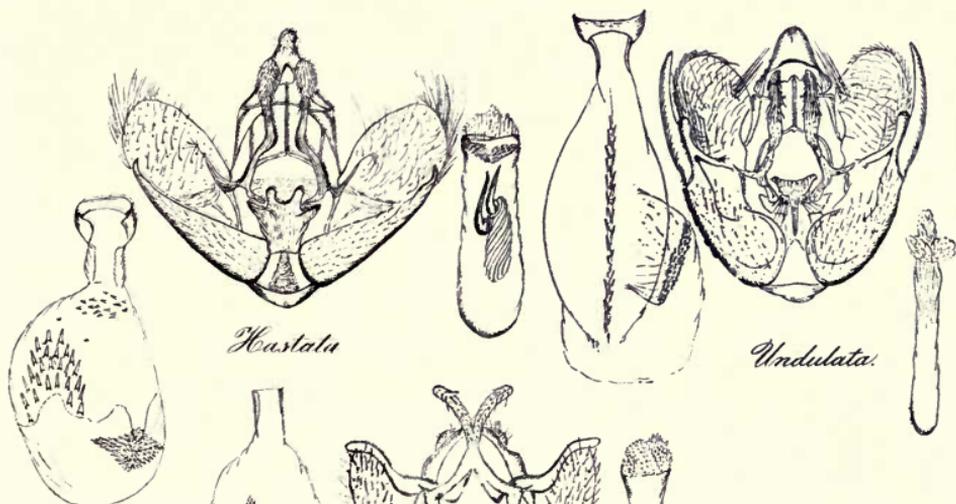
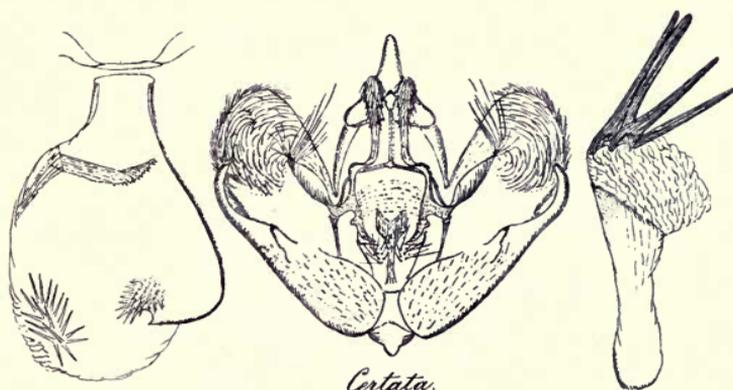
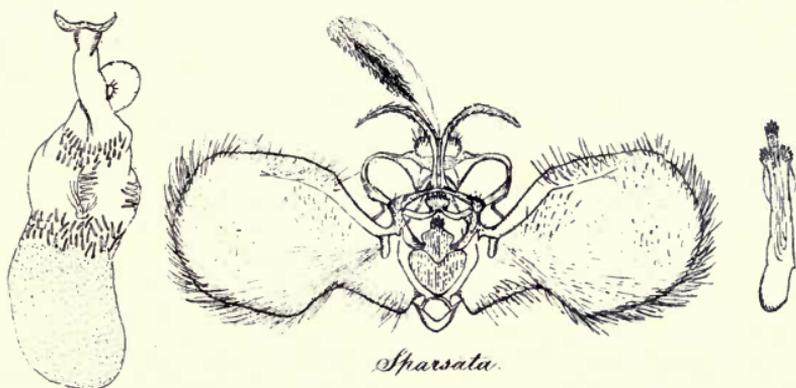
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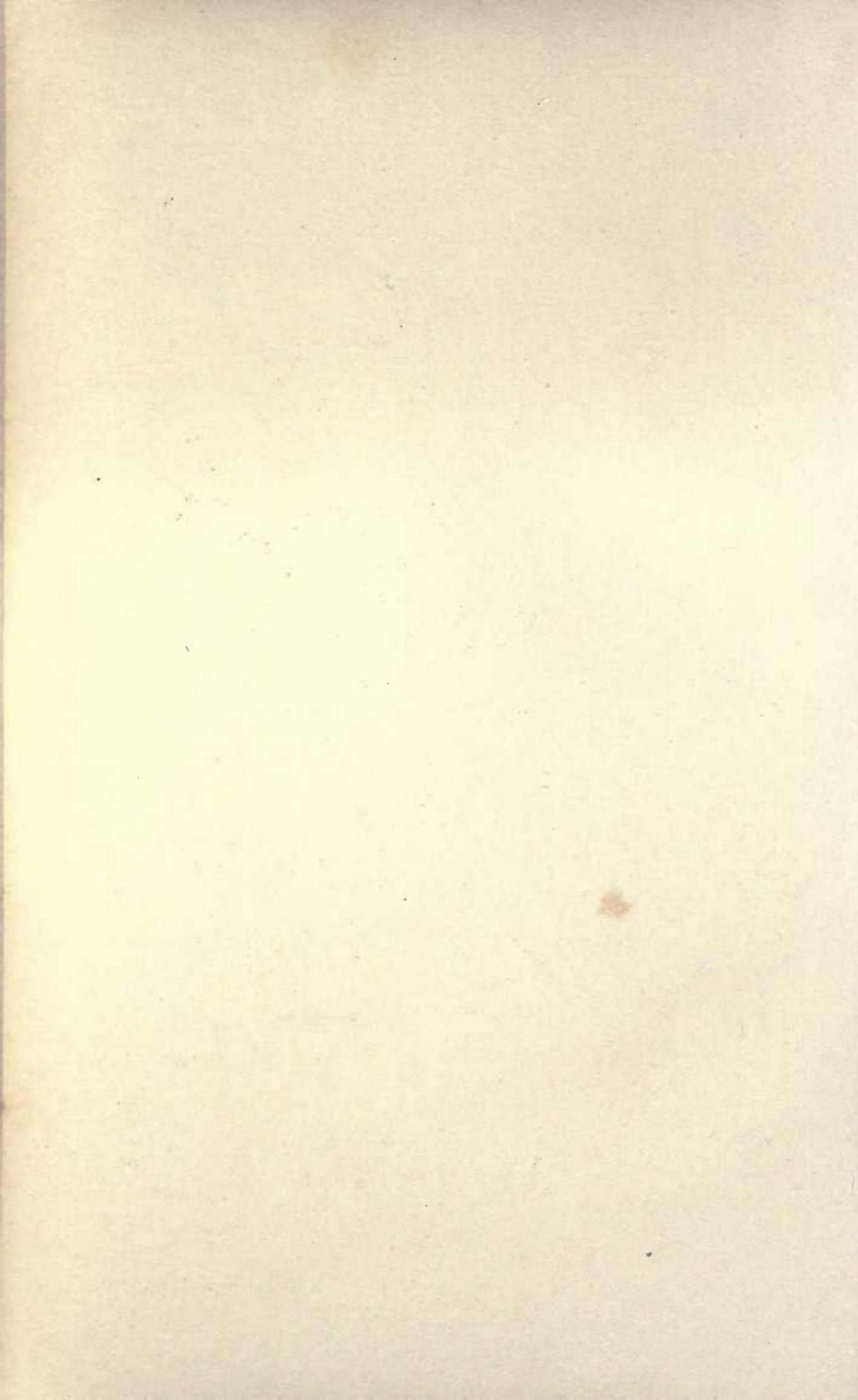


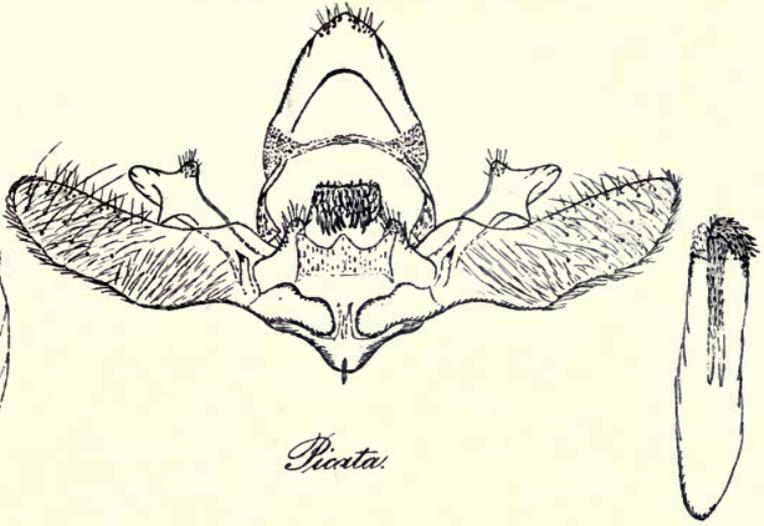
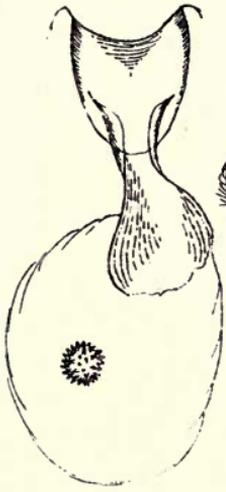
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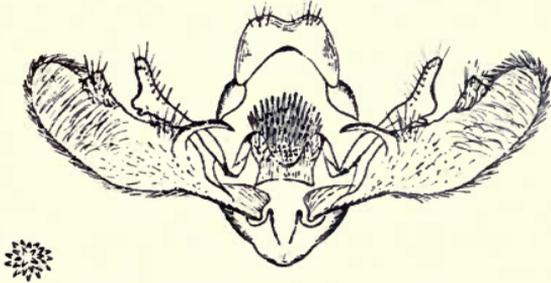
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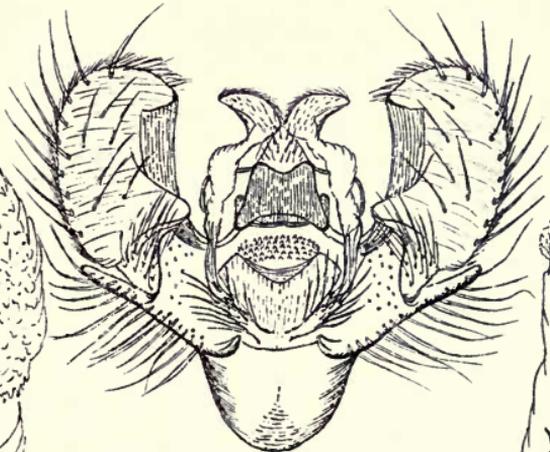
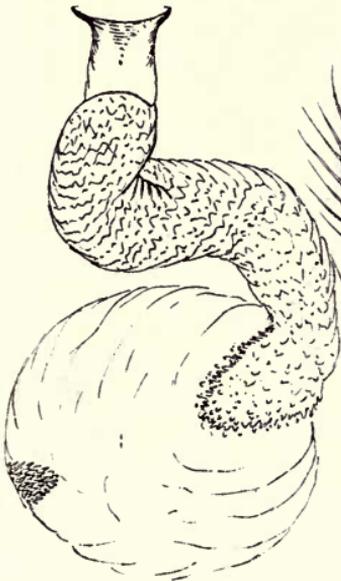




Picata.

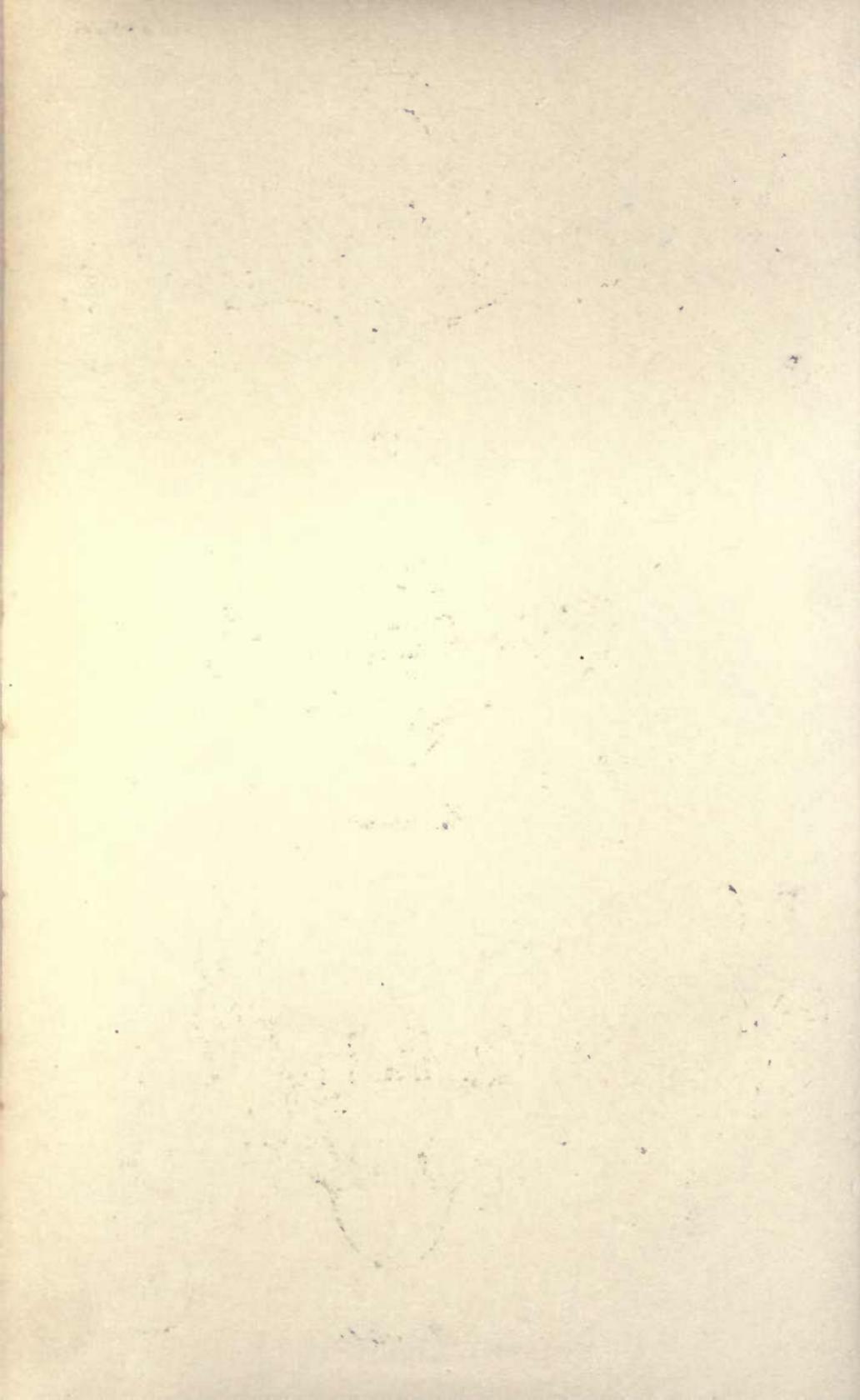


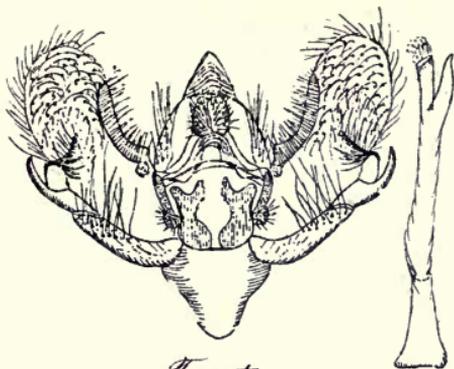
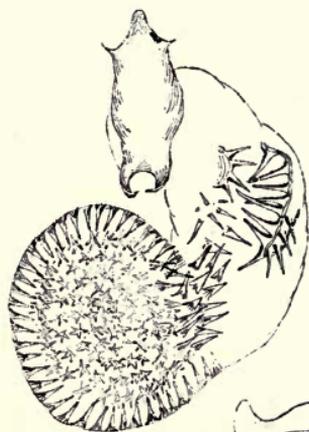
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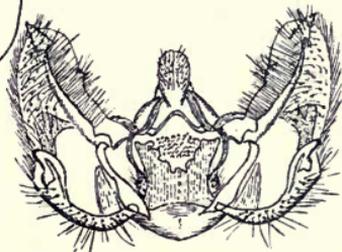
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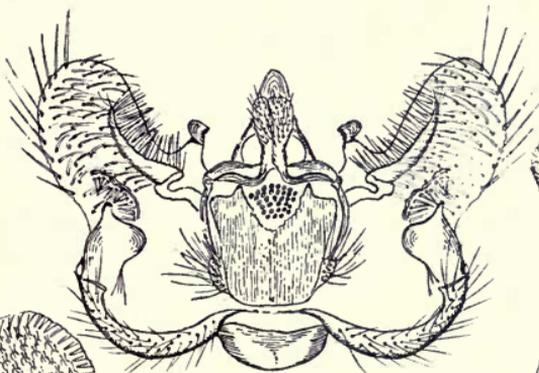




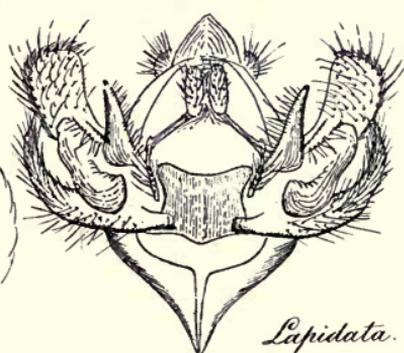
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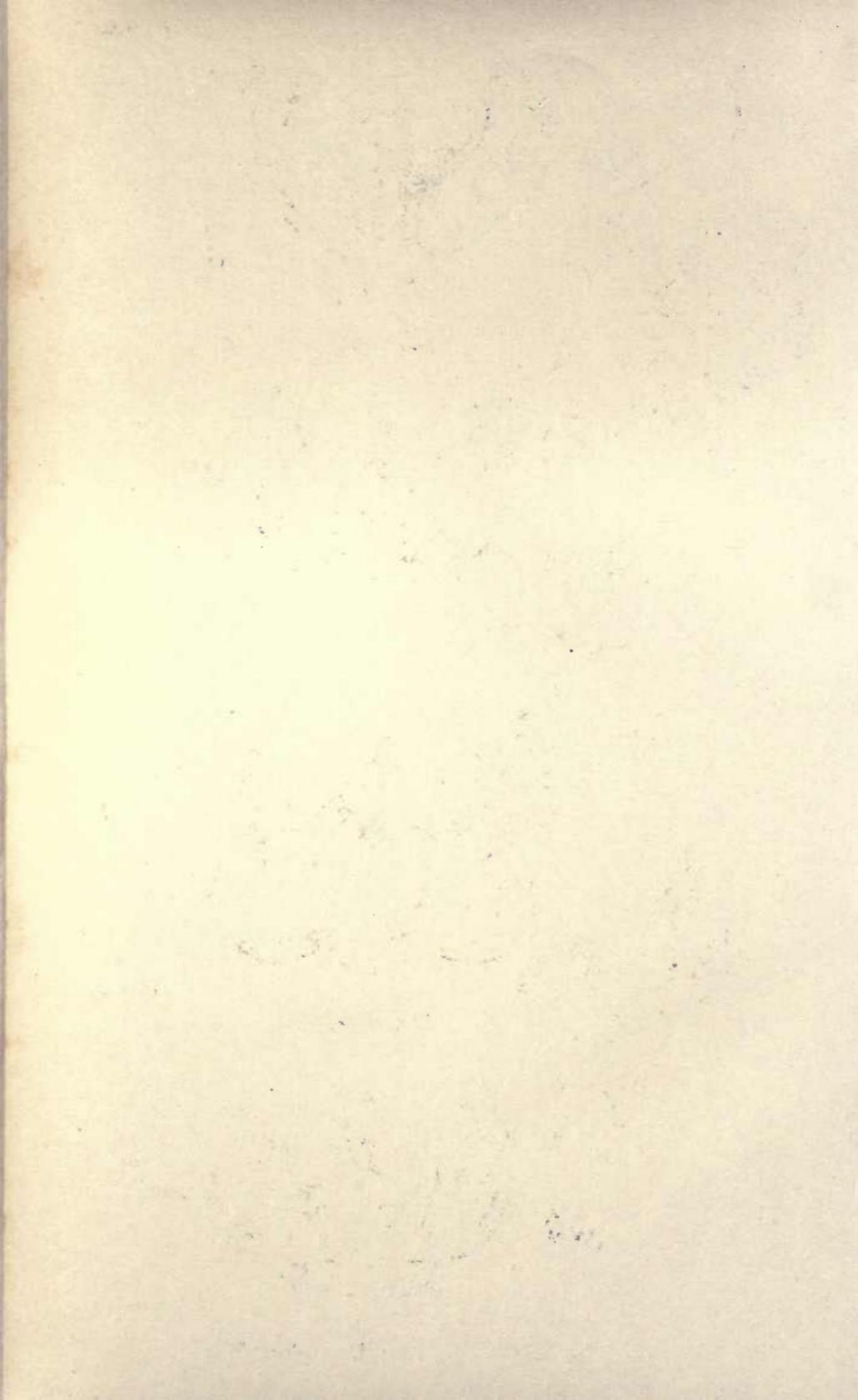
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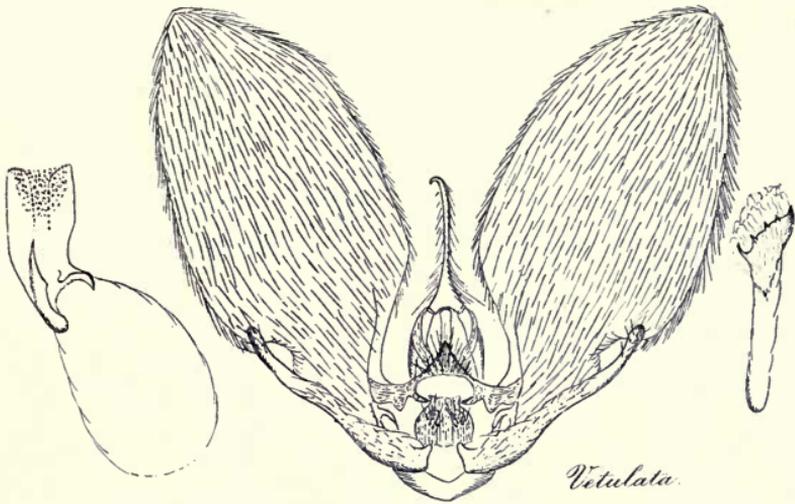


Vitalbata.



Lapidata.

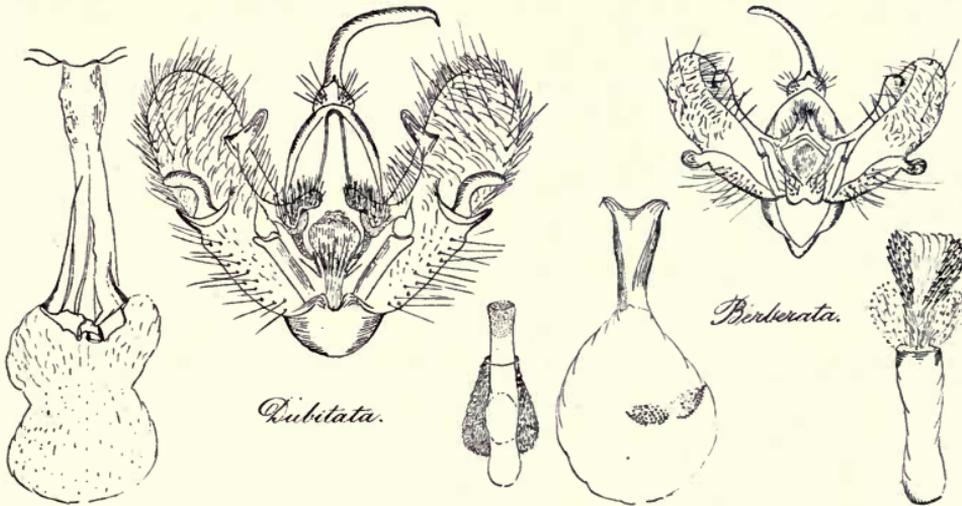




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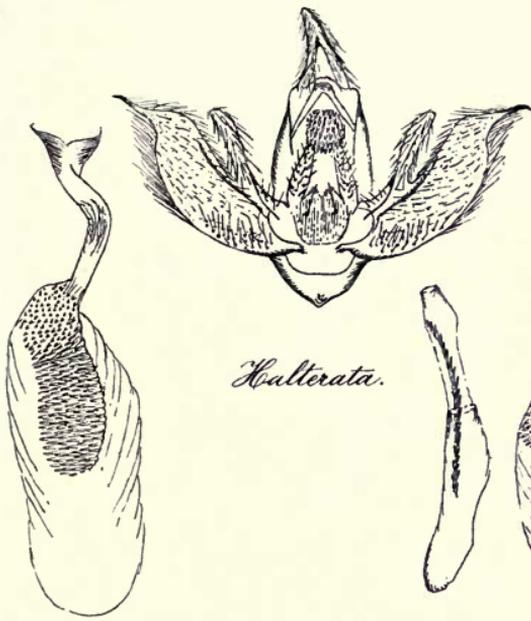


Rhamnata.



Rubitata.

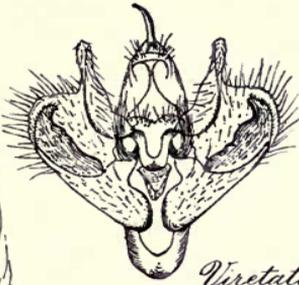
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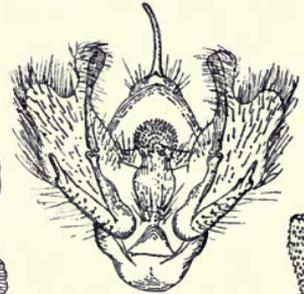
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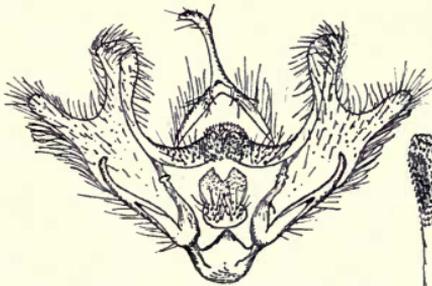
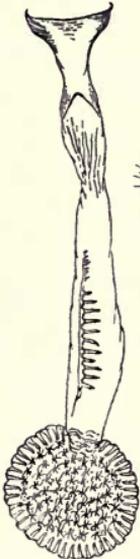
Sexalisata



Viretata

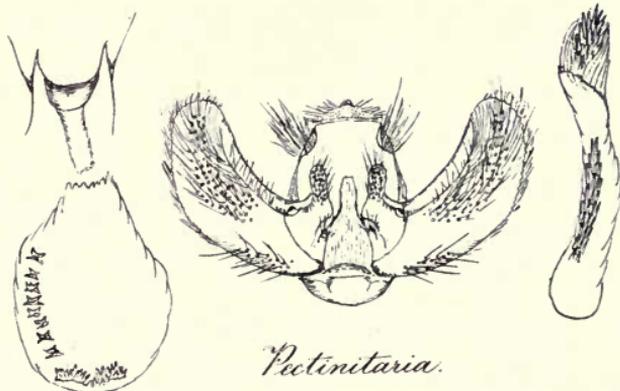
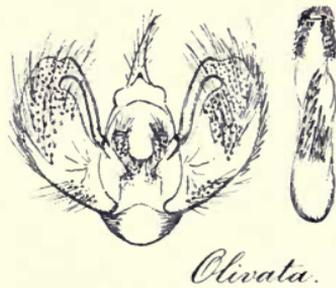
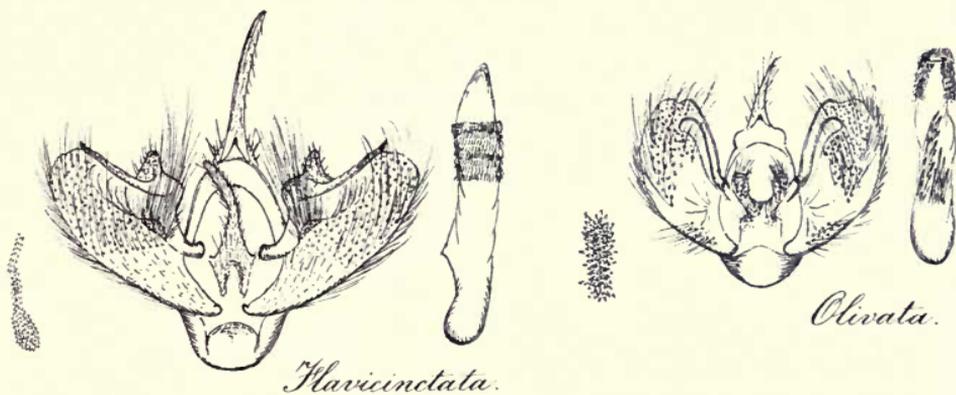
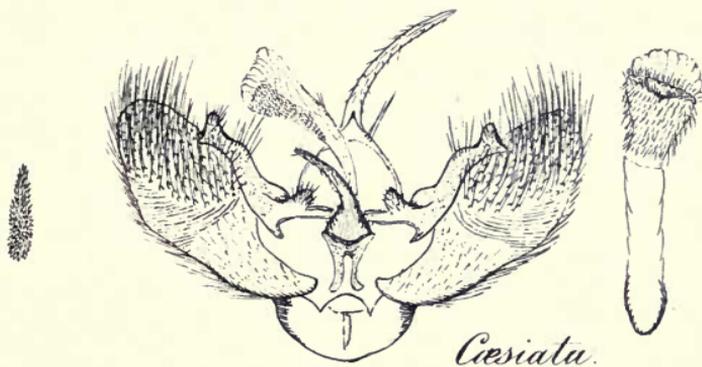


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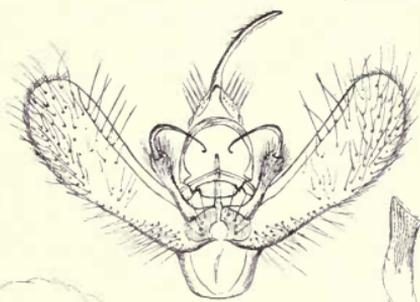
Carpinata.



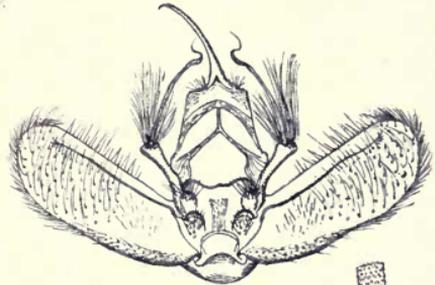




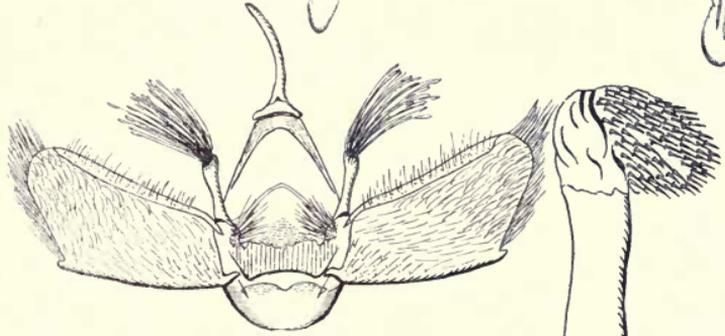
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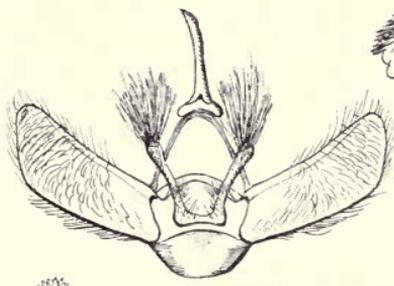
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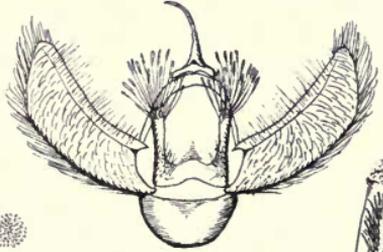
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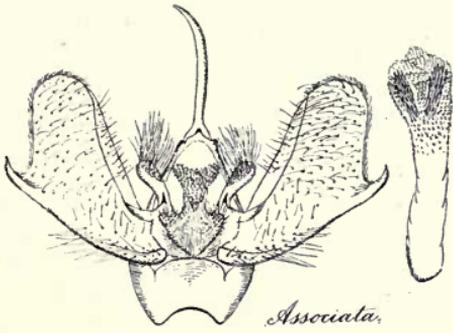
Prunata



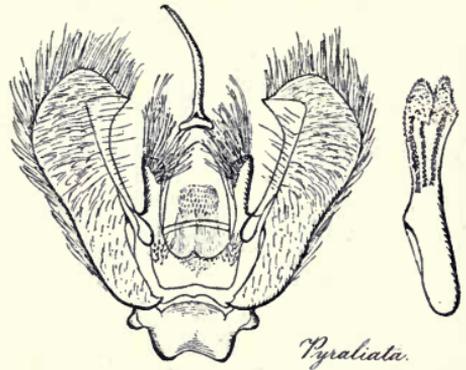
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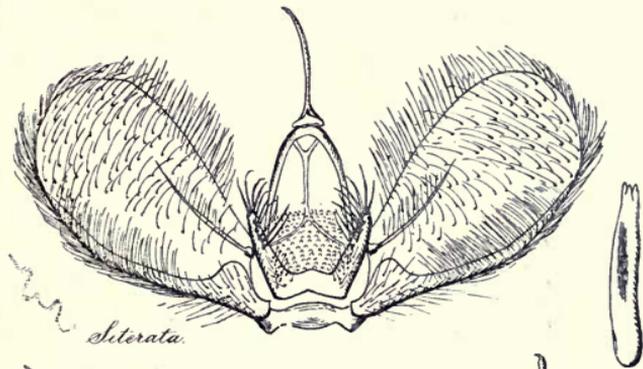
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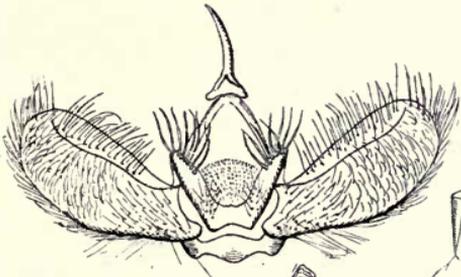
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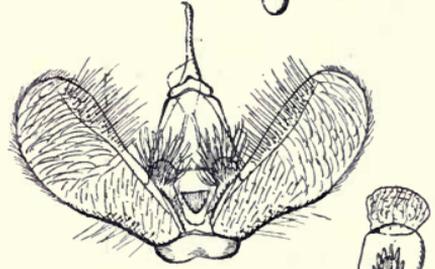
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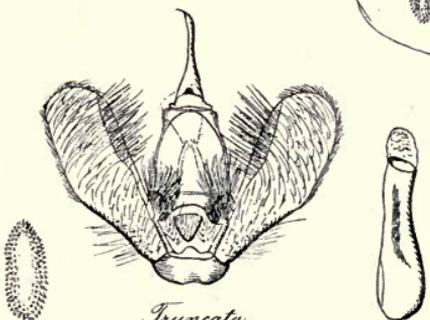
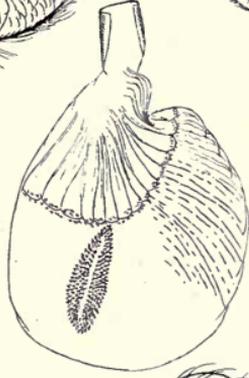
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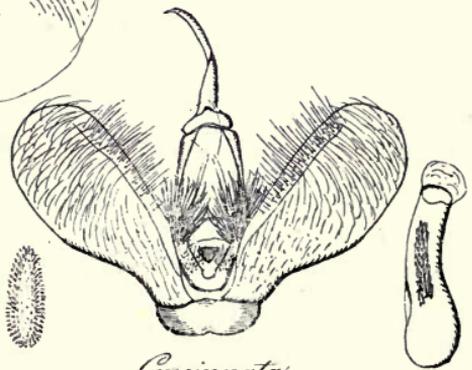
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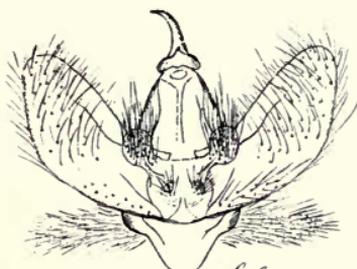
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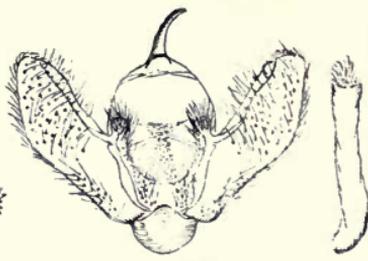
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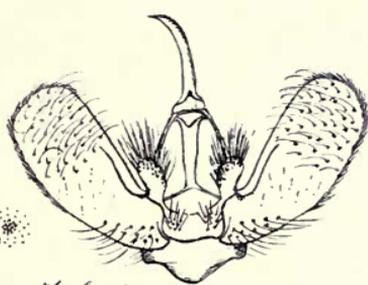
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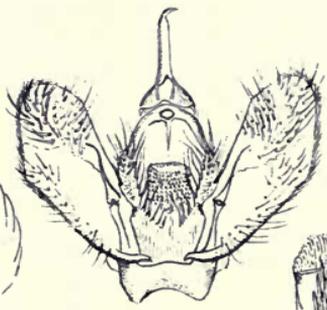
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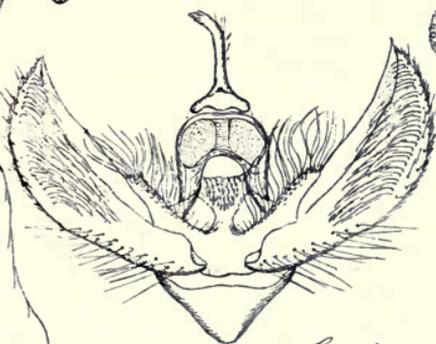
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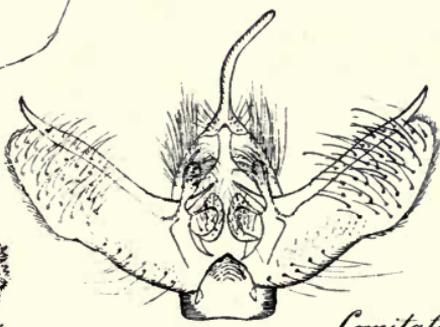
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Bicolorata.

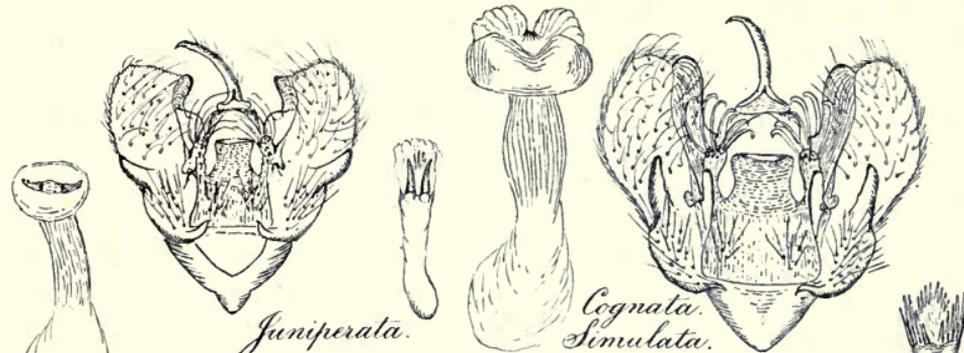


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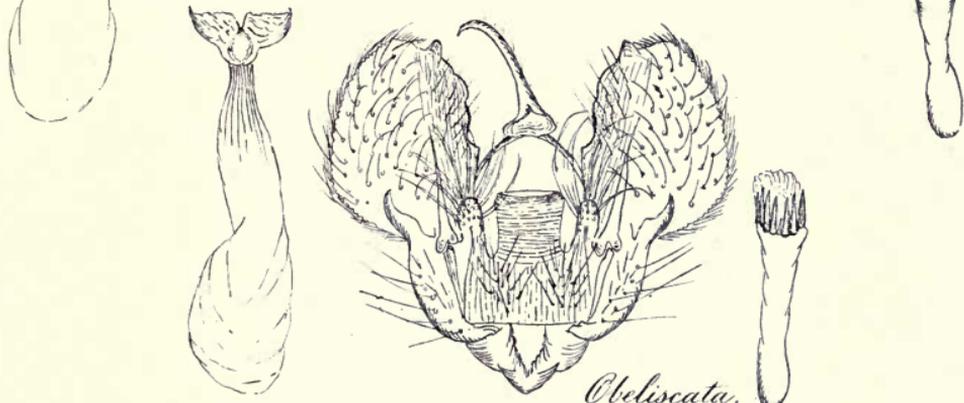
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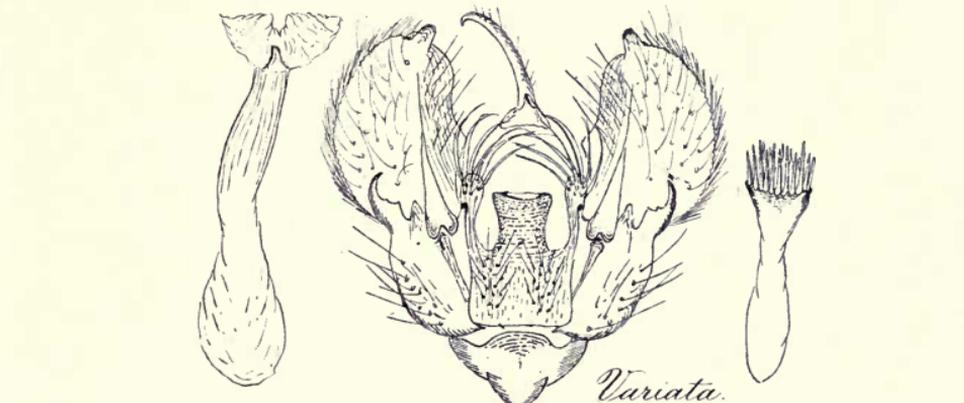


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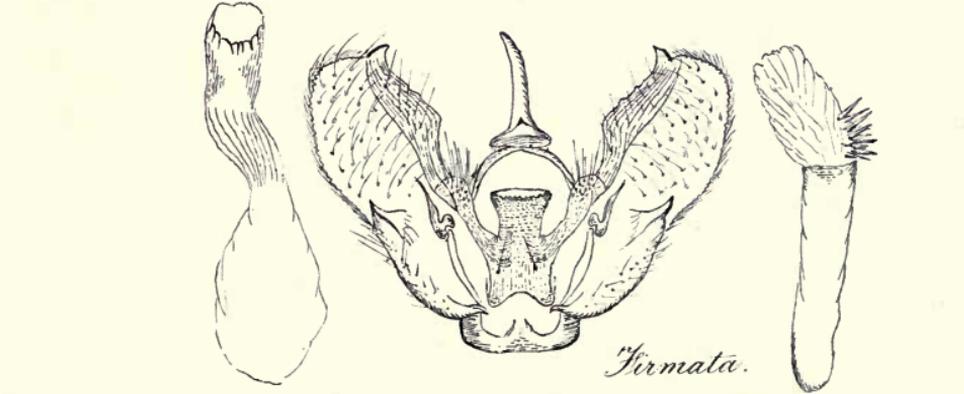
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Simulata.*



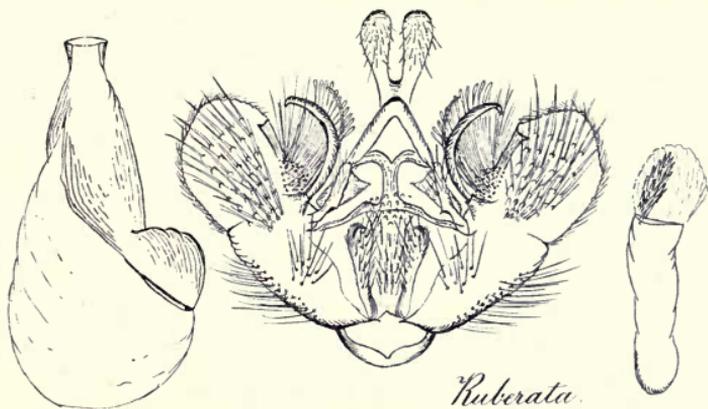
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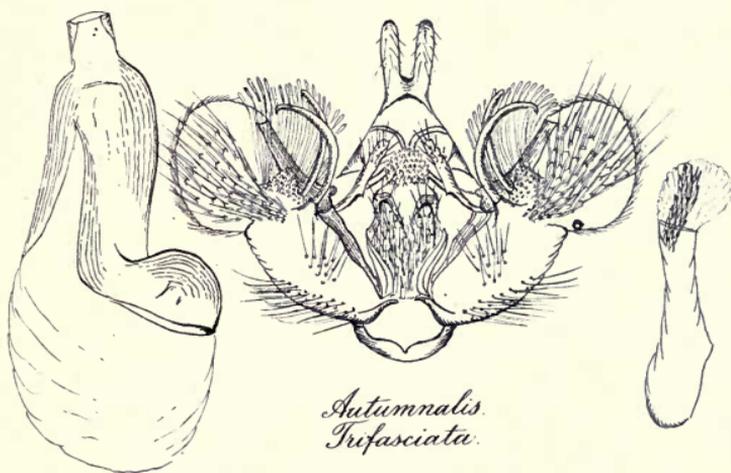
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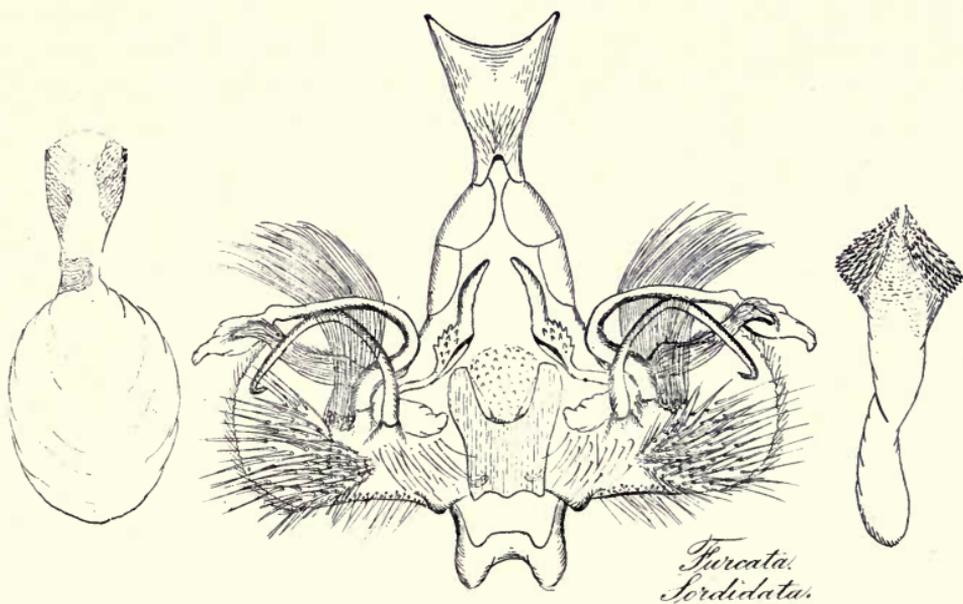
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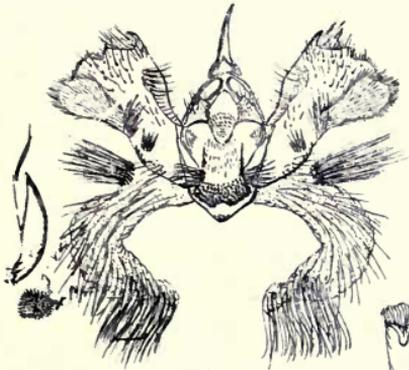
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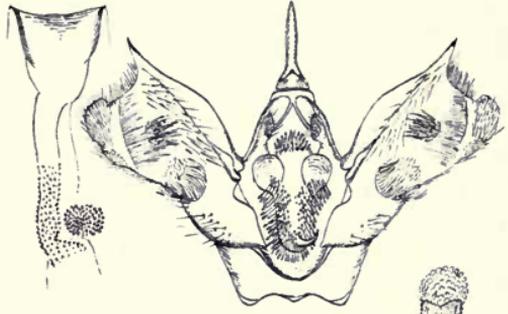
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Trifasciata.*



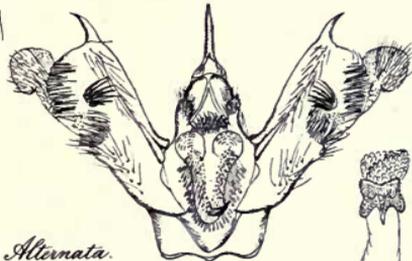
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Sordidatus.*



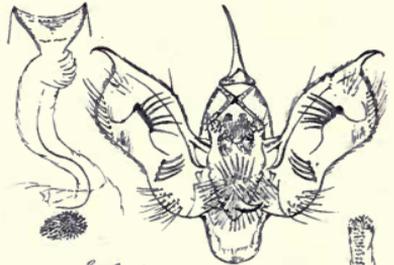
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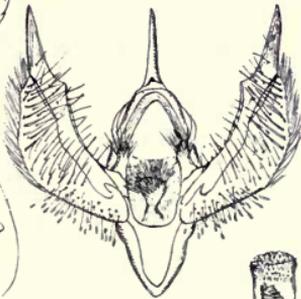
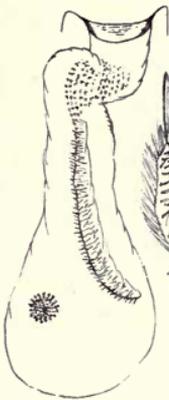
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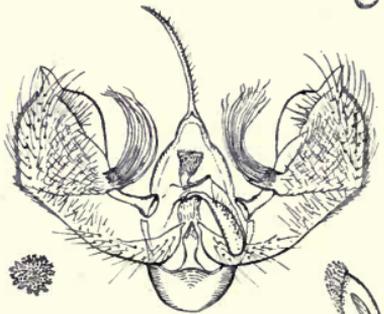
Alternata sociata.



Galata

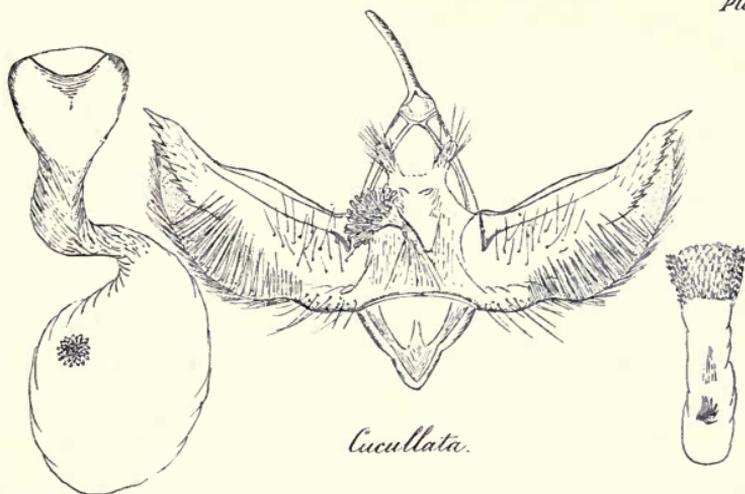


Rubedata.



Cervinata.



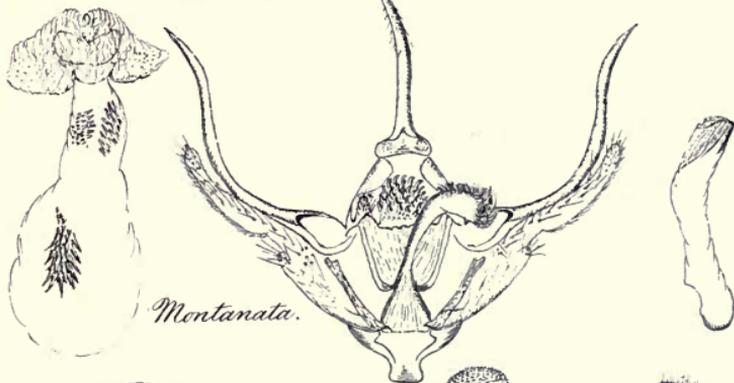


Cucullata.



Albicollata.

Flutuata

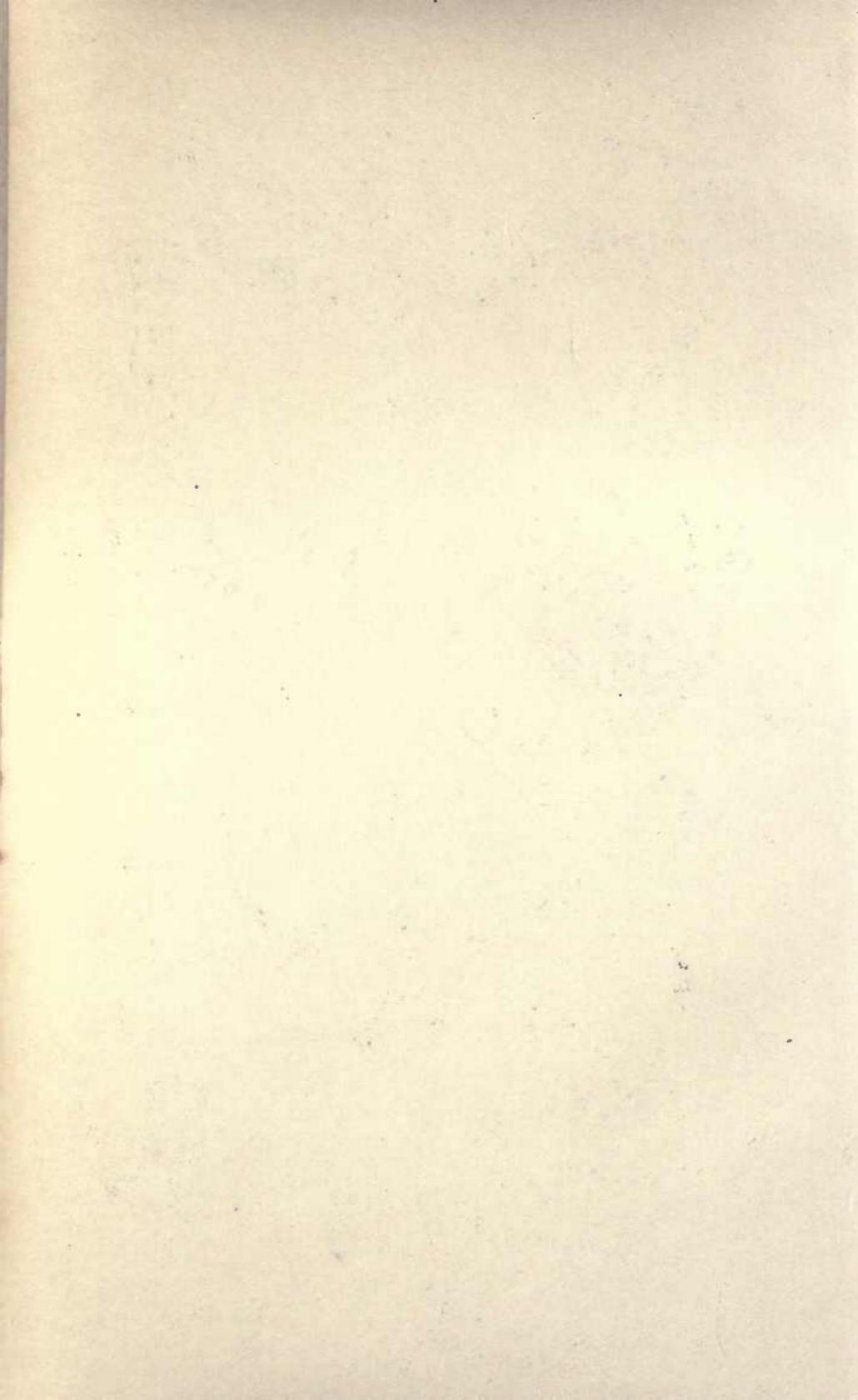


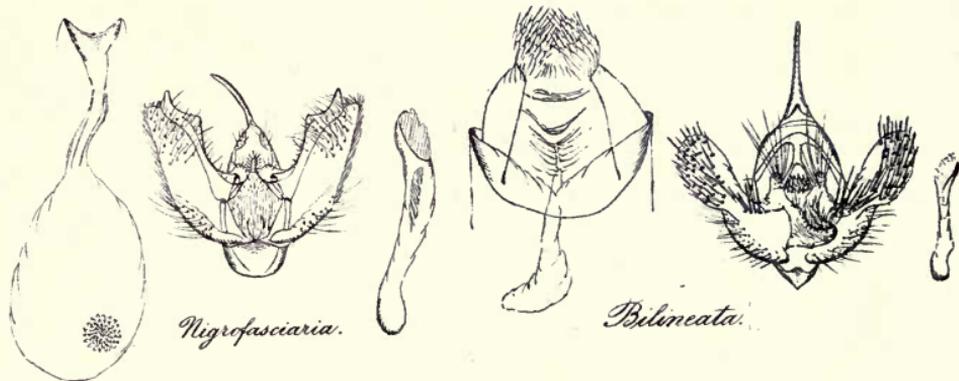
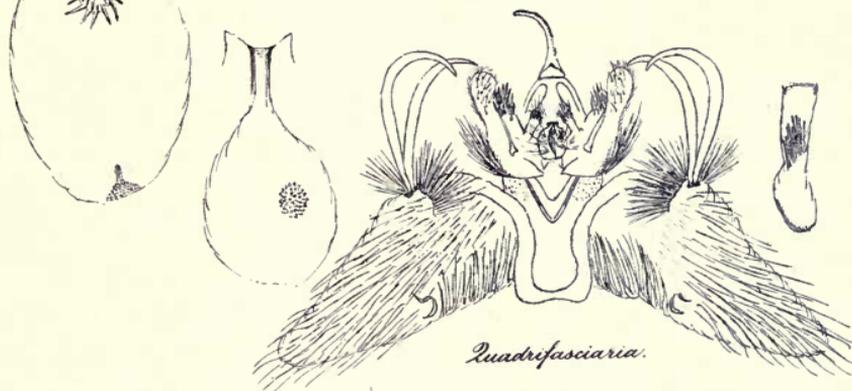
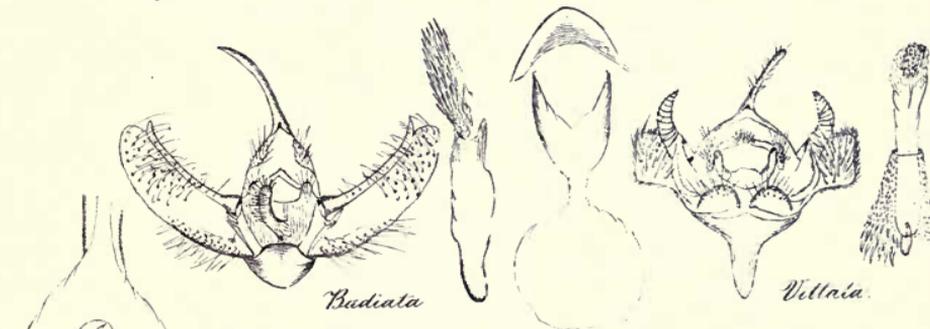
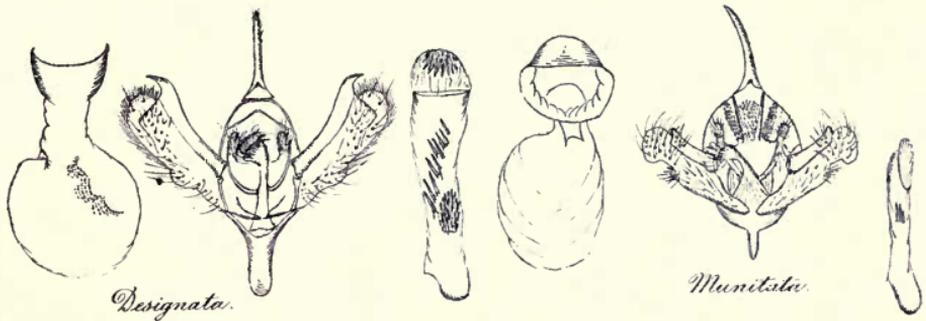
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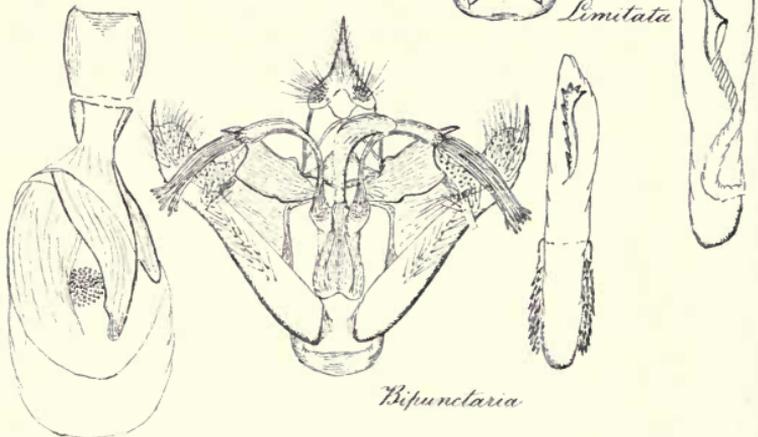
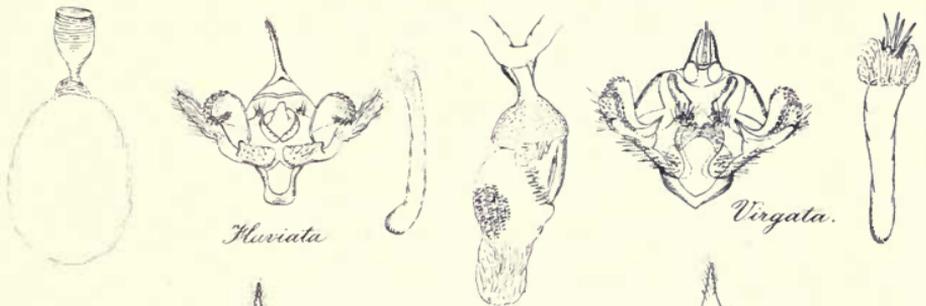
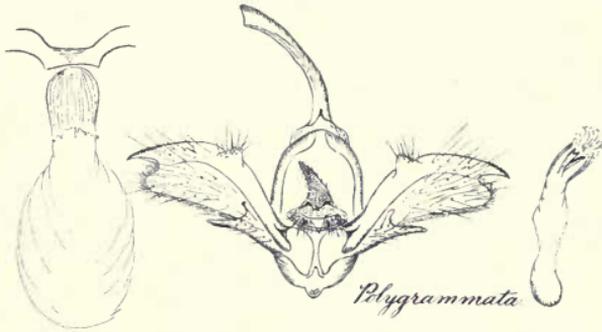


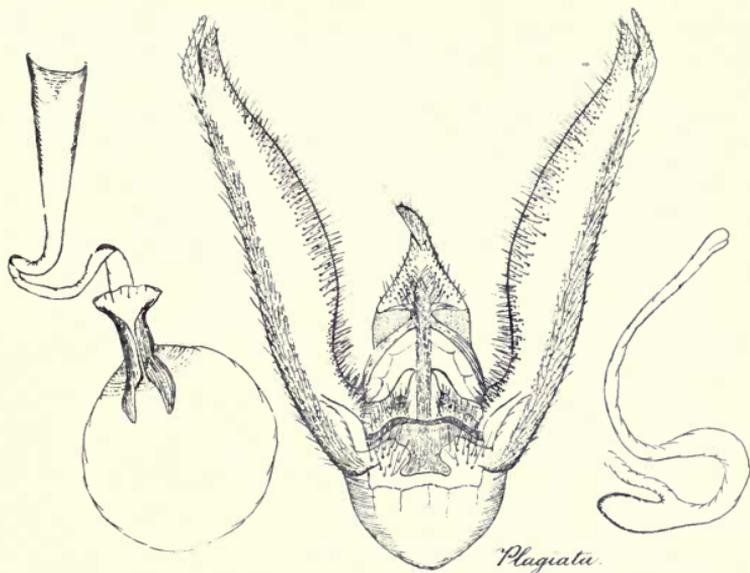
Ferrugata

Unidentaria.

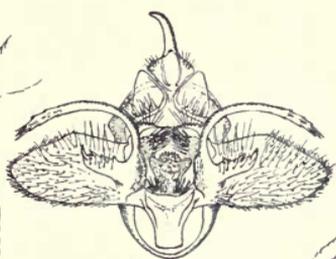
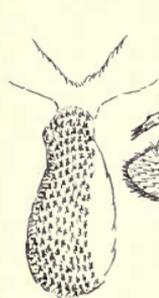




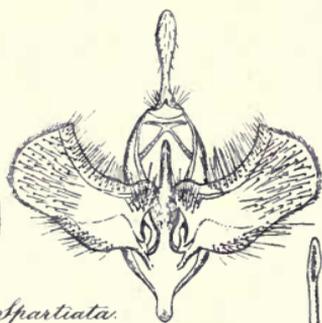




Plagiata.



Griseata.



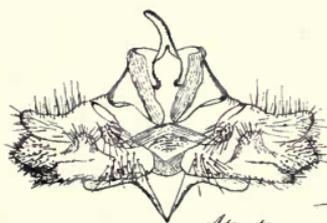
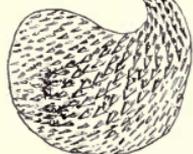
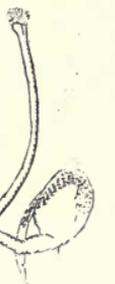
Spartiata.



Rufata.



Paludata.



Strata.







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