

1 Evolutionary mechanisms of runaway chromosome number change in *Agrodiaetus*
 2 butterflies

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4 **Supplementary information**

5 **Supplementary Table S1.** Karyotypes and *COI*, *trnL*, *COII*, *5.8S rDNA*, *ITS2*, *28S rDNA* sequence
 6 data for the studied samples of the subgenus *Agrodiaetus*.

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*Modal chromosome number (in brackets) reflects haploid karyotype in most of the individuals studied. "NSh" abbreviation corresponds to the Nazar Shapoval's sequence ID.

species name	n (modal n)*	Sequence ID		
		COI+trnL+COII	COI	5.8S rDNA + ITS2+28S rDNA
icarus (outgroup)	23	AY496815	AY556927	AY556590
achaemenes	134	EF104615	AY557140	AY556740
actinides	NA	EF104621	GU559748	AY556753
actis	26-28 (27)	EF104606	AY556999	AY556633
admetus	80	AY496711	AY556867	AY556733
admetus ssp. malievi	79	EF104617	-	HM210176
alcestis	20-21 (20)	-	AY557008	AY556641
alcestis ssp. karacetinae	19	AY954018	-	AY556574
altivagans	20- 23 (21)	AY496716	AY556846	AY556717
antidolus	42-44 (42)	AY496717	AY557095	AY556692
zarathustra	20-22 (21)	AY953994	AY557141	AY556741
arasbarani	25	AY496718	-	-
ardschira	113	AY954001	-	-
aroaniensis	48	-	AY556725	AY556856
artvinensis	21-22 (21)	-	AY557038	AY556663
baltazardi	45	AY954008	-	-
baytopi	27-28 (27)	AY496720	AY557087	AY556688
bilgini	25	AY496721	-	-
birunii	10	AY953985	AY556912	AY556578
bogra	53		NSh J318	
caeruleus	10	AY953987	AY556926	AY556589
carmon	81-82	AY496722	AY556981	AY556622
ciscaucasicus	16	AY496724	-	-
cyaneus ssp. damalis	20	EF104610	AY557143	-

cyaneus ssp. kernmansis	22	AY954003	-	-
cyaneus ssp. paracyaneus	19	AY953993	-	-
dagestanicus	39-40 (39)	AY954025	-	-
dagmara	NA	EF104618	AY556852	-
dama	41	-	AY557007	AY556640
damocles ssp. kanduli	25	AY496726	-	-
damocles ssp. krymaeus	26	AY496727	-	HM210178
damon	45	AY496732	AY557131	AY556714
damone ssp. altaicus	67	AY496734	FJ663228	-
dantchenkoi	40-42	AY496737	AY557073	AY556679
demavendi race-68 ssp. lorestanus	ca68	AY953995	AY557142	AY556743
demavendi race-73	73	EF104630	-	-
demavendi race-79	79	AY954007	-	-
dizinensis	17	EF104638	AY556939	AY556599
dolus ssp. virgilia	122	HM210162	-	HM210180
dolus ssp. vittatus	124-125 (124)	AY496740	-	-
ectabanensis	18	AY953992	-	-
elbursicus	17	AY953999	AY556877	AY556555
elbursicus from Veresk	20	AY953986	-	-
elbursicus ssp. gilensis	18	EF104637	-	-
eriwanensis	29-35 (32)	AY496742	-	-
ernesti	18	-	AY556989	AY556626
erschoffii	13-15 (13)	AY496743	AY556925	AY556588
fabressei	90	AY496744	AY556952	AY556608
faramarzii	107	AY954017	-	-
femininoides	27	EF104636	AY557150	AY556749
firdussii from Shahkuh	30-34 (30)	AY953997	-	-
firdussii ssp. vilai	35	EF104607	-	-
firdussii from Zanjan	28	EF104623	-	AY556576
fulgens	108-110 (109)	AY496712	AY556954	AY556610
glaucias	56	AY496747	AY557134	AY556736
gorbunovi	20	AY954022	AY556899	AY556569
guezelmavi	41-42 (42)	-	AY557022	AY556651
haigi	25	AY496750	AY557069	AY556677
hamadanensis	21-22	AY502112	AY556875	AY556554
hopfferi	15	AY496751	AY557005	AY556638
huberti	35-37 (35)	AY496753	AY557123	AY556707
humedasae	39	HM210170	AY557127	HM210193
interjectus	29-32 (31)	-	AY557059	AY556671
iphicarmon	29	EF104608	AY556990	AY556627
iphidamon	14	AY953988	AY556913	AY556584
iphigenia race-12	12	AY496757	AY557061	AY556656
iphigenia from Armenia	14	AY556849	-	-
iphigenia ssp. araratensis	13	AY496756	-	-

iphigenia race-15	15	EF104609	-	-
iphigenides	65-67 (67)	AY496758	FJ663236	AY556722
juldusus ssp. kasachstanus	67	AY496759	-	-
karatavicus	67	AY496760	-	-
karindus	68-73 (68)	EF104633	AY557145	NSh E398
kendevani	15-17 (15)	AY954005	-	NSh Nz3
khorsanensis	84	AY954013	AY557138	AY556737
klausschuriani	56	AY953984	AY556910	AY556577
kurdistanicus	62	AY496762	AY557074	AY556680
lukhtanovi	22	AY954021	-	-
luna	73-74	EF104624	-	NSh E154
lycius	21-22 (22)	-	AY556985	AY556625
magnificus	NA	EF104619	-	-
maraschi	16	-	AY557000	AY556634
masulensis	10	EF104613	-	GQ166175
mediator	NA	EF104602	-	-
menalcas	85	AY496763	AY557001	AY556635
merhaba	16-17 (17)	AY496764	AY557037	AY556662
mithridates from Etzincan	21-27 (22)	AY496765	-	-
mithridates from Malatya	21-27 (23)	-	AY557006	AY556639
mofidii	35	AY954012	AY557137	AY556739
morgani	25-27 (25)	-	NSh Z524	NSh W154
ninae	33-35 (34)	AY496766	AY557113	AY556701
paulae	17	-	AY556892	AY556564
peilei	38-39 (39)	EF104634	AY557144	AY556744
pfeifferi	106-108 (108)	AY954002	-	-
phyllides	66-67 (67)	AY496770	FJ663239	-
phyllis	80	AY953989	AY556923	AY556587
pierceae	22	AY496773	AY557083	AY556686
poseidon	19-21 (20)	AY496775	AY557002	AY556636
poseidonides	24	EF104622	-	AY556721
posthumus	90	AY953990	AY556922	AY556586
pseudactis	29	AY496777	AY556845	AY556716
pulcher	NA	EF104620	-	-
putnami	26	AY496778	AY557112	AY556700
ripartii	90	EF104603	AY556962	AY556727
rjabovi	49	AY954019	-	-
rjabovi from Masuleh	43	AY954006	-	-
rovshani	52-53	AY496788	AY556897	AY556567
sennanensis race-29	29	EF104616	-	-
sennanensis race-31	31	EF104625	AY557147	AY556746
sertavulensis	20	-	AY557023	AY556652
shahkuhensis	16	AY953998	-	NSh Nz7
shahrami	134	AY954016	AY557154	AY556752

shamil	17	AY954024	-	-
sigberti	29	-	AY557020	AY556650
sorkhensis	43	AY954010	-	-
stempfferi	23	AY954000	-	JX093393
surakovi	50	AY496792	AY556844	AY556715
tankeri	20-21 (21)	AY496794	AY557125	AY556709
tenhageni	54	AY954009	AY557139	AY556738
theresiaae	63	-	AY557013	AY556645
transcaspicus	52-53 (52)	AY954014	-	-
turcicolus	20	AY496796	AY557110	AY556699
turcicus	24	AY496798	AY557117	AY556674
valiabadi	23	-	AY556934	AY556594
vanensis	78	AY496799	AY556850	AY556720
vaspurakani	22	AY496713	AY557085	AY556687
wagneri	16-17 (16)	-	AY556995	AY556629
zapvadi	18-19 (18)	AY496741	AY557067	AY556675
schuriani	75-80, 81-82 (80)	-	AY557014	AY556646

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Хромосомные числа у изученных видов сем. *Pieridae*

Вид	Место сбора	Число изученных особей	Число метафазных пластинок	Число хромосом	
				основное	другие найденные числа
Подсем. <i>Dismorphiinae</i>					
<i>Leptidea sinapis</i> L.	Алтай, Зыряновск	1	1	44—45	
Тот же	Азербайджан, Талыш	3	11	?	28, 31, 32, 34
Подсем. <i>Coliadinae</i>					
<i>Colias hyale</i> L.	Алтай, Усть-Каменогорск	1	18	31	
<i>C. thisoa</i> Mén.	Армения, Даралагезский хр.	2	28	31	
Тот же	Алтай, Калбинский хр.	3	28	31	31+B, 32, 33, 34
<i>Gonopteryx rhamni</i> , L.	Алтай, Курчумский хр.	1	35	31	31+B
Подсем. <i>Anthocharinae</i>					
<i>Anthocharis cardamines</i> L.	Алтай, Зыряновск	3	39	31	30, 30+B
Подсем. <i>Pierinae</i>					
<i>Pieris brassicae</i> L.	Азербайджан, Талыш	4	32	15	
<i>P. rapae</i> L.	Алтай, Зыряновск	3	20	25	26
<i>P. napi</i> L.	Алтай, Зыряновск	1	11	25	
<i>P. ergane</i> Hbn.	Нахичевань	1	12	25	
<i>Pontia daplidice</i> L.	Алтай, Курчумский хр.	4	19	26	
<i>P. chloridice</i> Hbn.	То же	2	19	26	
<i>Aporia crataegi</i> L.	Алтай, Зыряновск	1	46	25	

Таблица 2

Хромосомные числа белянок мировой фауны

№№	Вид	Местность	Число хромосом (n)	Источник
Подсем. <i>Dismorphiinae</i> Schatz, 1886				
Триба <i>Dismorphiini</i> Schatz, 1886				
1	<i>Dismorphia amphione praxinoe</i> Doubl.	Мексика	30	de Lesse, 1970a
2	<i>D. critomediia</i> Hübn.	Боливия	31	de Lesse, 1967a
	<i>D. critomedia feodora</i> Lucas	Колумбия	31	Тот же
3	<i>D. hyposticta</i> Feld.	Колумбия	48	« «
4	<i>D. jethys</i> Boisd.	Мексика	31	de Lesse, 1970a
5	<i>D. nemesis</i> Latr.	Боливия	31	de Lesse, 1967a
6	<i>D. pinthaeus</i> L.	Гвиана	17	de Lesse, 1970c
7	<i>D. psamathe</i> F.	Аргентина	23, 24	de Lesse, 1967a
8	<i>D. theonoe melanina</i> Avin.	Гвиана	14(?) + B	de Lesse, 1970c
9	<i>D. thermesia</i> Godt.	Бразилия	31	de Lesse, Brown, 1971
10	<i>D. theucarila</i> Doubl.	Колумбия	18	de Lesse, 1967a
11	<i>Pseudopieris nehemia</i> Boisd.	Аргентина	23	Тот же
	<i>P. nehemia viridula</i> Feld.	Эквадор	23	« «
Триба <i>Leptideini</i> Verity, 1947				
12	<i>Leptidea amurensis</i> Mén.	Япония	61	Maeki, 1958a, b; 1959
13	<i>L. duponcheli</i> Stgr.	Франция	104	Lorković, 1941; 1949
	<i>L. duponcheli</i> Stgr.	Македония	104	Тот же
	<i>L. duponcheli</i> Stgr.	Турция	102, 103	de Lesse, 1960
	<i>L. duponcheli</i> Stgr.		103	Lorković, 1966 in Robinson, 1971
14	<i>L. morsei</i> Fent.	Япония	54	Maeki, 1958a, b; 1959
	<i>L. morsei maior</i> Grund.	Югославия	53, 54	Lorković, 1941

№№	Вид	Местность	Число хромосом (n)	Источник
15	<i>L. sinapis</i> L.	Финляндия	26—27,	Federley, 1938
	<i>L. sinapis</i> L.	Югославия	28, 30—31	Lorković, 1941
	<i>L. sinapis</i> L.	Алтай	28, 29, 30	
	<i>L. sinapis</i> L.	Талыш	31, 34, 35, 39	Данная работа
	<i>L. sinapis</i> L.		Около 44—45	Данная работа
			28, 31, 32, 34	
Подсем. Pseudopontiinae Reuter, 1896				
	<i>Pseudopontia</i> Plötz	Нет данных		
Подсем. Coliadinae Swainson, 1827				
Триба Coliadini Swainson, 1827				
16	<i>Colias alexandra</i> Edw.	С. Америка	31	Maeki, Remington, 1960; Maeki, 1961
17	<i>C. aurorina</i> Herr.-Schäff.	Иран	32	de Lesse, 1960
18	<i>C. australis</i> Verity	Франция	31	Тот же
19	<i>C. chlorocoma</i> Christ.	Турция	31	« «
20	<i>C. croceus</i> Fourc.	Югославия	32	Lorković, 1941
	<i>C. croceus</i> Fourc.	Азорские о-ва	31	Federley, 1942
21	<i>C. dimera</i> Doubl. et Hew.	Колумбия	31	de Lesse, 1967
22	<i>C. erate nilagiriensis</i> Feld.	Гималаи	31	Maeki, Ae, 1966
23	<i>C. eurytheme</i> Bois.	С. Америка	31	Maeki, Remington, 1960; Maeki, 1961
24	<i>C. fieldii</i> Mén.	Гималаи	31	Maeki, Ae, 1966
	<i>C. fieldii</i> Mén.	Китай	31	Saitoh, Abe, 1981
	<i>C. fieldii fieldii</i> Mén.	Индия	31	Saitoh et al., 1986
25	<i>C. hecla sulitelma</i> Auriv.	Финляндия	31	Federley, 1938; 1942
26	<i>C. hermina</i> Butl.	Перу	31	de Lesse, 1967a
27	<i>C. hyale</i> L.	Югославия	31	Lorković, 1941
	<i>C. hyale</i> L.	Финляндия	31, 32	Federley, 1942
	<i>C. hyale</i> L.	Алтай	31	Данная работа
28	<i>C. lesbia</i> F.	Аргентина	31	de Lesse, 1967a
	<i>C. lesbia</i> F.	Эквадор	32	Тот же
29	<i>C. meadii</i> Edw.	С. Америка	31	Maeki, Remington, 1960; Maeki, 1961
30	<i>C. myrmidone</i> Esp.	Европа	31—32 (?)	Kernewitz, 1915
31	<i>C. nastes werdandi</i> Zett.		31	Federley, 1942
32	<i>C. palaeno</i> L.	Финляндия	31, 31—32	Federley, 1938, 1942
	<i>C. palaeno sugitanii</i> Esaki	Япония	31	Maeki, 1958b; 1959
33	<i>C. phicomone</i> Esp.	Пиренеи	30	de Lesse, 1960
34	<i>C. philodice</i> Godt.	С. Америка	31	Maeki, Remington, 1960; Maeki, 1961
	<i>C. philodice</i> Godt.	« «	31	Lorković, 1966 in Robinson, 1971
25	<i>C. polygraphus</i> Motsch.	Япония	31	Maeki, 1958b; 1959
36	<i>C. sagartia</i> Led.	Иран	32	de Lesse, 1960
37	<i>C. scudderii</i> Reak.	С. Америка	31	Maeki, Remington, 1960; Maeki, 1961
38	<i>C. stoliczkana miranda</i> Fruhst.	Гималаи	31	Maeki, Ae, 1966
39	<i>C. thisoa</i> Mén.	Иран	32—33	de Lesse, 1960
	<i>C. thisoa</i> Mén.	Армения	31	Данная работа
	<i>C. thisoa</i> Mén.	Алтай	31, 31+B, 32, 33, 34	Данная работа
40	<i>C. vaulieri</i> Guer.	Чили	31	de Lesse, 1967a
41	<i>Zerene cesonia</i> Stoll.	Мексика	31	Maeki, Remington, 1960; Maeki, 1961
42	<i>Catopsila crocale</i> Cram.	О. Тайвань	31	Maeki et al., 1965
	<i>C. crocale</i> Cram.	Гималаи	31	Maeki, Ae, 1966
	<i>C. crocale</i> Cram.	Малайзия	31	Saitoh, Kudoh, 1972

Таблица 2 (продолжение)

№№	Вид	Местность	Число хромосом (n)	Источник
43	<i>C. florella</i> F.	Сенегал	31	de Lesse, Condamin, 1962
	<i>C. florella</i> F.	Уганда	31	de Lesse, 1968
	<i>C. florella</i> F.	Мадагаскар	31	de Lesse, 1972
44	<i>C. pomona</i> F.	Гималаи	31	Maeki, Ae, 1966
	<i>C. pomona</i> F.	Бангкок	31	Maeki, Ogata, 1970
	<i>C. pomona</i> F.	Австралия	31	Maeki, Ogata, 1971
	<i>C. pomona</i> F.	О. Тайвань	31	Maeki, Ae, 1968
45	<i>C. pyranthe</i> L.	Индия	31	Gupta, 1964
	<i>C. pyranthe</i> L.	Гималаи	31	Maeki, Ae, 1966
	<i>C. pyranthe</i> L.	Китай	31	Saitoh, Abe, 1981
46	<i>Anteos clorinde</i> Godt.	Мексика	31	Maeki, Remington, 1960; Maeki, 1961
	<i>A. clorinde</i> Godt.	Колумбия	31	de Lesse, 1967a
Триба Callidryini Kirby, 1896				
47	<i>Gonopteryx amintha formosana</i> Fruhst.	О. Тайвань	31	Maeki, Ae, 1968
48	<i>G. farinosa</i> Zell.	Турция	32	de Lesse, 1960
49	<i>G. machagura niponica</i> Verity	Япония	31	Maeki, 1958b; 1959
50	<i>G. rhamni</i> L.	Москва	31	Beliajeff, 1930
	<i>G. rhamni</i> L.	Финляндия	31—32	Federley, 1938
	<i>G. rhamni</i> L.	Югославия	31	Lorković, 1941
	<i>G. rhamni</i> L.	Алтай	31, 31+B	Данная работа
	<i>G. rhamni maxima</i> Butl.	Япония	31	Maeki, 1958b; 1959
	<i>G. rhamni major</i>	Китай	31	Saitoh, Abe, 1981
	<i>Dercas</i> Doubl.	Нет данных		
51	<i>Phoebis argante</i> F.	Аргентина	31	de Lesse, 1967a
	<i>Ph. argante</i> F.	Эквадор	31	Тот же
52	<i>Ph. cipris</i> F.	Аргентина	31	« «
53	<i>Ph. eubule</i> L.	Боливия	31	« «
	<i>Ph. eubule</i> L.	Колумбия	31	« «
54	<i>Ph. philea</i> L.	Мексика	31	Maeki, Remington, 1960; Maeki, 1961; de Lesse, 1970a
55	<i>Ph. sennae</i> L.	Тобаго	31	Wesley, Emmel, 1975
56	<i>Ph. (Aphrissa) statira</i> Cram.	Колумбия	31	de Lesse, 1967a
57	<i>Ph. (Rhabdodryas) trite</i> L.	Аргентина	31	Тот же
58	<i>Kricogonia lyside</i> Godt.	Мексика	31	Maeki, Remington, 1960; Maeki, 1961
	<i>Leucidia</i> Boisd.	Нет данных		
	<i>Gandaca</i> Moore	Нет данных		
59	<i>Eurema (Terias) andersoni</i> godana Fruhst.	О. Тайвань	29	Maeki, Ae, 1968
60	<i>E. (Terias) blanda arsakia</i> Fruhst.	О. Тайвань	31	Тот же
61	<i>E. (Terias) hecabe contudernalis</i> Moore	Гималаи	31	Maeki, Ae, 1966
	Тот же	Малайзия	31	Saitoh, Kudoh, 1972
	<i>E. (Terias) hecabe mandarina</i> de l'Orza	Япония	31	Maeki, Makino, 1953; Maeki, 1953b; 1958b; 1959
62	<i>E. (Terias) senegalensis</i> Boisd.	Сенегал	31	de Lesse, Condamin, 1962
	Тот же	Габон	31	Bernardi, de Lesse, 1964
	« «	Уганда	31	de Lesse, 1968
63	<i>E. (Maiva) brigitta</i> Cram.	Сенегал	12	de Lesse, Condamin, 1962
	<i>E. (Maiva) brigitta brigitta</i> Cram.	Уганда	12	de Lesse, 1968
64	<i>E. (Maiva) hapale</i> Mab.	Уганда	31 (?)	Тот же

Таблица 2 (продолжение)

№№	Вид	Местность	Число хромосом (n)	Источник
65	<i>E. (Nirmula) laeta bethesba</i> Jans.	Япония	29	Maeki, 1958b; 1959
66	<i>E. (Eurema) albula</i> Cram.	Колумбия	29	de Lesse, 1967a
	Тот же	Аргентина	28 (?)	Тот же
67	<i>E. (Eurema) boisduvaliana</i> Feld.	Мексика	31	de Lesse, 1970a
68	<i>E. (Eurema) daira</i> Godt.	Мексика	31	Тот же
69	<i>E. (Eurema) deva</i> Doubl.	Аргентина	31	de Lesse, 1967a
70	<i>E. (Eurema) graduata</i> Butl.	Боливия	31	Тот же
71	<i>E. (Eurema) gratiosa</i> Doubl. et Hew.	Колумбия	31	« «
72	<i>E. (Eurema) mexicana</i> Boisd.	Мексика	31	Maeki, 1961
73	<i>E. (Eurema) phiale</i> Cram.	Боливия	31	de Lesse, 1967a
74	<i>E. (Eurema) plataea</i> Feld.	Аргентина	31 (?)	Тот же
75	<i>E. (Eurema) reticulata</i> Butl.	Эквадор	31	« «
76	<i>E. (Eurema) salome</i> Feld.	Боливия	31	« «
77	<i>E. (Eurema) xanthochlora</i> Koll.	Эквадор	31	« «
78	<i>E. (Pyrisitia) calceolaria</i> Butl.	Мексика	31	de Lesse, 1970a
	Тот же	Гватемала	31	Тот же
79	<i>E. (Pyrisitia) leuce</i> Boisd.	Тобаго	31	Wesley, Emmel, 1975
80	<i>E. (Pyrisitia) limbica</i> Feld.	Боливия	31—32	de Lesse, 1967a
81	<i>E. (Pyrisitia) lisa</i> Boisd. et Lec.	С. Америка	31	Maeki, Remington, 1960; Maeki, 1961
82	<i>E. (Pyrisitia) nise</i> Cram.	Боливия	31	de Lesse, 1967a
	<i>E. (Pyrisitia) nise nelphe</i> Feld.	Гватемала	31	de Lesse, 1970a
83	<i>E. (Pyrisitia) proterpia</i> F.	Мексика	31	Maeki, Remington, 1960; Maeki, 1961
	Тот же	Колумбия	31	de Lesse, 1967a
84	<i>E. (Pyrisitia) venusta</i> Boisd.	Тринидад	30	Wesley, Emmel, 1975
85	<i>E. (Abaeis) nicippe</i> Cram.	Мексика	31	Maeki, Remington, 1960; Maeki, 1961; de Lesse, 1970a
86	<i>E. (Teriocolias) zelia</i> Lucas	Аргентина	31	de Lesse, 1967a
87	<i>Eurema esakii</i> Shirozu	О. Тайвань	30	Maeki, Ae, 1968
88	<i>Nathalis iole</i> Boisd.	Флорида	31	Maeki, 1961
	Тот же	Мексика	31	de Lesse, 1970a
Подсем. Anthocharinae Scudder, 1889				
	<i>Eroessa</i> Doubleday	Нет данных		
89	<i>Anthocharis cardamines</i> L.	Франция	31	de Lesse, 1960
	Тот же	Франция	31	Lorković, 1960
	« «	Югославия	31	Тот же
	« «	Финляндия	31, 32	Federley, 1938
	« «	Алтай	32, 30, 30+B	Данная работа
	« «	Англия	30	Bigger, 1960; 1978
90	<i>A. euphenoides</i> Stgr.	Испания	31	de Lesse, 1970b
91	<i>A. gruneri</i> Herr.-Schäff.		24	Lorković, 1966 in Robinson, 1971
92	<i>A. (Paramidea) scolymus</i> Bitl.	Япония	31	Maeki, Makino, 1953; Maeki, 1953b; 1958b; 1959
93	<i>Zegris eupheme</i> Esp.	Марокко	31	de Lesse, 1967b
	<i>Z. eupheme menestho</i> Mén.	Турция	31	Тот же
94	<i>Euchloe ausonia</i> Hübn.	Пиренеи	31	de Lesse, 1960
	<i>E. ausonia melanochloros</i> Röber	Марокко	31	de Lesse, 1967a
95	<i>E. ausonides</i> Bd.	С. Америка	31	Maeki, Remington, 1960; Maeki, 1961
96	<i>E. crameri occidentalis</i> Verity	Франция	31	Lorković, 1941
	<i>E. crameri romana</i> Calb.	Югославия	31	Тот же
97	<i>E. (Elphinstonia) charlonia</i> Donz.		30—32 (?)	Lorković, 1966 in Robinson, 1971
98	<i>E. (Elphinstonia) tagis</i> Hübn.	Франция	31	de Lesse, 1970b

№№	Вид	Местность	Число хромосом (n)	Источник
99	<i>E. lessei</i>	Иран	27—28	de Lesse, 1960
100	<i>Hesperocharis marchalii</i> Guer	Боливия	15	de Lesse, 1967a
101	<i>H. costaricensis</i> Bates	Мексика	15	de Lesse, 1970a
102	<i>Pinacopteryx eriphia</i> Godt.	Сенегал	13	de Lesse, Condamin, 1962
	<i>P. eriphia tritogenia</i> Klug	Оман	13	Saitoh, 1982
	<i>P. eriphia mabiliei</i> Auriv.	Мадагаскар	13	de Lesse, 1972
103	<i>Hebomoia glaucippe</i> L.	Гималаи	17	Maeki, Ae, 1966
	<i>H. glaucippe formosana</i> Fruhst.	О. Тайвань	17	Maeki et al., 1965
	<i>H. glaucippe shorizui</i>	Япония	17	Maeki, 1958b; 1959

Подсем. *Pierinae* Duponchel, [1835]Триба *Eroniini* Swinhoe in Moore, [1907]

104	<i>Eronia leda</i> Boisd.	Уганда	16—18	de Lesse, 1968
105	<i>Nepheronia argia</i> F.	Центрально-Африканская Республика	18	de Lesse, 1966
106	<i>N. thalassina</i> Boisd.	Уганда	18	de Lesse, 1968

Триба *Tetacolini* Reuter, 1896

107	<i>Colotis antevippe zera</i> Lucas	Уганда	28	de Lesse, 1968
	Тот же	Кения	28	Тот же
108	<i>C. aurigineus</i> Butl.	Уганда	27	de Lesse, 1968
109	<i>C. aurora evarne</i> Klug	Сенегал	5	de Lesse, Condamin, 1962
110	<i>C. danae pseudacaste</i> Butl.	Кения	28	de Lesse, 1968
111	<i>C. evaroge antigone</i> Boisd.	Уганда	28	Тот же
112	<i>C. evanthé</i> Boisd.	Мадагаскар	28	de Lesse, 1972
113	<i>C. evippe complexivus</i> Butl.	Уганда	28	de Lesse, 1968
114	<i>C. halimede halimede</i> Klug	Оман	28	Saitoh, 1982
115	<i>C. liagore</i> Klug	Сенегал	28	de Lesse, Condamin, 1962
116	<i>C. puniceus</i> Butl.	Кения	28	de Lesse, 1968
117	<i>C. zoe</i> Grandidier	Мадагаскар	27	de Lesse, 1972
118	<i>Gideona lucasi</i> Grandidier	Мадагаскар	27 (?)	de Lesse, 1972
119	<i>Ixias pyrene pyrene</i> L.	Китай	28	Saitoh, Abe, 1981
	<i>I. pyrene familiaris</i> Butl.	Гималаи	28	Maeki, Ae, 1966
	<i>I. pyrene insignis</i> Butl.	О. Тайвань	28	Maeki et al., 1965

Триба *Appiadini* Kusnezov, 1929

120	<i>Appias drusilla</i> Cr.	Аргентина	32	de Lesse, 1967a
	Тот же	Мексика	32	Maeki, Remington, 1960; Maeki, 1961
121	<i>A. epaphia orbona</i> Boisd.	Уганда	32	de Lesse, 1968
122	<i>A. indra aristoxenus</i> Fruhst.	О. Тайвань	32	Maeki, Ae, 1968
123	<i>A. libythea libythea</i> F.	Малайзия	32	Saitoh, Kudoh, 1972
124	<i>A. lycinda formosana</i> Wall	Формоза	32	Maeki et al., 1965
125	<i>A. melania</i> F.	Австралия	32	Maeki, Ogata, 1971
126	<i>A. (Glutophrissa) sabina</i> Feld.	Габон	32	Bernardi, de Lesse, 1964
	<i>A. (Glutophrissa) sabina confusa</i> Butl.	Мадагаскар	32	de Lesse, 1972
	<i>A. (Glutophrissa) sabina udei</i> Suff.	Кения	32	de Lesse, 1968
	<i>Udaiana</i> Distant	Нет данных		
	<i>Saletaria</i>	Нет данных		

Триба *Pierini* Duponchel, [1835]

<i>Eucheira</i> Westwood	Нет данных
<i>Neophasia</i> Behr	Нет данных

Таблица 2 (продолжение)

№№	Вид	Местность	Число хромосом (n)	Источник
127	<i>Catasticta albina</i> Lathy et Rosenb.	Боливия	25	de Lesse, 1967a
128	<i>C. flisa</i> Herr.-Schäff. Тот же	Боливия Эквадор	25 (25—26) + (1—2) В	Тот же « «
129	<i>C. pieris</i> Hopf.	Боливия	25	« «
130	<i>C. reducta</i> Butl. Тот же	Эквадор Боливия	(27—29) + (2—3) В 31 (?)	« « « «
131	<i>Archonias bellona hyrnetho</i> Fruhst.	Боливия	25	« «
132	<i>A. tereas</i> Godt. <i>A. tereas rosacea</i> Butl.	Бразилия Эквадор	25 26	de Lesse, Brown, 1971 de Lesse, 1967a
133	<i>Aporia crataegi</i> L. Тот же « « « « « «	Европа Югославия Финляндия Москва Алтай	25 26 26 25 25	Kernewitz, 1914; 1915 Lorković, 1941 Federley, 1938 Beliajeff, 1930 Данная работа
	<i>A. crataegi adherbal</i> Fruhst.	Япония	25	Маеки, 1953a, б; Маеки, Makino, 1953; Maeki, 1958b Maeki, 1958b; 1959
134	<i>A. hippia japonica</i> Mats. <i>Metaporia</i> Butl.	Япония Нет данных	25	
135	<i>Cepora coronis cibyra</i> Fruhst. <i>C. coronis phryne</i> F.	О. Тайвань Гималаи	23, 24, 25 22—24	Maeki, Ae, 1968 Maeki, Ae, 1966
136	<i>C. nadina eunama</i> Fruhst.	О. Тайвань	25	Maeki et al, 1965
137	<i>Delias aglaia</i> L. <i>D. aglaia curasena</i> Fruhst.	Гималаи О. Тайвань	25 25	Maeki, Ae, 1966 Maeki et al., 1965
138	<i>D. belladonna belladonna</i> F.	Индия	25	Kaur, 1988
139	<i>D. descombesi</i> Boisd.	Гималаи	27—32	Maeki, Ae, 1966
140	<i>D. hyparete diva</i> Fruhst.	Малайзия	26, 27	Masino, Sato, 1971
141	<i>D. (Cathaemia) lueharis</i> Dr.	Гималаи	25	Maeki, Ae, 1966
142	<i>D. (Cathaemia) mysis</i> F.	Австралия	25	Maeki, Ogata, 1971
143	<i>Pereute swainsoni</i> Gray <i>Leodonta</i> Butl.	Бразилия Нет данных	26—27	de Lesse, Brown, 1971
144	<i>Belenois aurota</i> F. Тот же	Сенегал Кения	25 25	de Lesse, Condamin, 1962 de Lasse, 1968
145	<i>B. calypso</i> Dr.	Габон	25	Bernardi, de Lesse, 1964
146	<i>B. creona</i> Cr. <i>B. creona infida</i> Butl. <i>B. creona severina</i> Stoll. <i>B. creona prorsus</i> Talbot	Сенегал Уганда Кения Мадагаскар	25 25 25 25	de Lesse, Condamin, 1962 de Lesse, 1968 Тот же de Lesse, 1972
147	<i>B. crawshayi</i> Butl.	Уганда	25	de Lesse, 1968
148	<i>B. mesentina</i> Cr.	Индия	25	Gupta, 1964
149	<i>B. solilucis</i> Butl.	Уганда	25	de Lesse, 1968
150	<i>B. subeida instabilis</i> Butl.	Уганда	25	Тот же
151	<i>B. theora concolor</i> Auriv.	Габон	25	de Lesse, Condamin, 1962
152	<i>B. (Pseudanapheis) gidica</i> Godt.	Сенегал	26	Bernardi, de Lesse, 1964
153	<i>B. (Pseudanapheis) mabella</i> Grose-Smith	Мадагаскар	25	de Lesse, 1972
154	<i>Dixeia doxo lambertoni</i> Le Cerf	Мадагаскар	25	Тот же
155	<i>D. orbona</i> Geyer <i>Prioneris</i> Wall.	Сенегал Нет данных	24	de Lesse, Condamin, 1962

№№	Вид	Местность	Число хромосом (n)	Источник
156	<i>Pieris (Pieris) brassicae</i> L. <i>P. (Pieris) brassicae</i> L.		14—15 15	Henking, 1890 Doncaster, 1912a, b; Bauer, 1967; Rishi, 1977
	Тот же	Англия	15	Bigger, 1960; 1975
	« «	Германия	15	Traut, Mosbacher, 1968
	« «	Финляндия	15	Federley, 1938
	« «	Югославия	15	Lorković, 1941
	« «	Москва	15	Beliajeff, 1930
	« «	Ленинград	15	Лухтанов, Кузне- цова, 1988
	« «	Талыш	15	Данная работа
	« «	Индия	15	Kaur, 1988
	<i>P. (Pieris) brassicae azoriensis</i> Rebel	Азорские о-ва	15	Federley, 1942
	<i>P. (Pieris) brassicae nepalensis</i> Doubl.	Гималаи	15	Maeki, Ae, 1966
	Тот же	Индия	15	Saitoh et al., 1986
157	<i>P. (Pieris) brassicoides</i> Guer.	Эфиопия	14	Saitoh, 1985
158	<i>P. (Artogeia) canidia</i> Sparr.	О. Тайвань	25	Maeki et al., 1965
	Тот же	Китай	25, 26	Saitoh, Abe, 1981
	<i>P. (Artogeia) canidia indica</i> Evans	Гималаи	25	Maeki, Ae, 1966
	Тот же	Индия	25	Saitoh et al., 1986
159	<i>P. (Artogeia) krueperi</i> Stgr.		24	Lorković, 1966 in Robinson, 1971
	Тот же	Турция	24	le Lesse, 1970b
160	<i>P. (Artogeia) manni</i> Mayer	Франция	25	Lorković, 1941
	Тот же	Югославия	25	Тот же
	« «	Турция	25	de Lesse, 1960
161	<i>P. (Artogeia) ergane</i> Hühn.	Далмация	26	Lorković, 1941
	Тот же		25+ (1—2) B	Lorković, 1968a
	« «	Нахичевань	25	Данная работа
162	<i>P. (Artogeia) rapae</i> L.	Англия	25, 25+B	Bigger, 1960; 1976
	Тот же	Финляндия	26	Federley, 1938
	« «	Москва	25	Beliajeff, 1930
	« «	Югославия	25	Lorković, 1941
	« «	Алтай	25, 26	Данная работа
	« «	Китай	25	Saitoh, Abe, 1981
	« «	Корея	25, 26	Lee, Kim, 1976
	« «	Корея	25, 26, 27, 28	Park, Kim, 1977
	« «	США	25	Maeki, Remington, 1960; Maeki, 1961
	<i>P. (Artogeia) rapae crucivora</i> Bdv.	Япония	25, 25+B	Maeki, 1953a, b; 1958b, c; Maeki, Makino, 1953
163	<i>P. (Artogeia) dulcinea pseudo-</i> <i>napi</i> Vty.	Япония	27, 27+B, 27+2B, 27+3B, 27+4B	Maeki, 1953a, b; 1958a; 1959; Maeki, Makino, 1953
164	<i>P. (Artogeia) napi</i> L.		25	Lorković, 1966 in Robinson, 1971
	Тот же	Англия	25, 25+B 25+2B	Bigger, 1960; 1976
	« «	Финляндия	25	Federley, 1938
	« «	Париж	25	Lorković, 1941
	« «	Югославия	25	Lorković, 1941; 1968;
	<i>P. (Artogeia) napi mandarina</i>	Китай	25	Saitoh, Abe, 1981
	<i>P. (Artogeia) napi meridionalis</i> Heyne&Rühl		25	Lorković, 1966 in Robinson, 1971
	<i>P. (Artogeia) napi japonica</i> Shirozu	Япония	26	Maeki, 1986

№№	Вид	Местность	Число хромосом (n)	Источник
	<i>P. (Artogeia) napi nesis</i> Fruhst.	Япония	26	Maeki, 1953 a, b; 1958b; 1959
	« «	Япония	25	Maeki, 1986
165	<i>P. (Artogeia) segonzaki</i> Le Cerf	Марокко	25	Suomalainen in Eitschberger, Ströhle, 1986
166	<i>P. (Artogeia) macdunnoughii</i> Rem.	С. Америка	25	Maeki, Remington, 1960
167	<i>P. (Artogeia) virginicensis</i> Edw.	Массачусетс	26	Maeki, 1961
168	<i>P. (Artogeia) bryoniae</i> O.		25—28	Lorković, 1966 in Robinson, 1971
	Тот же	Альпы	25	Lorković, 1941
	« «	Альпы	25, 25+B, 25+2B	Lorković, 1968a
	<i>P. (Artogeia) bryoniae caucasica</i> Lork.	Кавказ	26	Lorković, 1972
169	<i>P. (Artogeia) pseudorapae balcana</i> Lork.	Югославия	25, 26, 27, 26+B, 26+2B, 26+3B, 27+B, 27+2B	Lorković, 1968b
	<i>P. (Artogeia) pseudorapae balcarica</i> Wojt. et Nies.	Пятигорск	25, 25+B, 25+2B, 25+3B, 26+B, 26+2B	Тот же
170	<i>Pontia daplidice</i> L.	Югославия	26	Lorković, 1941
	Тот же	Алтай	26	Данная работа
	<i>P. daplidice moorei</i> Rüb.	Гималаи	26	Maeki, Ae, 1966
171	<i>P. (Pontieuchloia) chloridice</i> Esp.	Алтай	26	Данная работа
172	<i>P. (Synchloe) callidice</i> Esp.		26	Lorković, 1966 in Robinson, 1971
	Тот же	Франция	26	de Lesse, 1960
	<i>P. (Synchloe) callidice ratora</i> Moore	Индия	24, 25, 26	Saitoh et al., 1986
173	<i>P. (Synchloe) beskeri</i> Edw.	С. Америка	26	Maeki, Remington, 1960; Maeki, 1961
174	<i>P. (Synchloe) occidentalis</i> Reak.	С. Америка	26	Тот же
175	<i>P. (Synchloe) calyce</i> Edw.	С. Америка	26	« «
176	<i>(Synchloe) protidice</i> Bdv.		26	Lorković, 1966 in Robinson, 1971
	<i>Talbotia</i> Bernard	Нет данных		
	<i>Glennia</i> Klots	Нет данных		
177	<i>Leptophobia aripa</i> Boisd.	Боливия	26 (?)	de Lesse, 1967a
	Тот же	Эквадор	26	Тот же
178	<i>L. cleone</i> Doubl et Hew.	Боливия	26	« «
	Тот же	Эквадор	26	« «
179	<i>L. elensis</i> Lucas	Эквадор	26	« «
180	<i>L. philoma</i> Hew.	Эквадор	26	« «
181	<i>L. tovaria</i> Feld.	Эквадор	26	« «
	<i>Leuciactria</i> Roths. et Jord.	Нет данных		
	<i>Elodina</i> Feld.	Нет данных		
	<i>Theochila</i> Field	Нет данных		
182	<i>Tatochila autodice</i> Hübner.	Аргентина	28	de Lesse, 1967a
183	<i>T. mercedis</i> Esch.	Аргентина	28	Тот же
184	<i>T. microdice microdice</i> Blansk	Аргентина	28	« «
	<i>T. microdice arctodice</i> Stand	Эквадор	28	« «
185	<i>T. ortodice</i> Weym.	Аргентина	27—28 (?)	« «
186	<i>T. stigmadice</i> Stand.	Аргентина	27—28 (?)	« «
187	<i>T. sagittata</i> Rüb.	Эквадор	27	« «
188	<i>T. theodice</i> Boisd.	ЧИЛИ	27	« «
189	<i>T. vanvolxemii</i> Capr.	Аргентина	28	« «
	<i>Piercolias</i> Grote	Нет данных		
	<i>Hypsochila</i> Ureta	Нет данных		
	<i>Reliquia</i> Ackery	Нет данных		
	<i>Phulia</i> Herr.-Schäff.	Нет данных		
	<i>Baltia</i> Moore	Нет данных		

Таблица 2 (продолжение)

№№	Вид	Местность	Число хромосом (n)	Источник
190	<i>Itaballia demophile centralis</i> Joic. et Talb.	Мексика	25	de Lesse, 1970a
191	<i>I. tithoreides</i> Butl.	Эквадор	26	de Lesse, 1967a
192	<i>I. (Pieriballia) viardi</i> Boisd.	Гватемала	26	de Lesse, 1970a
193	<i>Perrhybris pamela</i> Stoll.	Бразилия	27, 28—29	de Lesse, Brown, 1971
194	<i>Aoa de Niceville</i> <i>Ascia monuste</i> L.	Нет данных Флорида	27	Maeki, Remington, 1960; Maeki, 1961
	Тот же	Мексика	27	Тот же
	« »	Аргентина	27	de Lesse, 1967a
195	<i>Melete leucanthe</i> Feld.	Эквадор	24	Тот же
196	<i>M. lycimnia paulista</i> Fruhst.	Бразилия	23	de Lesse, Brown, 1971
197	<i>Mylothris rhodope</i> F.	Габон	22—27	Bernardi, de Lesse, 1964
	<i>M. rhodope uniformis</i> Talb.	Уганда	22+(3—4) В	de Lesse, 1968
198	<i>M. hilara</i> Karsch.	Габон	22 (?)	Bernardi, de Lesse, 1964
199	<i>M. oshracea</i> Auriv.	Габон	25—26	Тот же
200	<i>Leptosia alcesta</i> Cr.	Сенегал	12	de Lesse, Condamin, 1962
	<i>L. alcesta inalcesta</i> Bdi	Кения	12	de Lesse, 1968
	<i>L. alcesta sylvicola</i> Boisd.	Мадагаскар	12	de Lesse, 1972
201	<i>L. nupta</i> Butl.	Уганда	12	de Lesse, 1968
202	<i>L. wigginsii</i> Dixey	Уганда	12	Тот же
203	<i>L. nina niobe</i> Wallace	О. Тайвань	19	Maeki, Ae, 1968; Maeki, 1981

бабочек рода *Pieris*, обработанных колхицином, наблюдаются центромероподобные перетяжки (Bigger, 1975). Самки гетерогаметны. Хромосомная система определения пола, по данным Биггера (Bigger, 1975), приведенным для *Pieris*, у самцов представлена двумя Z-хромосомами, у самок Z- и W-хромосомой (по другой системе обозначений XX и XY соответственно), причем Z относится к числу крупных (*P. brassicae*) или средних (*P. napi* и *P. rapae*) хромосом, а W — к числу мелких. Хромосомы относительно мелкие. В MI биваленты имеют характерную гантелеобразную или крестообразную форму, что хорошо видно на рис. 2, b и 2, з. Чаше всего биваленты независимо от их числа по размерам составляют плавно убывающий ряд (рис. 1, 2).

Число хромосом у представителей семейства варьирует от $n=12$ до $n=103$ —104 и часто является характерным для отдельных родов, триб и подсемейств. Многие группы, в том числе наиболее примитивные, имеют модальное число хромосом $n=31$. Это число наиболее широко распространено среди высших чешуекрылых (Robinson, 1971), встречается в самых примитивных семействах (Suomalainen, 1969) и, скорее всего, является анцестральным для всего отряда. Несомненно, что это число является исходным и для сем. *Pieridae*. Для многих видов семейства характерна внутри- и межпопуляционная изменчивость числа хромосом. Нами внутривидовая изменчивость обнаружена у представителей всех четырех подсемейств белянок (табл. 1). Причиной подобной вариабельности числа хромосом бывает наличие дополнительных, так называемых В хромосом, обычно очень мелких и не образующих бивалента в мейозе (рис. 1, d) или же изменение числа бивалентов (рис. 1, в и 1, г). Сведения о хромосомных числах белянок мировой фауны представлены в табл. 2.

Table 1. Summary of chromosome numbers in *Tellervo* and in the “primitive” radiation of *Ithomiinae*. Locality codes are shown at the end of Table 2. Localities in **bold** indicate places of origin of material for meiotic metaphases shown in Fig. 6 through 78.

Tribe	Genus	Species, subspecies	n =	No. fixed/counted		
				Pop./ind.	Ind.	Localities
A	<i>Tellervo</i>	<i>zoilus zoilus</i>	32	3/5	1	QA3 (EMMEL et al. 1974)
	<i>Aeria</i>	<i>o. olena</i>	27	3/3	3	AR(a),ES,SP
		<i>eurimedia</i> (4 different)	°°38°°	10/16	7	AC3,CC3, RG3 ,RO
		<i>elara</i> (3 different)	°°°°80°°	8/28	8	AC,AN,DF, GO ,MT,RG2,RO
	<i>Elzunia</i>	<i>humboldt</i> (4 different)	14	5/8	1	AN,CC,EE,TV,VC
		<i>pavonii</i>	°20	3/7	3	MP3
	<i>Tithorea</i>	<i>harmonia</i> (16 different, from <i>salvadoris</i> to <i>caissara</i>)	°14	22/45	25	AM2,AN(a),AR(a), BO ,CM,EB,EV,GO(d),HU,MP,MT2,MX(b),PA,RG,RO2,RR2,SP,TR(e)
		<i>t. tarricina, franciscoi, parola</i>	11	5/10	3	AN,CT2,VC2
	B	<i>Methona</i>				
		<i>m. megisto</i> , new ssp.	14	3 /4	3	AM,MT,PA
		<i>curvifascia</i>	14	4/9	3	AC,EE2,HU
		<i>g. grandior</i>	14	2/4	4	AC, AM
		<i>confusa</i> (3 different)	14	11/20	18	AC,AM2,CM,EB,EE2,RO2,RR,TV
		<i>themisto</i> ssp. nov.	14	1/1	1	GO(d)
C	<i>Olyras</i> <i>Eutresis</i> <i>Athyrtis</i> <i>Melinaea</i> (see details of this genus in Table 8)	<i>crathis</i> (4 different)	8	5/15	12	CC,EV, RG2 ,TV
		<i>h. hypereia</i>	20+19–20	2/6	4	EV,RG
		<i>mechanitis salvini</i>	°50°	8/13	11	AC2,RO6
		<i>mnasias</i> (4 different)	°°°26°°	5/7	5	AP,BA,CM,GY(c),RR
		<i>l. ludovica</i>	17–23	12/19	18	AM5,AP2,GY(c),PA,RO,RR2
		<i>paraiya; crameri</i>	°23°	4/5	5	BA,RJ(d),SP,EV, BO
		<i>i. idae, vespertina</i>	13	4/4	4	AN,CC,CZ,WE
		<i>maelus</i> (8 different)	°15°°	10/23	18	AC2,AM2,EB3,EE,HU,RO
		<i>lilis</i> (6 different)	°°22°°	7/11	11	CC,CH,EV,MX,OX,RG,TR(e), TV
		<i>ethra</i>	°30	5/8	7	BA,ES,PE,RJ,SP
		<i>mneme</i> (3 different)	°17	5/21	18	AM,AP2,GY(c),RO
		<i>menophilus</i> (3 different)	°20°°	6/12	11	AC,EE(a),EE,RO3
		<i>marsaeus</i> (4 different)	°17°	9/16	15	AC2,PA,RO4,VV2
		<i>phasiana, satevis</i>	15	3 /4	4	AC2,EB
		<i>maenius</i> (6 different)	°°22°°	10/18	17	AC,AP2,EE4,GY(c),RO,VV
D	<i>Thyridia</i> <i>Sais</i> <i>Scada</i>	<i>psidii</i> (6 different)	17	11/15	12	AC,CH2, EE2 ,ES,GO,MP,MT2,RO
		<i>rosalia</i> (6 different)	20	11/26	14	AC,ES,GO,MT,PA,RG,RO3,RR2
		<i>z. zibia, xanthina, zeroca</i>	°18°	4/6	2	CC3 ,CH
		<i>batesi; batesi quotidiana</i>	43	2/7	2	AC,EE
		<i>reckia</i>	28?	3/9	1	BA2,PE
		<i>ethica</i> (6 different)	°21°°	7/14	10	AC2,AM,EE,PA,RO,RR
		<i>karschina</i>	20	2/7	3	BA ,ES
		<i>kusa</i>	21	2/5	1	MP2

Table 1 (Continued)

Tribe	Genus	Species, subspecies	n =	No. fixed/counted		
				Pop./ind.	Ind.	Localities
E	<i>Mechanitis</i> (see details of this genus in Table 7)	<i>l. lysimnia</i>	18–19	5/10	7	AR(a),BA,GO,RJ(d),SP
		<i>nesaea, connectens</i>	16–17°	7/31	23	BA2;GO,MT2,PB,RO
		<i>menecles, ocona, acreana, elisa</i>	15	7/26	15	CM,EB(a), EB2 ,EE,MT,RO
		<i>macrinus</i> (4 different)	22,23	4/8	5	CH,CZ,EV,RG
		<i>polymnia</i> (7, Transandean)	°18°°	11/31	24	AN(a),CC,CZ,EV,GU(a),MX,RG, VC2,VV,WE
		(9, Amazonian to SE Brazil)	°15°	27/58	43	AM,AP3,CM,DF(d),EB,EE,GO,HU, MG,MP,MT5,PA3,RJ,RO3,RR3
		<i>menapis</i> (4 different)	°°24–25°°°	8/19	14	AN(a),CC3,EV,RG,VC2
		<i>dariensis, mantineus</i>	20	2/5	4	DA,WE(incl. a)
		<i>mazaesus</i> (6 different, Amazon Basin)	14,15	7/15	14	AC,AM2,EE,RO,VV2
		(4 from peripheries)	°°16	10/36	21	EE3,CM,GY(c),PA2,RO,VV2
	<i>Forbestra</i>	<i>proceris</i>	9+6–8	2/4	4	AC2
		<i>olivencia</i> (4 different)	9+1–6	5/11	10	AC2,AM,EB,EE
		<i>equicola</i> (4 different)	°°°63°°	5/11	11	AC,AM,AP,EE,RO
	<i>Roswellia</i>	<i>acrisione</i> (f), <i>a. vitrala</i>	32,34	2/4	2	EE(f), MP
		<i>clearista, c. colombiensis</i>	24	5/11	8	AN,EV, RG2 ,VC
	<i>Athesis</i>		28+10	1/2	2	RG
			14	1/2	2	VC
		<i>d. deryllidas</i>	14	1/1	1	EE(f)
	<i>Patricia</i>	<i>d. demylus</i>	14	1/1	1	EE(f)

Explanation of Tables: nomenclature follows Lamas (2004) with few exceptions (Results, footnote). Superscript dots before and after a number indicate variation, as much as 3–6 over or under the given figure, encountered infrequently, rarely in the same population.

Localities are grouped by region; a number at the end indicates more than one population sampled within this region; a letter in parentheses indicates previous work (a = de LESSE 1967, b = de LESSE 1970a, c = de LESSE 1970b, d = de LESSE and BROWN 1971, e = WESLEY and EMMEL 1975, f = Eliazar and Emmel, pers. comm., g = MAEKI and REMINGTON 1960, h = MAEKI 1961).

Locality codes: AC = Acre (SW Brazil), AM = Amazonas (N Brazil), AN = NC Colombia, AP = Amapá (N Brazil), AR = N Argentina, AV = Amazonas (S Venezuela), BA = Bahia (Brazil), BO = Bolívar (SE Venezuela), CC = Chocó (W Colombia), CH = W Panama, CM = Chanchamayo (C Peru), CR = Costa Rica, CT = NW Venezuela, CZ = Canal Zone (Panama), DA = E Panama, DF = Brasília, DR = Dominican Republic, EB = E Bolivia, EE = E Ecuador, ES = Espírito Santo (Brazil), EV = NE Venezuela, GO = Goiás (C Brazil), GU = Guatemala, GY = Guianas, HU = Huallaga Valley (C Peru), JM = Jamaica, LO = NE Peru, MG = Minas Gerais (Brazil), MP = upper Río Marañón (NW Peru), MT = Mato Grosso (Brazil), MX = SE Mexico, OX = S Mexico, PA = Pará (Brazil), PB = Paraíba (NE Brazil), PE = Pernambuco (NE Brazil), PT = S Colombia, QA = N Queensland (Australia), RG = N Venezuela, RJ = Rio de Janeiro (Brazil), RO = Rondônia (SW Brazil), RR = Roraima (N Brazil), SC = Santa Catarina (S Brazil), SP = São Paulo (SE Brazil), TR = Trinidad, TV = Táchira (SW Venezuela), VC = Valle de Cauca (W Colombia), VV = Meta (E Colombia), WE = W Ecuador.

Table 2. Chromosome numbers in “advanced” Ithomiinae: smaller or better-defined genera. Localities in **bold** indicate places of origin of meiotic metaphases shown in Fig. 4 through 78.

Tribe	Genus	Species, subspecies	n =	No. fixed/counted		
				Pop./ind.	Ind.	Localities
F	<i>Pagyris</i>	<i>cymothoe</i>	30	3/9	4	RG,TV,VV
	<i>Placidina</i>	<i>euryanassa</i>	28	2/2	2	BA ,RJ(d)
	<i>Ithomia</i>	<i>iphianassa</i> (5 different)	°11–12	8/18	11	AN2,CC2,RG,VC,VV,WE
		<i>p. pellucida</i> , ssp.	14	2/2	1	MPTV
		<i>terra</i> (4 different)	15–17	4/6	5	CC,CH,CM,EE
		<i>amarilla</i>	15–16°°	1/9	3	EE
		<i>jucunda bolivari</i>	16	2/2	1	CH2
		<i>diasia</i> (3 different)	17	5/12	10	CC3,CH,WE
		<i>celemia plaginota</i>	17–18	1/3	2	CH
		<i>agnosia</i> (4 different)	°18°	7/18	17	GO,EE3,PE,RG,RJ
		<i>p. patilla, leila</i>	18	3/3	3	CH,GU(a),MX(a)
		<i>lichyi</i> (3 different)	18	3/9	2	AC,BA,RJ(incl.d)
		<i>h. hyala</i> , ssp.	19	2/5	2	CC,WE
		<i>lagusa theuda, linda</i>	19	3/6	6	EE,VC2
		<i>avella</i>	20	1/1	1	VC
		<i>drymo</i>	20	2/4	4	ES,RJ(d)
		<i>ellara</i>	20,21	1/2	2	CM
		<i>salapia</i> (3 different)	34–35°°°	6/20	11	AC2,CM,EE3
G	<i>Epityches</i>	<i>eupompe</i>	17	2/4	2	BA ,RJ
	<i>Napeogenes</i>	<i>harbona domiduca</i>	6	1/1	1	CM
		<i>verticilla</i>	7	1/1	1	CM
		<i>gracilis</i>	12	1/2	2	CM
		<i>pharo</i> (4 different)	10,11,13	5/9	6	AC,PA,RO2,VV
		<i>aethra deucalion</i> , ssp.	12,13,14	4/9	7	AC2,RO2
		<i>a. apulia, lycora</i>	13	2/3	3	EE,VV
		<i>sylphis</i> (4 different)	14°°	8/11	8	AM,AP,PA2,RO4
		<i>s. stella, opacella</i>	°12,13,14	4/9	7	AN2(incl.a),CC2
		<i>(stella?) duessa, jamariensis</i>	15	2/6	4	AC,RO
		<i>cranto</i> ssp. nov.	18	1/1	1	WE
		<i>inachia johnsoni, pozziana</i> (NW)	13,14	2/6	4	EE,VV
		ssp. nov. (SW)	16,17,18	5/7	7	MT3,RO2
		<i>pyrois</i> , 2 sspp. nov.(C)	22	3/5	2	AM2, PA
		<i>(inachia?) sulphurina</i> , ssp. nov.	24,26,28	4/10	5	BA,PE3
		<i>cyrianassa</i> (7, Amazon)	°32°	11/22	13	AM2,AP2,BO,PA,RO,3,RR2
		<i>rhezia, yanetta</i>	35,37	4/9	5	BA2,ES2
	<i>Hyaliris</i>	<i>leptalina</i> ssp. nov.	18	1/3	1	ES
		<i>c. cana</i>	20	1/1	1	RG
		<i>oulita? oulita lurida?</i>	26,28	2/8	2	CM, EB
		<i>o. ocna, adelinda</i>	°43	2/2	3	EE,VV
		<i>coeno</i> (4 different)	°48–49	4/23	12	MP,RG,TV,VV

Table 2 (Continued)

Tribe	Genus	Species, subspecies	n =	No. fixed/counted		
				Pop./ind.	Ind.	Localities
H	<i>Garsauritis</i> <i>Rhodussa</i> <i>Hypothyris</i>	<i>excelsa</i> ssp. nov	60	1/2	2	TV
		<i>antea flebilis</i> , <i>frater</i>	°66°	2/7	6	CM,TV
		<i>metella</i>	98–100	1/5	3	CM
		<i>x. xanthostola</i> , ssp. nov.	18,20	2/4	3	AM,AP
		<i>cantobrica nundina</i> , ssp. nov	50–51	3/9	5	RO3
		<i>thea</i> , <i>theatina</i> , <i>vestita</i>	5	4/6	5	AM2,PA2
		(<i>fluonia</i> ?) <i>rowena</i>	9	1/3	2	VV
		<i>fluonia</i> (4 Amazonian ssp.)	°°15°°	5/14	6	AC2,GO,MT,RO
		<i>euclea</i> (8 Amazonian and Atlantic subspp.)	14°	18/42	32	AC,AM,AP2,BA,CM,EB2,EE3, ES, GO,MT,RG,RO,TR,TV
		<i>valora</i> , <i>philetaera</i>	°16°	4/10	7	AN,CC,CZ,VC
		<i>ninonia</i> (9 Amazonian subspp.)	°°16°°	16/46	36	AC,AP2,AM5,BO,MT,PA2,RO2, RR2
		<i>daeta</i>	18–19	4/9	8	BA,ES,MG(a),RJ(a)
		<i>evanescens</i>	21–23	3/10	9	BA2,PE
		<i>semifulva</i> (3 different)	°°17	5/10	8	AC2,RO3
		<i>v. vallonina</i> , ssp. n.	°°20°	2/3	3	PA,RR
		<i>d. daphnis</i> , <i>madeira</i>	°20	2/9	4	AM,RO
		<i>leprieuri</i> (4 different)	°20	10/16	14	AC2,GY(c),MT3,RO4
		<i>anastasia</i> (3 different)	17,20,21	3/6	3	AC2,RO
		<i>mamercus</i> (4 different)	°24°°	6/13	7	AC,EE,RO4
		<i>lycaste</i> (5 different)	°°°45°	5/11	7	CC,EV,GU(b),RG,VC
	<i>Hyposcada</i> (the genus <i>Oleria</i> is in Table 3)	sp.	12	1/2	2	CC
		sp.	12	1/2	1	AM
		<i>illinissa abida</i>	12	1/3	2	CC
		<i>attilodes</i> ?	13	2/2	2	EE2
		<i>zarepha</i>	14	4	14	AP
		<i>illinissa</i> (4 different)	13,15	4/9	2	AM,EE,PT,RR
		<i>v. virginiana</i> , <i>consobrina</i>	15	2/2	2	AN,CC
		<i>anchiala</i> (3 different)	15	3/7	5	AC,EE,RO
		[like <i>makrena</i>]	19	1/1	1	EE
		<i>Megoleria orestilla</i>	35	1/4	1	EE(f)
	<i>Ollantaya</i>	<i>aegineta cleobulina</i>	6?	1/1	1	CM
		<i>canilla</i>	14	1/3	2	CM
I	<i>Callithomia</i>	<i>hezia beronilla</i>	11	1/1	1	CC
		<i>alexirrhoe</i> (5 different)	12	6/6	5	AM,GY(c),MT,PA2,RO
		<i>lenea</i> (5 different)	12°°	12/19	11	BA,EB2,MT5,PA,RO,RR2
	<i>Dircenna</i> (the genus <i>Pteronymia</i> is in Table 3)	<i>loreta</i> (4 different)	°12	12/21	14	EE3,MT,PA,RG,RO4,VV2
		<i>adina</i> (3 different)	14	4/8	7	EE2,RG,TV
		<i>dero</i> (4 different)	14,15	14/44	20	AC,CM,EB2,EE,ES2,GO,MG2, MT,PE,SP,VV

Table 2 (Continued)

Tribe	Genus	Species, subspecies	n =	No. fixed/counted		
				Pop./ind.	Ind.	Localities
J	(may be hybrids or contaminants) <i>Hyalenna</i>	<i>“dero” euchytna</i> (Transandean)	16,17	7/12	11	AN(a), CH 2,RG2,VC2
		<i>p. paradoxa</i> , ssp.	17	2/3	3	VC,WE
		<i>jemina</i> (5 different)	°19°	5/14	11	CH,CM,EB,EV,RG
		<i>“dero celtina”</i>	23	1/3	3	AR(a)
		<i>“dero rhoeo, dark”</i>	30,33	1/3	2	GO
		sp. nov.	13	1/1	1	WE
		<i>a. alidella</i>	15	1/2	2	VC
		<i>minna</i>	22	1/2	2	CM
		<i>pascua</i>	43°	3/9	5	RJ, SP 2
		<i>Haenschia</i>	33	1/4	3	CM
	<i>Episcada</i>	<i>hemixanthe</i>	16	1/2	2	BA
		<i>mira</i>	17	3/5	3	AC,EE,VV
		<i>c. clausina, striposis</i>	°21°	3/5	4	EB,RJ(d),SP
		<i>montanella</i>	24	1/3	2	SP
		<i>munda</i>	26–27 + few	1/5	4	SP
		<i>philoclea</i>	28 + many	3/6	4	RJ, SP 2
		<i>polita</i>	28°	5/6	4	AC2,CC,TV2
		<i>sylpha</i>	31	2/7	1	RG,TV
		<i>s. salvinia, cabenis</i>	°°34°	5/7	5	MX,OX,VC3
		<i>carcinia</i>	60–62	3/5	2	BA, SP 2
	<i>Prittwitzia</i>	<i>hymenaea</i> (4 different)	°15	7/12	10	AR(a),BA, DF ,GO,MG(d),RJ,RG
	<i>Ceratiscada</i>	<i>doto</i> ssp.	12	1/1	1	BO
		<i>canaria</i>	24,27	2/7	3	BA ,ES
	<i>Ceratinia</i>	<i>iolaia</i>	12,14,15	1/5	5	AN(incl.a)
		<i>neso</i> (7 different)	14	9/21	14	BO,CM,EE2,RG,RO2,RR,VV
		<i>tutia</i> (10 different)	°°17°°°	17/32	17	AC3,AN,CC,CM,EE4,RG3,RO, VC,VV2
		<i>c. cayana, giparanaensis</i>	19 + 1,23	2/2	2	RO,RR
	<i>Talamancana</i>	<i>lonera</i>	20	1/1	1	CH
	<i>Velamysta</i>	<i>phengites</i>	12	1/1	1	EE
		<i>pupilla cruxifera</i>	22	1/1	1	EE
	<i>Dygoris</i>	<i>peninna</i> ms. ssp.	38	1/3	2	CM
		<i>d. dircenna</i> , ssp. nov.	36	2/4	4	CM ,VV
	<i>Godyris</i>	<i>kedema</i> (3 different)	13	3/9	4	EV, RG ,VV
		<i>nero</i>	15	2/2	2	CH ,OX
		<i>crinippa</i> ssp.	24	1/1	1	CM
		<i>nepos hewitsoni</i> , ssp. nov.	31,32	2/2	2	CM ,EE
		<i>panthyale</i> ssp.	44	1/1	1	CM
		<i>duillia</i>	46,47	1/1	1	VV
		<i>zavaleta</i> (5 different)	°°°°40°°°°°°	7/27	17	CM,EE,RO3,TV,VV
		<i>zygia</i>	75	2/3	3	CH2
		<i>sappho</i>	77	1/2	1	CM
		<i>gonussa, petersii, telesilla</i>	98–120	5/11	9	AN,CC2,WE2

Table 2 (Continued)

Tribe	Genus	Species, subspecies	n =	No. fixed/counted		
				Pop./ind.	Ind.	Localities
	<i>Greta</i>	<i>p. polissena, umbrana</i>	12	3/6	1	CH,WE2
		(<i>andromica</i> ?) <i>andania</i>	°36°	2/8	5	CM,EE
		<i>a. andromica, lyra</i>	°42°	8/18	6	AN2(a),CC,CH,RG,TV,VC,WE
		<i>morgane oto</i>	°°47°	3/5	2	CH,MX(b),OX
		<i>quisqueya</i>	70	1/6	2	DR
		<i>diaphanus</i>	78	1/5	2	JM
		<i>annette</i>	73,80	4/4	2	CH,OX3
	<i>Hypomenitis</i>	<i>cyrcilla?</i>	24	1/1	1	CM
		<i>dercetis</i>	27	4/7	2	EE2,RG,TV
		<i>enigma</i>	42	1/3	3	WE
		<i>alpesiboea</i>	60	2/2	1	EE,VV
		<i>ortygia ssp.</i>	68	1/1	1	CM
		<i>ochretis</i>	”very many”	2/2	1	AN,VC
		<i>theudelinda</i>	about 100	1/6	2	EE(f)
	<i>Mcclungia</i>	<i>cymo</i> (4 different)	°11	6/9	4	BO,GO2,MG2,MT
		<i>fallens</i> (3 different)	13	4/12	5	AC,RJ,RO
	<i>Hypoleria</i> s.l.	<i>aelia pachiteae, plisthenes</i>	8	14/28	11	AC3,BA,DF(d),GO2,MG,MT2, RO3,SP
		<i>orolina</i> (5 different)	°15°	7/15	6	AC2,DF,GO,MT,RO,SP
	<i>Hypoleria</i>	<i>ocalea</i> (4 different)	10,11	6/15	9	AN2,MT2,RG,RO
		<i>adasa</i> (3 different)	20°	4/8	3	ES,GO,RJ(d),RR
		<i>lavinia</i> (4 different)	26,29–30	5/10	6	CC2,CZ,TV,WE
		<i>alema</i> (12 different)	36–38, 40–43	16/34	15	AC2,AP,BA,EE,ES,GO,MT4,PA,PE, RO2,VV
	<i>Pseudoscada</i>	<i>sarepta virginia</i> , + 2 different	44,45	6/11	8	AC3,AM2,SP
		<i>erruca</i>	°30°	7/12	4	ES,MG4,RJ2
		<i>timna</i> (5 different)	°31°	12/34	16	AC2,AN(a),CC2,CH,C-M,EE2,RG,VV,WE
		<i>florula</i> (4 different)	30–31	7/23	11	AC2,BA2,EE,ES,RJ
		<i>acilla quadrifasciata</i> , ssp.	31	5/16	13	GO(d),MT3,RO
	<i>Heterosais</i>	<i>giulia</i> (5 different)	°°31	15/31	20	AN(a),CH,CM,EB,EE,HU,MT3, RG,RO3,VV,WE
		<i>edessa</i>	30–31	4/7		PE,BA,ES2

Table 3. Chromosome numbers in two large, poorly resolved genera: *Oleria* and *Pteronymia*. Localities in **bold** indicate places of origin of meiotic metaphases shown in Fig. 54–59 and 66–69.

Tribe	Genus	Species, subspecies	n =	Pop./ind.	Ind.	Localities
H	<i>Oleria</i>	<i>victorine graziella</i>	9	2/6	4	RG2
		<i>deronda valida</i>	10	1/1	1	CM
		<i>fasciata</i>	11	1/2	1	CM
		<i>gunilla lota, lubilerda</i> + 2	10,11	5/15	5	AM2,EE2,VV
		<i>amalda, a. modesta</i>	12	3/8	3	CC2,WE
		<i>olerioides</i>	12	1/1	1	CM
		<i>peruvicola</i>	13	1/2	2	CM
		<i>makrena</i> ? + 2	°13°	7/16	6	CC,CH,CM,CZ,VC,WE2
		<i>manora</i>	14	2/5	4	RO,RJ(d)
		<i>cyrene</i>	14	1/6	5	CM
		<i>aegle</i>	14,15	1/2	2	AP
		<i>ilerdina priscilla, quintina</i>	°14°	6/25	18	AC2,CM,EB2,HU
		<i>alexina didymaea</i> + 2	°15	7/10	6	PA,RO,RR,EB
		<i>a. astraea, burchelli, similigena</i>	°15	5/25	12	AC2,AM,AP, BA3 ,EE,ES
		<i>p. paula</i>	16	2/3	3	MX2(b)
		<i>phenomoe</i>	18,19	3/8	2	RG,TV2
		<i>onega crispinilla</i> + 1	°22	4/12	5	AC3,CH
		<i>e. egra, divisa</i>	23–24	3/11	2	AM2,AC
		<i>e. estella</i>	27–28	2/5	4	EE2
		<i>padilla pseudmakrena</i> + 2	30	3/12	2	CM,RG,VV
		<i>o. onega, ilerda, machadoi</i> + 1	30°	5/8	5	AP2,CM,EE,VV
		<i>zelica</i> (2 different)	32,29	2/7	7	VE, WE
		<i>athalina</i>	41	1/1	1	CM
		<i>aquata</i> (3 different)	°°43°°°	8/26	7	AC,BA2,ES,GO,MT2,RO
I	<i>Pteronymia</i>	<i>donella donata</i>	10	1/1	1	DA
		<i>alida</i>	13	1/2	1	RG
		<i>vestilla</i> ? (2 different)	14	3/6	5	AN,PA,VC
		<i>sylvo</i>	14	5/7	2	AR(a),GO,MG,RJ(d),RO
		<i>euritea</i>	14	2/6	6	ES,RJ(d)
		<i>cotytto</i>	15	1/1	1	MX(b)
		<i>são guntheri</i> , ssp. nov. (Lamas)	15	2/3	1	AC,CM
		<i>artena</i> (3 different)	15	3/4	3	EE,TV,VV
		<i>forsteri</i>	16	1/1	1	AC
		<i>latilla</i> (3 different)	16	3/11	5	CC,RG,TV
		<i>veia linzera</i> + 4	°°17°°	7/10	9	CM,EE,HU,TV,VC2, WE
		<i>o. oneida</i>	20	1/1	1	EE
		<i>granica</i> ?	23	1/1	1	EE
		<i>oneida</i> ? <i>asopo</i> (2 different)	°24°°°	4/7	3	EE2 ,RG,TV
		<i>zerlina nubivaga</i>	26	1/2	1	RG
		<i>aletta</i>	26	4/10	3	AN,CC,RG,TV
		<i>teresita thabena</i>	38	1/10	2	EE(f)
		<i>hara semonis</i> ?	54	1/2	1	VC

Table 4. Chromosome numbers of the American *Danainae*. The taxonomic division follows ACKERY and VANE-WRIGHT (1984). The numbers $n=29$ for *D. eresimus* and ($n=29-30$) for *D. gilippus* come from MAEKI (1961); the number for *D. plexippus* comes from a population kept at the University of Madras, India (RAO and MURTY 1975).

Tribe	Genus	Species, subspecies	n =	No. fixed/counted		
				Pop./ind.	Ind.	Localities
A	<i>Anetia</i>	<i>thirza</i>	31	1/2	1	OX
		<i>briarea</i>	31	1/5	2	DR
		<i>pantheratus</i>	31	1/2	1	DR
B	<i>Lycorea</i>	<i>cleobaea</i> (2 different)	30	2/2	2	AN(a),RJ(d)
		<i>pasinuntia</i> (3 different)	22	10/17	10	AC3,AM3,EV,GY(c),RO2
		(<i>Ituna</i>) <i>ilione</i> (2 different)	30	3/5	4	EE2(incl. a),VV
C	<i>Danaus</i>	<i>cleophile</i>	30	1/2	1	DR
		<i>plexippus</i>	30	1/1	?	Madras, India
		<i>erippus</i>	30	1/2	2	SP
	(Anosia)	<i>eresimus</i> (5 different)	°30	6/8	5	CT,DR,DA,EV,MX(gh)
		<i>plexaure</i>	30–31	1/2	2	BA
		<i>gilippus</i> (2 different)	29°	3/6	3	BA,ES,MX(gh)

Not counted: *Anetia jaegeri*, *A. cubana*.

Table 5. Chromosome number comparisons in monophyletic sister-groups (within small genera, or between them and their closest relatives).

Tribe (Fig. 1)	Genus (most primitive or widespread species)	n/n	More advanced or restricted species, or putative sister-genus
A	<i>Elzunia humboldt</i>	14/20	<i>Elzunia pavonii</i>
	<i>Tithorea harmonia</i>	14/11	<i>Tithorea tarricina</i>
	<i>Aeria olena</i>	27/38, 80	<i>Aeria eurimedia</i> , <i>A. elara</i>
E	<i>Athesis clearista</i>	24/14	<i>Patricia</i> (2 spp.)
C	<i>Olyras crathis</i>	8/20 + 19–20 mc	<i>Eutresis hypereia</i>
	<i>Melinaea</i> (10 spp.)	13–30/50	<i>Athyrtis mechanitis</i>
D	<i>Thyridia psidii</i>	17/18–43	<i>Sais rosalia</i> , <i>Scada</i> spp.
	<i>Mechanitis lysimnia</i>	15–19/22–23	<i>Mechanitis macrinus</i>
	<i>Forbestra olivencia</i>	9 + mc/63	<i>Forbestra equicola</i>
I	<i>Callithomia</i> (3 spp.)	11–12/12–38	<i>Velamysta</i> spp.
H	<i>Ollantaya canilla</i>	14/6	<i>Ollantaya aegineta cleobulina</i>
	<i>Hyposcada</i> (11 spp.)	12–15/9–43, 35	<i>Oleria</i> (>20 spp.), <i>Megoleria susiana</i>
G	<i>Epityches eupompe</i>	17/6–37	<i>Napeogenes</i> spp.
F	<i>Pagyrus cymothoe</i>	30/11–35	<i>Ithomia</i> spp.
G	<i>Garsauritis xanthostola</i>	18–20/50–51	<i>Rhodussa cantobrica</i>
I	<i>Hyalenna</i> sp. nov., <i>H. alidella</i>	13,15/22, 43	<i>Hyalenna minna</i> , <i>H. pascua</i>
	<i>Ceratiscada doto</i>	12/24–27	<i>Ceratiscada canaria</i>
	<i>Prittwitzia hymenaea</i>	15/17–62	<i>Episcada</i> spp.
J	<i>Dygoris dircenna</i>	36/13–120	<i>Godyris</i> spp.
	<i>Mcclungia salonina</i>	11/8–45	<i>Hypoleria</i> spp.
	<i>Heterosais</i> , <i>Pseudoscada</i>	31, 30–31/12–100	<i>Greta</i> , <i>Hypomenitis</i>

Table 6. *Ithomiine species with appreciable geographic variation in their chromosome numbers, in different localities (see also Table 7–8). Asterisk (*) indicates variation within populations also.*

Tribe	Genus	Species	Localities	n =	Comments
E	<i>Athesis</i>	<i>clearista</i>	Colombia, W Venezuela NE Venezuela	24 28 + 10 mc	Related <i>Roswellia</i> has 32, 34
F	<i>Ithomia</i>	<i>*iphiannassa</i>	C Colombia Venezuela, W Ecuador	10 12–13	Intergrade freely giving n = 11, 12
		<i>terra</i>	W Colombia Eastern Peru	14 17	n = 16 also known in between these
G	<i>Garsauritis</i>	<i>xanthostola</i>	Amapá, N Brazil Manaus, C Amazon	20 18	
	<i>Napeogenes</i>	<i>*inachia</i>	E Colombia	13–14	The conspecificity of these populations might be questioned!
			Rondônia, SW Brazil Amapá-Para, N Brazil	16–18 22	
		<i>sulphurina</i>	Pernambuco, Bahia	24, 26, 28	
		<i>*stella</i>	Central Colombia W Colombia	11–13 12–14	Almost surely all are conspecific
	<i>Hypothyris</i>	<i>*ninonia</i>	Amazonian Brazil	15–18	Possibly not the same species
		<i>*n. daeta</i>	Eastern Brazil	18–23	
		<i>vallonia</i>	Roraima, N Brazil Pará, E. Brazil	24 20–21	Sister sp. (<i>gemella</i>) has n = 18–20 in Roraima, Venezuela
			SW Venezuela	22	
		<i>fluonia</i>	E Colombia E Ecuador S-C Brazil	9 16–17 13	Conspecificity is quite certain for all these
		<i>*euclea</i>	C America– W Colombia Amazon to S Brazil	16–17 12–15	Intergrades in W Colombia, n = 16–17
		<i>*lycaste</i>	Guatemala W Colombia W Ecuador	48 42–45 50	
H	<i>Oleria</i>	<i>*aquata</i>	SE Brazil SW Brazil	46 43	
		<i>zelica</i>	W Colombia W Ecuador	29 33	Most species have the same number in both
I	<i>Dircenna</i>	<i>dero</i>	C America to W Ecuador S Brazil–Argentina	16–17 14–15	
	<i>Ceratinia</i>	<i>*tutia</i>	C America– W Colombia N Venezuela	15–16 19–20	Almost surely these are conspecific with each other
			Acre, SW Brazil Rondônia, SW Brazil	15 18	
	<i>Ceraticada</i>	<i>canaria</i>	Bahia, E Brazil Esp. Santo, E. Brazil	24 27	
J	<i>Hypoleria</i>	<i>lavinia</i>	Costa Rica to W Colombia W Ecuador	26 29	
		<i>alema</i>	SW Venezuela	30	
		<i>oreas</i>	SW Brazil NE Brazil NW Brazil E Colombia	36 40–42 38, 40 37–38	

Table 7. Chromosomes and systematics of *Mechanitis* species and subspecies.

Species	Subspecies examined	Localities	n =	Comments
<i>lysimmia</i>	<i>menecles</i> , <i>ocona</i> , <i>acreana</i> , <i>elisa</i> <i>lysimmia</i>	CM,EB,EE,MT,RO AR,BA,RJ	15 18–19	no variation in these western ssp. Form “connectens” (GO,MT) has n = 16–17
	<i>nesaea</i>	BA,PB	17	Form “sulphurescens” has n = 18
<i>macrinus</i>	<i>macrinus</i> , <i>utemaia</i> , <i>solaria</i> , new ssp.	CH,CZ,EV,RG	22–24	Consistently higher n than <i>lysimmia</i> , for names see LAMAS (1988)
<i>polymnia</i>	<i>lycidice</i> , <i>isthmia</i> , <i>veritabilis</i> , <i>wernerii</i> , <i>caucaensis</i> , <i>kayei</i> , <i>chimbazona</i> (Transandean)	AN,CC,CZ,EV,MX,VC,WE	17–19	Occasionally to n = 20 or more, especially in Sucre/Trinidad
	<i>bolivarensis</i> , <i>dorissides</i> , <i>proceriformis</i> , <i>eurydice</i> , <i>polymnia</i> , <i>mauensis</i> , new ssp., <i>angustifascia</i> , <i>casabranca</i>	MP,RR,VV,EE, CM,PA,AM,MT,CM, EB,HU,GO, MG,RJ	14–16	n = 16 seen very rarely, possibly due to non- pairing in an otherwise stable complement
<i>menapis</i>	<i>menapis</i> , <i>occasiva</i> , <i>caribensis</i> , new ssp.	DA,CC,VC,RG,EV	24–25	occasionally lower (22–23 in E Venezuela) or higher (28 in W Colombia)
<i>mazaesus</i>	<i>dariensis</i> , <i>mantineus</i> <i>mazaesus</i> , <i>elevata</i> , <i>egaensis</i> , <i>pannifera</i> , <i>visenda</i> , <i>pothetoides</i> , various forms	DA,WE GY,VV,EE,AM, RO,PA,AC	20 14–16	lowest numbers at extremes of range darker forms tend to lower numbers (14) in W Amazon and Andean foothills but most pops. have variable 14–16
	<i>messenoides</i> , <i>deceptus</i>	VV,EE,CM	15–16	very occasional counts of 14 seen

Table 8. Chromosomes and systematics of *Melinaea*.

Species	Subspecies examined	Localities	n =	Comments
<i>mnasias</i>	<i>eratosthenes</i> , <i>rondonia</i> , <i>thera</i> , <i>comma</i> , new ssp.	AP,CM,GY,RR, BA,PA,RO	23–27	Seems coherent and amply distinct; also includes 7–10 other ssp.
<i>iudovica</i>	<i>iudovica</i> (some populations)	AP,PA,RO,RR	17–19	Varies within populations or individuals
	<i>iudovica</i> , <i>paraiya</i> <i>crameri</i> , <i>paraiya</i>	AM,BA,GY BA,BO,EV,RJ,SP	20–23 23,24	May be due to incomplete pairing at times Highest n at extremes of range
<i>idea</i>	<i>idae</i> , <i>vespertina</i>	AN,CC,CZ,WE	13	Separated from <i>iudovica</i> by chromosomes
<i>ethra</i>	(none)	BA,ES,PE,RJ,SP	29,30	E Brazil; separated from <i>maelus/maeonis</i>
<i>maelus</i>	<i>zamora</i> , <i>maeonis</i> , <i>cydon</i> , <i>tarapotensis</i> , <i>flavomaculata</i> , <i>mnemopsis</i> , <i>scylax</i>	AC,AM,CH, EB,EE,HU,TV	14,15, 17	Consistent form of wing markings (FW Cu, HW cell) and low number
	<i>lamasi</i> , new ssp.	AC,RO	14–17	higher numbers can be seen in this region
<i>lilis</i>	<i>imitata</i> , <i>parallelis</i> , <i>lilis</i> , <i>dodona</i>	CH,CC,MX,OX RG	21–24	Variable within and between populations, includes also 7 more Transandean ssp.
	<i>sola</i> , <i>lateapicalis</i>	EV,TR,TV	20–21	Lowest n at NE, S extremes of range
<i>mneme</i>	<i>mneme</i> , <i>mauensis</i> , new ssp.	AM,AP,GY,RO	16,17	Consistent in pattern and number
<i>menophilus</i>	<i>menophilus</i> , <i>orestes</i> , <i>zaneka</i>	AC,EE,RO	19–22	Consistent E to E Pará
<i>marsaeus</i>	<i>messenina</i> , <i>mothone</i> , <i>clara</i> , <i>pothete</i>	AC,EE,TV,VV RO,PA	16–18	Also includes <i>marsaeus</i> , <i>macaria</i> , <i>rileyi</i> ; sympatric with <i>maelus</i> , <i>menophilus</i> , <i>maenius</i>
	<i>phasiana</i> , <i>satevis</i>	AC,EB	15	lowest numbers in SW, <i>satevis</i> was in <i>iudovica</i>
<i>maenius</i>	<i>mediatrix</i> , <i>isocomma</i> , <i>simulator</i> , <i>cocana</i> , <i>egesta</i> , <i>juruaensis</i>	GY,AP,VV,EE, RO,AC	20–23	Up to n = 25 in some areas; often hard to separate superficially from <i>marsaeus</i>

Table 1. Haploid chromosome numbers for South American Nymphalidae. The taxon name used in the original reference is in parentheses. A comma between chromosome numbers shows that the numbers come from different individuals. Localities are grouped by region; a number at the end of locality codes indicates the number of populations sampled within a region. A lower case letter in parentheses indicates previous work (*a* = DE LESSE 1967a, *b* = DE LESSE 1970a, *c* = DE LESSE 1970b, *d* = DE LESSE and BROWN 1971, *e* = FRANCINI 1989, *f* = MAEKI and REMINGTON 1960, *g* = WESLEY and EMMEL 1975, *h* = EMMEL and ELIAZAR, unpubl.). Locality codes: AC = Acre (extreme western Brazil), AM = Amazonas (northwestern Brazil), AN = Andes of north-central Colombia, AV = Amazonas (southern Venezuela), BA = Bahia (eastern Brazil), BO = Bolivar (southern Venezuela), CC = Chocó (western Colombia), DF = Brasília (central Brazil), DR = Dominican Republic, EE = eastern Ecuador, ES = Espírito Santo (eastern Brazil), MG = Minas Gerais (central Brazil), MT = Mato Grosso (central Brazil), OX = Oaxaca (southern Mexico), PA = Pará (northern Brazil), RJ = Rio de Janeiro (southeastern Brazil), RO = Rondônia (western Brazil), TV = Táchira (southwestern Venezuela), VC = Valle de Cauca (western Colombia), VV = Villavicencio, Meta (eastern Colombia).

Genus	Species, subspecies	n =	No. studied pop./ind.	Locality
Family NYMPHALIDAE				
Subfamily LIBYTHEINAE				
<i>Libytheana</i>	<i>carinenta</i>	31 + 2 small	1/1	Mexico(b)
<i>Libytheana</i>	<i>carinenta bachmanii</i> (L. b.)	31	1/7	Mexico(f)
Subfamily DANAINAE; BROWN et al. (2004)				
Tribe Danaini; BROWN et al. (2004)		~30		
Tribe Ithomiini; BROWN et al. (2004)		~14–15-variable		
Subfamily CHARAXINAE; BROWN et al. (2007)		variable		
Subfamily SATYRINAE; BROWN et al. (2007)		~29-variable		
Subfamily CYRESTINAE				
<i>Marpesia</i>	<i>berania</i>	32	1/1	Colombia(a)
<i>Marpesia</i>	<i>corinna</i>	33	1/2	Bolivia(a)
<i>Marpesia</i>	<i>petreus</i>	32	1/2	Argentina(a)
<i>Marpesia</i>	<i>zerynthia (coresia)</i>	32	1/2, 1/1	Bolivia(a), Ecuador(a)
Subfamily BIBLIDINAE				
Tribe Biblidini				
<i>Biblis</i>	<i>hyperia</i>	28	1/2, 1/5	Argentina(a), Mexico(f)
<i>Mestra</i>	<i>dorcas apicalis</i> (M. a.)	31	1/1	Bolivia(a)
<i>Mestra</i>	<i>dorcas hersilia</i>	31	1/1	Tobago(g)
	(M. hypermestra cana)			
<i>Mestra</i>	<i>dorcas semifulva</i> (M. s.)	33	1/1	Colombia(a)
<i>Vila</i>	sp.	15	1/1	RO
Tribe Epicaliini				
<i>Catonephele</i>	<i>antinoe</i>	14	1/2	Guyane(c)
<i>Catonephele</i>	<i>chromis</i>	15	1/1	TV
<i>Catonephele</i>	<i>numilia</i>	15	1/1	Mexico(b)
<i>Catonephele</i>	<i>nyctimus</i>	23	1/1	OX
<i>Catonephele</i>	<i>orites</i>	21	1/1	TV
<i>Catonephele</i>	<i>salambria</i>	15	1/1	TV
<i>Cybdelis</i>	<i>phaesyla (phaesila)</i>	23	1/2	Bolivia(a)
<i>Eunica</i>	<i>alcmena flora</i>	30	1/2	MT
<i>Eunica</i>	<i>bechina</i>	28	1/1	DF(d)
<i>Eunica (Libythina)</i>	<i>cuvierii</i>	31	1/1	DF(d)
<i>Eunica (Evonyme)</i>	<i>eburnea</i>	30	1/2	Argentina(a)
<i>Eunica</i>	<i>ingens</i>	30	2/4	MT, RO(h)
<i>Eunica</i>	<i>macris</i>	16	1/1	RO(h)
<i>Eunica</i>	<i>malvina</i>	14, 31	1/1, 1/1	MT2
<i>Eunica</i>	<i>monima</i>	31	2/2	MT, RO
<i>Eunica</i>	<i>mygdonia</i>	31	1/3	MT
<i>Eunica</i>	nr <i>eurota</i>	30	1/1	TV
<i>Eunica</i>	nr <i>orphise</i>	29	1/1	ES
<i>Eunica (Evonyme)</i>	<i>tatila</i>	26	1/3	Argentina(a)
<i>Eunica</i>	sp.	15	1/1	RO(h)
<i>Eunica</i>	sp.	29–30	1/1	MT

Table 1 (Continued)

Genus	Species, subspecies	n =	No. studied pop./ind.	Locality
<i>Eunica</i>	sp.	31	1/1	AN
<i>Eunica</i>	sp.	31	1/1	RO(h)
<i>Myscelia</i>	<i>orsis</i>	24	1/1	RJ(d)
<i>Nessaea</i>	<i>batesii</i>	11	1/1	Guyane(c)
<i>Nessaea</i>	<i>hewitsonii</i>	7	1/1	La Macarena, Colombia(h)
<i>Nessaea</i>	<i>obrinus</i>	7	1/2	AM(h)
<i>Nessaea</i>	<i>obrinus</i>	8	1/1	BO
Tribe Ageroniini				
<i>Ectima</i>	<i>lirides</i>	16	1/1	AM
<i>Hamadryas</i>	<i>amphinome</i>	31	1/1	Colombia(a)
<i>Hamadryas</i>	<i>arinome</i>	31	1/1	Colombia(a)
<i>Hamadryas</i>	<i>epinome</i>	31	1/2	Argentina(a)
<i>Hamadryas</i>	<i>feronia</i>	31	1/1	Guyane(c)
<i>Hamadryas</i>	<i>glauconome</i>	31	1/2	Mexico(f)
<i>Hamadryas</i>	<i>guatemalena</i>	31	1/1	Mexico(b)
<i>Hamadryas</i>	<i>laodamia</i> (<i>Peridroma arethusa</i>)	31	1/2	Guatemala(b)
<i>Hamadryas</i>	sp.	30	1/1	RO
<i>Panacea</i>	<i>procilla</i>	31	1/1	VC
<i>Panacea</i>	sp.	31	1/3	CC
Tribe Epiphilini				
<i>Asterope</i>	sp. nr <i>markii</i>	10	1/1	AC
<i>Asterope</i>	sp.	10	1/1	AV
<i>Epiphile</i>	<i>adrasta</i>	29	2/2	Guatemala(b), Mexico(b)
<i>Epiphile</i>	<i>hubneri</i> (<i>huebneri</i>)	32	1/1	MG(d)
<i>Epiphile</i>	<i>orea</i>	32	1/1	DF
<i>Epiphile</i>	<i>orea</i>	32, 34	1/2	Argentina(a)
<i>Nica</i> (<i>Pseudonica</i>)	<i>flavilla</i>	54	1/1	Guatemala(b)
<i>Peria</i>	<i>lamis</i>	23	1/1	EE
<i>Pyrrhogyra</i>	<i>neaerea ophni</i>	29	1/1	ES
<i>Pyrrhogyra</i>	<i>neaerea ophni</i>	31	1/1	BA
<i>Pyrrhogyra</i>	<i>otolais</i> (<i>nasica</i>)	30	1/1	Colombia(a)
<i>Pyrrhogyra</i>	sp.	30	1/1	EE
<i>Temenis</i>	<i>laothoe</i>	11	1/1	MT(h)
<i>Temenis</i>	<i>laothoe</i>	12	2/3	DF, RO
<i>Temenis</i>	<i>laothoe</i>	13	3/5	Argentina(a), MG, PA
<i>Temenis</i>	<i>laothoe</i> (dark)	14	1/1	EE
<i>Temenis</i>	<i>laothoe</i>	14	1/1	VV
<i>Temenis</i>	<i>laothoe bahiana</i>	13 (2 small)	1/3	BA
<i>Temenis</i>	<i>pulchra</i>	27	2/3	VC, VV
<i>Temenis</i>	sp. nr <i>huebneri</i>	7	1/1	EE
Tribe Eubagini				
<i>Dynamine</i>	<i>agacles</i>	ca 29	1/1	Argentina(a)
<i>Dynamine</i>	<i>arene</i>	30	1/1	Tobago(g)
<i>Dynamine</i>	<i>athemon</i>	29	1/4	Argentina(a)
<i>Dynamine</i>	<i>coenus</i>	30	1/1	Argentina(a)
<i>Dynamine</i>	<i>myrrhina</i>	29	1/1	Argentina(a)
<i>Dynamine</i>	<i>postverta</i> (<i>myllita</i>)	28	1/2	Guatemala(b)
<i>Dynamine</i>	<i>postverta</i> (<i>myllita</i>)	29	2/4	Argentina(a), Guatemala(b)
<i>Dynamine</i>	<i>tithia</i>	30	1/1	Argentina(a)
<i>Dynamine</i>	<i>tithia salpensa</i> (<i>D. s.</i>)	30	1/2	Bolivia(a)
Tribe Callicorini				
<i>Callicore</i>	<i>hydaspes</i>	30	1/2	Argentina(a)
<i>Callicore</i>	<i>hydaspes</i>	30–31	1/1	Argentina(a)
<i>Callicore</i>	<i>lyca</i>	31	1/1	Ecuador(a)
<i>Callicore</i>	<i>tolima</i>	21	1/1	Ecuador(a)
<i>Diaethria</i>	<i>anna</i> (<i>annua</i>)	31	1/1	Mexico(b)
<i>Diaethria</i>	<i>candrena</i>	31	1/5	Argentina(a)
<i>Diaethria</i>	<i>clymena</i>	31	2/2	Argentina(a), Ecuador(a)

Table 1 (Continued)

Genus	Species, subspecies	n =	No. studied pop./ind.	Locality
<i>Diaethria</i>	<i>clymena marchalii</i> (<i>D. m.</i>)	31	1/3	Colombia(a)
<i>Haematera</i> (<i>Callidula</i>)	<i>pyrame</i>	30	1/2	Argentina(a)
<i>Haematera</i>	<i>pyrame</i>	30–31	1/1	RJ(h)
<i>Mesotaenia</i> (<i>Perisama</i>)	<i>vaninka</i>	31	1/3	Bolivia(a)
<i>Orophila</i> (<i>Perisama</i>)	<i>cardases</i>	31	1/1	Ecuador(a)
<i>Perisama</i>	<i>bomplandii</i>	31	1/3	Ecuador(a)
<i>Perisama</i>	<i>humboldtii</i>	31	1/1	Ecuador(a)
<i>Perisama</i>	<i>lebasii hilara</i> (<i>P. h.</i>)	31–32	1/1	Bolivia(a)
<i>Perisama</i>	<i>morona</i>	31	1/2	Bolivia(a)
<i>Perisama</i>	<i>oppelii</i>	31	1/1	Ecuador(a)
Subfamily APATURINAE				
<i>Asterocampa</i>	<i>leilia</i>	31	1/1	Mexico(f)
<i>Doxocopa</i>	<i>cyane</i>	32–33	1/1	Ecuador(a)
<i>Doxocopa</i>	<i>elis</i>	31	1/1	Bolivia(a)
<i>Doxocopa</i>	<i>laurentia</i> (<i>seraphina</i>)	31	1/1	Argentina(a)
<i>Doxocopa</i>	<i>linda</i>	32	1/1	Argentina(a)
<i>Doxocopa</i>	<i>pavon</i>	33–34	1/1	Mexico(b)
<i>Doxocopa</i>	sp. nr <i>agathina</i>	31	1/1	EE
Subfamily NYMPHALINAE				
Tribe Coeini				
<i>Baeotus</i>	<i>deucalion</i>	15	2/2	EE, RO(h)
<i>Baeotus</i>	sp.	14	1/1	CC
<i>Historis</i> (<i>Coea</i>)	<i>acheronta</i>	31	1/1	Ecuador(a)
Tribe Nymphalini				
<i>Colobura</i>	<i>dirce</i>	31	1/2	RJ(d)
<i>Hypanartia</i>	<i>bella</i>	31	1/3	Argentina(a)
<i>Hypanartia</i>	<i>dione</i>	31	1/1	Bolivia(a)
<i>Hypanartia</i>	<i>kefersteini</i>	31	1/1	Bolivia(a)
<i>Hypanartia</i>	<i>lethe</i>	31	2/3	Argentina(a), Ecuador(a)
<i>Smyrna</i>	<i>blomfildia</i>	31	1/2	MG
<i>Tigridia</i>	<i>acesta latifascia</i>	30	1/1	DF(d)
<i>Vanessa</i>	<i>carye</i>	31	1/1	Argentina(a)
<i>Vanessa</i>	<i>virginiensis</i>	31	1/1	Argentina(a)
Tribe Victorinini				
<i>Anartia</i>	<i>amathea</i>	30–31	1/1	Argentina(a)
<i>Anartia</i>	<i>amathea</i>	31	3/10	Argentina(a), Trinidad2(g)
<i>Anartia</i>	<i>amathea</i>	32	1/1	Argentina(a)
<i>Anartia</i>	<i>fatima</i>	31	1/2	Mexico(f)
<i>Anartia</i>	<i>jatrophae</i>	31	6/8	Bolivia(a), Colombia(a), Guyane(c), Mexico(f), Trinidad2(g)
<i>Metamorphia</i>	<i>elissa</i> (<i>sulpicia</i>)	31	1/3	Ecuador(a)
<i>Siproeta</i>	<i>epaphus</i>	31	1/3	Ecuador(a)
<i>Siproeta</i> (<i>Metamorphia</i>)	<i>stelenes</i>	31	3/4	Colombia(a), Ecuador(a), Mexico(f)
Tribe Junoniini				
<i>Junonia</i>	<i>coenia</i>	31	1/1	Mexico(f)
<i>Junonia</i>	<i>evarete</i>	31	2/4	Ecuador(a), RJ
<i>Junonia</i> (<i>Precis</i>)	<i>evarete zonalis</i> (<i>lavina z.</i>)	31	3/3	Mexico(f), Trinidad2(g)
<i>Junonia</i>	<i>vestina</i>	31	1/1	Argentina(a)
<i>Junonia</i>	<i>vestina livia</i>	31	1/1	Ecuador(a)
Tribe Melitaeini				
<i>Anthanassa</i> (<i>Phyciodes</i>)	<i>frisias hermas</i>	31	1/1	Argentina(a)
<i>Castilia</i> (<i>Phyciodes</i>)	<i>eranites</i>	31	1/1	Colombia(a)
<i>Chlosyne</i>	<i>gaudialis</i>	31	1/1	Mexico(b)
<i>Chlosyne</i>	<i>hippodrome</i>	31	1/1	Mexico(b)
<i>Chlosyne</i>	<i>janais</i>	31	2/4	Mexico2(b)
<i>Chlosyne</i>	<i>lacinia adjutrix</i>	31	1/1	Mexico(b)

Table 1 (Continued)

Genus	Species, subspecies	n =	No. studied pop./ind.	Locality
<i>Chlosyne</i>	<i>lacinia lacinia</i>	31	1/1	Mexico(b)
<i>Chlosyne</i>	<i>narva</i>	ca 31	1/1	Colombia(a)
<i>Eresia</i>	<i>datis moesta</i> (<i>Phyciodes m.</i>)	32	1/3	Ecuador(a)
<i>Eresia</i>	<i>datis moesta</i> (<i>Phyciodes m.</i>)	33, 33–34	1/2	Ecuador(a)
<i>Eresia</i>	<i>datis margaretha</i> (<i>Phyciodes m.</i>)	ca 34–35	1/1	Colombia(a)
<i>Eresia</i> (<i>Phyciodes</i>)	<i>emerantia</i>	31	1/1	Colombia(a)
<i>Eresia</i> (<i>Phyciodes</i>)	<i>lansdorfi</i>	31	2/2	Argentina(a), MG(d)
<i>Ortilia</i> (<i>Phyciodes</i>)	<i>ithra</i>	31	1/1	Argentina(a)
<i>Telenassa</i> (<i>Phyciodes</i>)	<i>teletusa</i>	31	1/1	Argentina(a)
Subfamily LIMENITIDINAE				
<i>Adelpha</i>	<i>alala</i>	42, 45	1/2	Bolivia(a)
<i>Adelpha</i>	<i>cocala</i>	27	1/1	Ecuador(a)
<i>Adelpha</i>	<i>c. cocala</i> (<i>c. urraca</i>)	15, 16	1/2	MT
<i>Adelpha</i>	<i>cocala didia</i> (<i>c. riola</i>)	30	1/1	RJ(d)
<i>Adelpha</i>	<i>cytherea</i>	30	1/2	Colombia(a)
<i>Adelpha</i>	<i>epione</i>	33	1/1	VC
<i>Adelpha</i>	<i>epione</i> ssp.	32–33	1/1	EE
<i>Adelpha</i>	<i>justina valentina</i> (<i>A. v.</i>)	30	1/1	Ecuador(a)
<i>Adelpha</i>	<i>lycorias lara</i> (<i>A. lara</i>)	30	1/1	Ecuador(a)
<i>Adelpha</i>	<i>malea goyama</i> (<i>A. g.</i>)	30	1/1	Argentina(a)
<i>Adelpha</i>	<i>mesentina</i>	30	1/2	AM
<i>Adelpha</i>	<i>mythra</i>	30	1/1	RJ(d)
<i>Adelpha</i>	<i>saundersii</i>	30	1/1	Bolivia(a)
<i>Adelpha</i>	<i>serpa</i>	11	1/2	ES
<i>Adelpha</i>	<i>syma</i>	29	1/1	MG(d)
<i>Adelpha</i>	<i>thessalia indefecta</i> (<i>A. mincia</i>)	30	1/2	Argentina(a)
Subfamily HELICONIINAE				
Tribe Argynnini				
<i>Euptoieta</i>	<i>hegesia</i>	31	2/3	Bolivia(a), Mexico(f)
<i>Euptoieta</i>	<i>hortensia</i>	31	1/2	Argentina(a)
<i>Yramea</i>	<i>cytheris</i>	31	2/4	Argentina(a), Chile(a)
<i>Yramea</i>	<i>lathonoides</i>	31	1/1	Chile(a)
Tribe Acraeini				
<i>Abananote</i> (<i>Actinote</i>)	<i>erinome</i>	ca 150	1/1	Bolivia(a)
<i>Actinote</i>	<i>carycina</i>	31	several	SP(e)
<i>Actinote</i>	<i>melanisans</i>	31	several	SP(e)
<i>Actinote</i>	<i>parapheles</i>	31	several	SP(e)
<i>Actinote</i>	<i>pellenea</i>	31	several	SP(e)
<i>Actinote</i>	<i>thalia pyrrha</i> (<i>A. p.</i>)	31	several	SP(e)
<i>Altinote</i> (<i>Actinote</i>)	<i>alcione corduba</i>	14	1/1	Bolivia(a)
Tribe Heliconiini; SUOMALAINEN and BROWN (1984), BROWN et al. (1992)		31 → 21		

2004). The two tribes of Charaxinae have quite different distributions of numbers (BROWN et al. 2007). The Anaeni have a peak at $n=31$, followed by a descending series with many numbers in $n=26$ through 30 and a minor peak at $n=21$, all the way to $n=6$, while the Preponini have a peak at $n=12$ with a single number above $n=19$.

Among Satyrinae (BROWN et al. 2007), the Morphini have a peak at $n=28$, while the Brassolini have an equally distinctive peak at $n=29$. The other tribes of Satyrinae have a weak modal of $n=29$ (BROWN

et al. 2007), starting with the basal groups with $n=29$ relatively common, followed with the first clade of Pronophilina (PEÑA et al. 2006) which has $n=29$ fixed, followed by the second clade that has an uneven distribution resembling the one of Euptychiina that has all numbers between $n=6$ and $n=31$ present at least once, with $n=13$ as the most common one but without any clear modal number.

The next clade is made up of Heliconiinae (including Argynnini, Heliconiini and Acraeini) and Limenitidinae. The samples for Argynnini and Acraeini are

Table 1. *Haploid chromosome numbers for species and recognized additional subspecies of South American riordinids. The taxon name used in the original reference is in parentheses. A comma between chromosome numbers indicates different individuals, a dash indicates uncertain alternative numbers within an individual.*

Voucher code	Genus	Species	n =	No. studied pop./ind.	Locality
Subfamily EUSELASIINAE					
Tribe Euselasiini					
314	<i>Euselasia</i>	<i>clesa</i>	29	1/1	ES
335		<i>eucerus</i>	28	1/1	ES
260		<i>eusepus</i>	29	1/1	ES
304		<i>fervida</i>	29	1/1	ES
1117		<i>gelanor</i>	28	1/1	EB
419		<i>melaphaea</i>	12	1/1	MT
476		<i>mys cytis</i>	28	1/1	MT
399		<i>praeclara</i>	29	1/1	MT
252		<i>thucydides</i>	27	1/1	ES
316		<i>utica</i>	17	1/1	ES
1452		<i>Hades</i>	<i>noctula</i>	20	1/1
Subfamily RIODININAE					
Tribe Mesosemiini					
Subtribe Mesosemiina					
428, 438, 455	<i>Mesosemia</i>	<i>bella</i>	21, 23	1/1, 2/2	MT; MT2
Wesley and Emmel 1975 (TR-118)		<i>lamachus (methion)</i>	18	1/1	Trinidad
189		<i>melpia</i>	20	1/2	DF
464		<i>melpia vaporosa</i> (?)	ca 46	1/1	MT
577		<i>metope</i>	26	1/1	PB
951, 866		<i>mevania mimallonis</i>	43, 45	1/1, 1/2	VC, VV
Subtribe Napaeina					
261	<i>Cremna</i>	<i>alector</i>	24	1/1	ES
414		<i>cuyabaensis</i>	43	1/1	MT
158	<i>Eucorna</i>	<i>sanarita</i>	13	1/1	RJ
310	<i>Napaea</i>	<i>eucharila</i>	22	1/1	ES
298		<i>orpheus</i>	26	1/2	ES
Tribe Eurybiini					
1146	<i>Alesa</i>	<i>prema</i>	21	1/1	MG
1120, 1042	<i>Eurybia</i>	<i>dardus</i>	14	2/2	EB, EE
442, 400, 445, 751, 907		<i>dardus annulata</i>	28, 29, 32	1/1, 2/3, 1/1	MT; MT, PA; VV
974		<i>franciscana</i> ssp.	14	1/1	WE
1541		<i>halimede</i>	29	1/1	BA
de Lesse and Brown 1971		<i>halimede passercula (elvina tephrias)</i>	29	1/1, 1/1	DF, MG
de Lesse and Brown 1971		<i>misellivestis (dardus misellivestis)</i>	13	1/2	MG
de Lesse and Brown 1971		<i>molochina hyacinthina</i>	30	1/1, 1/1	RJ
743, 1059		<i>nicaeus</i>	29	1/1, 1/1	EE, PA
de Lesse and Brown 1971	<i>nicaeus</i> (f. <i>paula</i>)	14	1/1	DF	
1250		<i>nicaeus</i> ssp. (violet HW)	29	1/1	RO
Tribe Riordinini					
380, 454	<i>Amarynthia</i>	<i>meneria</i>	20	2/3	MT2
307		<i>aulestes pandama</i>	27	1/2	ES
1229		<i>meliboeus</i>	27	1/1	RO
311	<i>Baeotis</i>	<i>hisbon</i>	28	1/1	ES
267		<i>melanis</i> (?)	15	1/2	ES
de Lesse 1967	<i>Barbicornis</i>	<i>basilis mona</i>	30	1/2	Argentina
529	<i>Calephelis</i>	<i>aymaran</i>	9	1/1	BA

(Continued)

Table 1. (Continued).

Voucher code	Genus	Species	n =	No. studied pop./ind.	Locality
de Lesse 1967		<i>candiope</i> (<i>Charmona c.</i>)	23	1/2	Colombia
de Lesse 1967		<i>nilus</i>	10	1/1	Bolivia
Maeki and Remington 1961		<i>virginiensis</i>	45	1/1	Florida
270	<i>Chalodeta</i>	<i>chelonis</i>	16	1/1	ES
de Lesse 1967		<i>theodora</i>	15	1/1	Argentina
708	<i>Charis</i>	<i>cadytis</i>	27–28	1/1	MG
175, 456	<i>Chorinea</i>	<i>amazon</i>	21, 27	1/1, 1/1	MG, MT
519		<i>octavius</i>	20	1/3	MT
de Lesse and Brown 1971	<i>Detritivora</i>	<i>zama</i> [<i>Charis (gynaea?) zama</i>]	20	1/1	DF
562	<i>Isapis</i>	<i>agyrtus</i>	27	1/1	PE
450	<i>Lasaia</i>	<i>agesilas</i>	22 (?)	1/2	MT
452	<i>Lyropteryx</i>	<i>apollonia</i>	25	1/1	MT
de Lesse 1967	<i>Melanis</i>	<i>aegates aegates</i> (<i>Lymnas a.</i>)	16	1/2	Argentina
241, 447, 440, 427		<i>aegates albugo</i>	20, 21, 27	1/1, 1/1; 1/1; 1/1	MG, MT; MT; MT
1188		<i>aegates/hillapana</i>	21	1/1	MT
224, 829		<i>electron electron</i>	19, 21	1/2, 1/1	MG, RG
422		<i>marathon</i>	34	1/3	MT
569, 443		<i>smithiae</i>	16, 31	1/1, 1/2	PE, MT
437		<i>xenia ambryllis</i>	31	1/2	MT
179	<i>Metacharis</i>	<i>lucius</i>	11	1/1	GO
1471a, 1471b	<i>Necyria</i>	<i>bellona</i>	21, 27	1/1, 1/3	EE
de Lesse and Brown 1971	<i>Panara</i>	<i>jarbas (thisbe)</i>	15, 16	1/1, 1/1	MG
239		<i>ovifera</i>	26	1/1	RJ
de Lesse and Brown 1971, 423	<i>Rhetus</i>	<i>periander (arthuriana)</i>	15	1/1, 1/2, 1/1	GO, MT
477, 792	<i>Riodina</i>	<i>lysippus</i>	14	1/3, 1/2	MT, RR
de Lesse 1967	<i>Siseme</i>	<i>neurodes</i>	17	1/1	Bolivia
295	<i>Syrmatia</i>	<i>nyx</i>	21	1/1	ES
Tribe Symmachiini					
439	<i>Mesene</i>	<i>monostigma</i>	24	1/1	MT
563		<i>phareus</i>	27	1/1	PE
793	<i>Phaenochitonia</i>	<i>cingulus</i>	8–10	1/1	RR
513		<i>rufilinea</i>	10	1/3	MT
de Lesse and Brown 1971	<i>Pirascia</i>	<i>sagaris satnius</i> (<i>Phaenochitonia s. s.</i>)	20	1/1	GO
1595	<i>Symmachia</i>	<i>accusatrix</i>	22	1/1, 1/1	ES
319		<i>menetas</i>	27	1/1	ES
Tribe Helicopini					
812, 3317	<i>Helicopis</i>	<i>cupido</i>	20	2/2	GY, AV
1028		<i>gnidus</i>	16	1/1	EE
Tribe INCERTAE SEDIS					
1366	<i>Calydna</i>	<i>lusca</i>	40	1/1	ES
583, 1187		<i>thersander</i>	33, 64	1/1, 1/1	PE, MT
1118	<i>Echydna</i>	<i>chaseba</i> (?)	26	1/1	EB
de Lesse 1967	<i>Emesis</i>	<i>angularis</i>	ca 34	1/1	Bolivia
de Lesse 1967		<i>cypria</i>	17	1/1	Ecuador
463		<i>lucinda lucinda</i>	29	1/1	MT
910		<i>lucinda ssp.</i>	25	1/1	VV
425a,b,c		<i>mandana</i>	11, 21, 27	1/1, 1/1, 1/1	MT

(Continued)

Table 1. (Continued).

Voucher code	Genus	Species	n =	No. studied pop./ind.	Locality
1446		<i>ocypore</i> ssp.	15	1/1	CC
654		<i>tenedia</i>	14	1/1	SC
de Lesse 1967	<i>Imelda</i>	<i>mycea glaucosmia</i>	21	1/1	Ecuador
Tribe Nymphidiini					
Subtribe Aricorina					
de Lesse 1967	<i>Aricoris</i>	<i>chilensis</i> (<i>Hamearis</i> c.)	31	1/1	Argentina
de Lesse 1967, 797		<i>epulus</i> (<i>Hamearis</i> e.)	29, 28–30	1/1, 1/1	Argentina, RR
1181		<i>middletoni</i>	34 (?)	1/1	MT
Subtribe Lemoniadina					
750	<i>Juditha</i>	<i>azan majorana</i>	13	1/1	PA
479		<i>azan?</i>	31	1/1	MT
1265, 673	<i>Lemonias</i>	<i>zygia</i>	24, 25	1/1, 1/1	RO, RJ
726	<i>Synargis</i>	<i>abaris?</i>	24	1/2	PA
1161		<i>brennus</i>	ca 20	1/1	DF
de Lesse and Brown 1971; 659		<i>calyce</i>	17	1/1, 1/1	GO
796		<i>orestessa</i> (?)	18	1/2	RR
1577		<i>phliasus</i>	17	1/1	SP
802		<i>pittheus</i>	27	1/1	RR
de Lesse and Brown 1971	<i>Thisbe</i>	<i>irenea</i>	ca 15	1/1	RJ
Subtribe Nymphidiina					
1004	<i>Adelotypa</i>	<i>huebneri</i>	20	1/1	EE
300		<i>leucophaea</i>	30	1/2	ES
744	<i>Calospila</i>	<i>lucianus</i> ssp.	ca 30	1/1	PA
655, 672	<i>Menander</i>	<i>menander nitida</i>	28–29, 29	1/1, 1/1	SC, RJ
619	<i>Nymphidium</i>	<i>acherois</i>	31	1/1	PE
421		<i>caricae</i>	31	2/2	MT
de Lesse and Brown 1971		<i>leucosia</i>	31	1/1	DF
481		<i>mantus</i>	31	1/2	MT
1598		<i>molpe</i> (?)	31	1/1	BA
Subtribe Theopina					
497	<i>Theope</i>	<i>acosma</i>	16	1/3	MT
605		<i>foliorum</i>	29	1/1	PE
1551		<i>foliorum</i> (?)	32	1/1	BA
Tribe Stalachtini					
Rio 10	<i>Stalachtis</i>	<i>magdalena</i>	19	1/1	VC
de Lesse and Brown 1971		<i>phlegia</i>	28	1/2	DF
de Lesse and Brown 1971		<i>phlegia susanna</i>	36	1/1	RJ

Localities are grouped by region; a number at the end of the locality code indicates that more than one population has been sampled within this region. Locality codes: AM = Amazonas (northwestern Brazil), AV = Amazonas, (southern Venezuela), BA = Bahia (eastern Brazil), CC = Chocó (western Colombia), DA = Darien (southern Panama), DF = Brasília (central Brazil), EB = eastern Bolivia, EE = eastern Ecuador, ES = Espírito Santo (eastern Brazil), GO = Goiás (central Brazil), GY = French Guyana, MG = Minas Gerais (central Brazil), MT = Mato Grosso (central Brazil), OX = Oaxaca (southern Mexico), PA = Pará (northern Brazil), PB = Paraíba (northeastern Brazil), PE = Pernambuco (northeastern Brazil), PT = Putumayo (southern Colombia), RG = Aragua (northern Venezuela), RJ = Rio de Janeiro (southeastern Brazil), RO = Rondônia (western Brazil), RR = Roraima (northern Brazil), SC = Santa Catarina (southern Brazil), SP = São Paulo (southeastern Brazil), TV = Táchira (western Venezuela), VC = Valle de Cauca (western Colombia), VV = Villavicencio, Meta (eastern Colombia), WE = western Ecuador.

In addition, certain details on fore or hind wings are abbreviated as FW or HW.

We also give the chromosome numbers for 17 Neotropical lycaenids (Theclinae and Polyommatainae) for comparison in Table 3. The names of species follow the checklist of ROBBINS and LAMAS (2004). Among

the theclines, *Eumaeus minyas* has both $n=24$ and $n=ca\ 45$. With three exceptions the Neotropical Lycaenidae have $n=24$, characteristic for this family elsewhere.

Table 2. Chromosome numbers for riodinids that have not been reliably assigned to species. Certain details on fore or hind wings are abbreviated as FW or HW. Otherwise as in Table 1.

Voucher code	Genus	Species	n =	No. studied pop./ind.	Locality
Subfamily EUSELASIINAE					
Tribe Euselasiini					
970	<i>Euselasia</i>	sp. nr <i>eusepus</i>	29	1/2	WE
1278		sp. nr <i>cafusa</i>	28	1/1	RO
1210		sp. (large)	18	1/1	MT
Tribe Mesosemiini					
Subtribe Mesosemiina					
1517	<i>Mesosemia</i>	sp. nr <i>metuana</i>	26	1/1	EE
1023, 1514		sp. nr <i>mevania</i>	44	2/2	EE2
1143		sp. (blue-lined, light)	11	1/1	RO
778		sp. (like large <i>metope</i>)	25	1/1	AM
1119		sp.	26	1/1	EB
1283		sp. (white HW border)	27	1/1	MT
3263		sp.	41	1/1	RR
1397		sp. (large, very blue)	43–44	1/1	VC
785		sp. (blue lines)	ca 110 (two large chr.)	1/1	AM
Subtribe Napaeina					
1052	<i>Ithomiola</i>	sp.	25	1/2	EE
Tribe Eurybiini					
1021	<i>Alesa</i>	sp. (blue-black)	19	11	EE
846	<i>Eurybia</i>	<i>franciscana</i> (?)	17	1/1	TV
1082a		sp. (small)	14	1/2	EE
1082b		sp. (small)	26	1/1	EE
1444		sp. (large, yellow on HW)	29	1/1	CC
1526		sp. (eye, violet HW)	29	1/1	WE
1213		sp. (violet HW)	29–30	1/1	MT
Tribe Riodinini					
1440	<i>Ancyluris</i>	sp. (narrow shorter band)	27	1/1	CC
1382		sp.	28	1/1	EE
1496		sp.	28	1/1	EE
1230		sp. (straight caudal red)	31	1/1	RO
1015	<i>Caria</i>	sp. (red under FW)	16	1/1	EE
914	<i>Charis</i>	sp. (dark)	16	1/1	PT
652a		sp.	18	1/1	SC
652b		sp.	25	1/1	SC
1266		sp. (blue ventrally)	29	1/1	RO
1064	<i>Crocozona</i>	sp.	23	1/1	EE
1038	<i>Ithomeis</i>	sp. (large, orange-tipped)	18 (?)	1/1	EE
475	<i>Melanis</i>	sp. ('white spot')	12	1/2	MT
697		sp. (<i>albugo</i> ?)	20	1/2	ES
1466		sp. (orange HW border)	33	1/1	EE
554		sp.	38	1/2	PE
634		sp.	15	1/2	BA
606		sp.	25	1/1	PE
1476	<i>Rhetus</i>	sp. (white lines under)	15	1/1	EE
1380		sp.	15	1/1	EE
Tribe Symmachiini					
404	<i>Mesene</i>	sp. (two-dot)	15	1/1	MT
441	<i>Symmachia</i>	sp.	14	1/1	MT
651		sp. (dark)	18	1/1	SC
Tribe INCERTAE SEDIS					
327	<i>Argyro-grammana</i>	sp. (red)	16	1/1	ES

(Continued)

Table 2. (Continued).

Voucher code	Genus	Species	n =	No. studied pop./ind.	Locality
302		sp.	30	1/1	ES
689	<i>Emesis</i>	sp.	45	1/1	RJ
Tribe Nymphidiini					
Subtribe Lemoniadina					
564	<i>Synargis</i>	sp. nr <i>phliasus</i>	20	1/1	PE
1436		sp. (orange half HW)	15	1/1	CC
Subtribe Nymphidiina					
781	<i>Adelotypa</i>	sp. (russet FW, white HW)	21	1/1	AM
1112		sp. (dark)	ca. 30	1/1	EB
1435	<i>Calospila</i>	?sp. (small pattern)	30	1/1	CC
763	<i>Menander</i>	sp. (very blue)	18	1/1	AM
518		sp.	18	1/4	MT
779	<i>Nymphidium</i>	sp. nr <i>cahrus</i>	21	1/1	AM
733		sp. (light orange on borders)	31	1/1	PA
515		sp.	31	1/2	MT
Subtribe Theopina					
1149	<i>Theope</i>	sp. (blue and grey)	16	1/1	MG
UNKNOWN					
1361	Riodinid	like <i>Callicore</i> (<i>Orimba</i> ?)	27	1/1	EE
1467		sp. (small, blue, short white band)	27	1/1	EE

DISCUSSION

The results show that the riodinids have widely variable chromosome numbers, while the Neotropical lycaenids largely conform to the modal $n=24$ that characterizes the family (WHITE 1978). The riodinids do not appear to have a distinct modal number. Very few (six at most in this study) have the $n=23$ or 24 that characterize the lycaenids (Fig. 1).

The most common numbers among riodinids are $n=27$, 29 and 31 . The latter two belong to the modal $n=29-31$ of butterflies (WHITE 1978; BROWN et al. 2007a, 2007b). The distribution of these numbers is, however, uneven and it is difficult to discern a pattern at all. Nevertheless, the most primitive Euselasiinae have $n=28-29$, while the highly advanced genus *Nymphidium* is nearly stabilized at $n=31$. MAEKI and AE (1968a, 1968b) give chromosome numbers for three representatives of the small Old World subfamily Hamerariinae (Nemeobiinae): *Abisara burnii etymander* (from Taiwan) has $n=30$, *Abisara echerius echerius* (from Hong Kong) $n=31$, *Zemeros flegyas flegyas* (from Hong Kong) $n=31$.

The over-all distribution of riodinid chromosome numbers with no modal one is unique among the Lepidoptera. The nymphalids are the sister group of the evidently monophyletic Lycaenidae and Riodinidae (CAMPBELL et al. 2000). The satyroids have a weak modal $n=29$ with many numbers lower than that and

rather few higher than the modal numbers (BROWN et al. 2007a) but even they include many groups with stable chromosome numbers. Ithomiinae, another variable nymphalid subfamily, seem to have originated from a lineage that already has had the nymphaline modal, $n=31$ (BROWN et al. 2007b) divided by two through what appears to have been pairwise fusions of all chromosomes, with about $n=14$ as a predominant number.

If the Ithomiinae have had their chromosome number halved, then such a process runs riot among the riodinids. They, and *Eumaeus* among the theclines, show clear evidence for near-even multiples of a chromosome number, either up or down or both within a species or within a genus. So, in addition to the examples mentioned in the results section, *Melanis smithiae* has $n=16$ and $n=31$, *Emesis mandana* $n=11$, 21 and 27 . This implies that once one chromosome is either divided into two or fuses with another to form a larger chromosome, then the other follow suit until again a set of chromosomes of about equal size is again attained. Such a concerted evolution of lepidopteran chromosomes was described by BELIAJEFF (1930) and discussed e.g. by LORKOVIĆ (1990).

Our riodinid sample sizes are limited, so that it is difficult to say much about the nature of the variation within a species. Several samples from a locality or samples from several localities may have either the same or quite different chromosome numbers.

Table 3. Haploid chromosome numbers for 17 neotropical lycaenids (Theclinae and Polyommatainae). The genus and species names used in earlier publications are in parentheses.

Voucher code	Genus	Species	n =	No studied pop./ind.	Locality
Subfamily THECLINAE					
Tribe Eumaeini					
<i>Eumaeus</i> section					
Maeki and Remington 1960, Lyc 11	<i>Eumaeus</i>	<i>childrenae</i> (<i>debora</i>)	24	2/2	Mexico, OX
de Lesse 1970, M 7		<i>minyas</i>	24, ca 45	1/1, 1/1	Mexico, AM
Lyc 1		<i>minyas</i> ssp.	23	1/1	DA
<i>Brangas</i> section					
de Lesse 1967	<i>Evenus</i> (<i>Thecla</i>)	<i>coronata</i>	24	1/2	Ecuador
1367		<i>regalis</i>	24	1/1	ES
646		<i>satyroides</i>	24	1/1	BA
<i>Atlides</i> section					
Lyc 10		<i>mavors</i>	24	1/1	TV
297		<i>triquetra</i>	24	1/3	ES
<i>Thereus</i> section					
Wesley and Emmel 1975 (TR-202)	<i>Arawacus</i>	<i>aetolus</i> (<i>linus</i>)	22–24 (22,23,24)	1/1	Trinidad
de Lesse 1967	<i>Contrafacia</i> (<i>Thecla</i>)	<i>francis</i>	24	1/1	Argentina
<i>Strymon</i> section					
de Lesse 1967	<i>Strymon</i> (<i>Thecla</i>)	<i>Astiocha</i> (<i>faunalia</i>)	24	1/1	Argentina
de Lesse 1967	<i>Strymon</i> (<i>Thecla</i>)	<i>eurytulus</i>	24	1/3	Argentina
Subfamily POLYOMMATINAE					
de Lesse 1967	<i>Hemiargus</i>	<i>hanno</i>	14	1/1	Argentina
de Lesse 1967	<i>Itylos</i>	sp. probably <i>titicaca</i> (?)	ca 23–24	1/1	Argentina
de Lesse 1967	<i>Leptotes</i>	<i>andicola</i>	24, 24–25	1/3	Ecuador
de Lesse 1967		<i>callanga</i>	24	1/1	Peru
de Lesse 1967		<i>cassius</i>	18	1/1	Argentina

The authors who write about riodinids (BROWN 1993a, 1993b; DEVRIES 1997) stress that there are undescribed species in each major genus and that the genera are in need of revision. We have included in our lists several undescribed species and feel that much of the variation within what we think is a species at a locality may, in fact, be explained through sibling species, each with a different chromosome number. DE LESSE (1967) who had studied the relationship of chromosome change and speciation of lycaenids in detail (WHITE 1978; WIEMERS 2003) argued that whenever one sees sympatric populations of what seems to be a single species with different chromosome numbers, one must suspect a pair of sibling species with probably, in part, overlapping distributions. On the other hand, species having the same chromosome number may lack an obstacle for interbreeding. GOMPERT et al. (2006) and MAVÁREZ et al. (2006) have not only shown that hybrid speciation is not only possible but that it has contributed to lepidopteran speciation. It may be argued to be a factor that has stabilized chromosome numbers in two groups with

exceptionally stable chromosome numbers: lycaenids and the genus *Heliconius*. Such phenomena are, however, evidently rare. MAEKI and AE (summarized in AE 1995) have shown that between species crosses involving papilionids with $n = 30$ show gross chromosome pairing disturbances at meiosis.

Ecology

A coevolutionary process is thought to accelerate the rate of evolution. The riodinids show several kinds of coevolution. They have a potential arms race with their host plants; the larvae of Eurybiini, Lemoniadina and Nymphidiina associate with ants; the representatives of some 16 genera participate in mimicry rings of heliconians, ithomiines, arctiids, diopitids and other lepidopterans (BROWN 1993a). In addition to nectar, adults feed on damp sand and mud ('puddling') and carrion (HALL and WILLMOTT 2000). Most riodinid subfamilies and tribes have diverse host plants representing a wide range of both monocots and dicots; in addition the adults

Table 1. Chromosome number of skippers (Lepidoptera, Hesperidae) of the world fauna (Us are univalents; 2n is diploid chromosome number).

Years of the species descriptions are given square brackets in cases where they were not stated in the original sources but were inferred from reliable external evidence.

#	Species	Haploid chromosome number	Country	Reference
Subfamily Coeliadinae				
1	<i>Bibasis aquilina</i> (Speyer, 1879)	29	Japan	Maeki 1953
	<i>B. a. chrysaeglia</i> (Butler, 1881)	31 (2n=62)	Japan	Abe et al. 2006
2	<i>B. jaina formosana</i> Fruhstorfer, 1911	31	Taiwan	Maeki and Ae 1968b
3	<i>Choaspes benjaminii</i> (Guérin-Ménéville, 1843)	31	Japan	Maeki 1953
	<i>Ch. b. japonica</i> (Murray, 1875)	31	Japan	Saitoh et al. 1978
4	<i>Coeliades anchises jucunda</i> (Butler, 1881)	30	Oman	Saitoh 1982
5	<i>C. ernesti</i> (Grandidier, 1867)	31	Madagascar	de Lesse 1972
6	<i>C. fervida</i> (Butler, 1880)	23	Madagascar	de Lesse 1972
7	<i>C. forestan arbogastes</i> (Guenee, 1863)	31	Madagascar	de Lesse 1972
8	<i>C. ramanatek</i> (Boisduval, 1833)	31	Madagascar	de Lesse 1972
Subfamily Euschemoninae no chromosomal data available				
Subfamily Eudaminae				
9	<i>Achalarus casica</i> (Herrich-Schäffer, 1869)	29	USA (Texas)	Emmel and Trew 1973
10	<i>A. lyciades</i> (Geyer, 1832)	31	USA (Connecticut)	Maeki 1961
11	<i>A. toxeus</i> (Plötz, 1882)	16	Mexico	Maeki and Remington 1960
12	<i>Astraptes anaphus</i> (Godman et Salvin, 1896)	31	Bolivia	de Lesse 1967a
13	<i>A. fulgurator</i> (Walch, 1775)	31	Peru	Kumagai et al. 2010
14	<i>A. naxos</i> (Hewitson, 1867)	31	Brazil	Saura et al. 2013
15	<i>A. phalacrus</i> (Godman et Salvin, 1893)	25	Guatemala	de Lesse 1967a
16	<i>A. longipennis</i> (Plötz, 1882)	31	Costa Rica	Kumagai et al. 2010
		31	Peru	Kumagai et al. 2010
		31	Brazil	Kumagai et al. 2010
17	<i>Autochton</i> sp.	20, 21	Brazil	Kumagai et al. 2010
18	<i>Chioides albofasciatus</i> (Hewitson, 1867)	31	Mexico	de Lesse 1970a
	<i>Ch. albofasciatus</i> (Hewitson, 1867) (as <i>Ch. catillus</i>)	31	Mexico	Maeki and Remington 1960
	<i>Ch. albofasciatus</i> (Hewitson, 1867)	31	USA (Texas)	Emmel and Trew 1973
19	<i>Entheus priassus pralina</i> Evans, 1952	22	Brazil	Saura et al. 2013
20	<i>Epargyreus barisses</i> (Hewitson, 1874)	31	Argentina	de Lesse 1967
21	<i>E. clarus</i> (Cramer, 1775)	31	USA (Florida)	Maeki 1961
22	<i>E. clavicornis tenda</i> Evans, 1955	ca 29–30	Guatemala	de Lesse 1970a
23	<i>Oechydus chersis</i> (Herrich-Schäffer, 1869)	31	Bolivia	de Lesse 1967a

#	Species	Haploid chromosome number	Country	Reference
24	<i>Phocides polybius phanias</i> (Burmeister, 1880)	16	Brazil	Saura et al. 2013
25	<i>Tarsoctenus praecia plutia</i> (Hewitson, 1857)	15	Brazil	Saura et al. 2013
26	<i>Thorybes pylades pylades</i> (Scudder, 1870)	31	USA (Connecticut)	Maeki 1961
27	<i>Udranomia spitzi</i> (Hayward, 1942)	29	Brazil	de Lesse and Brown 1971
28	<i>Urbanus dorantes dorantes</i> (Stoll, 1790)	31	Mexico	de Lesse 1970a
29	<i>U. doryssus doryssus</i> (Swainson, 1831)	14	Costa Rica	Kumagai et al. 2010
30	<i>Urbanus proteus</i> (Linnaeus, 1758)	31	Bolivia	de Lesse 1967a
		31	Mexico	de Lesse 1970a
		31	USA (Florida)	Maeki 1961
31	<i>U. simplicius</i> (Stoll, 1790)	31	Argentina	de Lesse 1967a
32	<i>U. teleus</i> (Hübner, 1821)	31	Argentina	de Lesse 1967a
Subfamily Pyrginae				
Tribe Pyrrhopygini				
33	<i>Elbella lamprus</i> (Hopffer, 1874)	40	Brazil	de Lesse 1970a
34	(?) <i>Jemadia</i> sp.	32(?)	Brazil	Saura et al. 2013
35	<i>Mimoniades montana</i> J. Zikán, 1938	27	Brazil	Saura et al. 2013
36	<i>M. nurscia</i> (Swainson, 1821)	28	Ecuador	de Lesse 1967a
	<i>M. n. malis</i> (Godman et Salvin, 1879)	28	Colombia	Saura et al. 2013
37	<i>Mimoniades</i> sp.	21	Colombia	Saura et al. 2013
38	<i>Mimoniades</i> sp.	28	Colombia	Saura et al. 2013
39	<i>M. versicolor</i> (Latreille, [1824])	28	Brazil	de Lesse and Brown 1971
40	<i>Pyrrhopyge charybdis</i> Westwood, 1852	14(?)	Brazil	Saura et al. 2013
41	<i>P. pelota</i> Plötz, 1879	28	Argentina	de Lesse 1967a
42	<i>Pyrrhopyge</i> sp.	15	Brazil	Saura et al. 2013
43	<i>Sarbia</i> sp.	30	Brazil	Saura et al. 2013
Tribe Tagiadini				
44	<i>Daimio tethys</i> (Ménétriés, 1857)	30	Japan	Maeki 1953, Maeki and Makino 1953
45	<i>D. t. moorei</i> Mabille, 1876	30	Taiwan	Maeki and Ae 1968b
46	<i>Eagris lucetia</i> (Hewitson, 1876)	30	Uganda	de Lesse 1968
47	<i>E. sabadius astoria</i> Holland, 1896	30	Kenya	de Lesse 1968
48	<i>Eretis lugens</i> (Rogenhofer, 1891)	28	Kenya	de Lesse 1968
Tribe Celaenorrhinini				
49	<i>Sarangesa phidyle</i> (Walker, 1870)	29	Senegal	de Lesse and Condamin 1962
Tribe Carcharodini				
50	<i>Carcharodus alcaeae</i> (Esper, [1780])	31	Croatia	Lorkovic 1941
51	<i>C. boeticus</i> Reverdin, 1913	43–47	Spain	de Lesse 1960
	<i>C. boeticus</i> Reverdin, 1913	40–52	France	de Lesse 1960
	<i>C. boeticus</i> Reverdin, 1913	38–46	Italy	de Lesse 1960

#	Species	Haploid chromosome number	Country	Reference
52	<i>C. dravina</i> (Moore, 1874)	37–48 (with Us)	Iran	de Lesse 1960
53	<i>C. flocciferus</i> (Zeller, 1847)	32–41 (with Us)	France (Cauterets)	de Lesse 1960
54	<i>C. flocciferus</i> (Zeller, 1847)	42–58 (with Us)	Italy	de Lesse 1960
55	<i>C. lavatherae</i> (Esper, [1783])	30	France (Salau, Ariege)	de Lesse 1960
56	<i>C. orientalis</i> Reverdin, 1913	31–32	Lebanon	de Lesse 1960
		30	Turkey (Van)	de Lesse 1960
		30–37 (with Us)	Turkey (Amasya)	de Lesse 1960
57	<i>C. stauderi ambiguus</i> Verity, 1925	30	Lebanon	de Lesse 1960
		30	Turkey	de Lesse 1960
58	<i>Hesperopsis alpheus</i> (W. H. Edwards, 1876) (as <i>Pholisora</i>)	34	USA (Texas)	Emmel and Trew 1973
59	<i>Muschampia nomas</i> (Lederer, 1855)	30	Lebanon	de Lesse 1960
60	<i>M. proteides</i> (Wagner, 1929)	30	Lebanon	Larsen 1975
61	<i>M. proto</i> (Ochsenheimer, 1808)	30	Spain	de Lesse 1960
		30	Lebanon	Larsen 1975
62	<i>Pholisora catullus</i> (Fabricius, 1793)	29	?USA	Lorkovic in Robinson 1971
63	<i>Spialia orbifer</i> (Hübner, [1823])	30	Croatia	Lorkovic 1941
		31	Turkey	de Lesse 1960
64	<i>S. phlomidis</i> (Herrich-Schäffer, [1845])	31	Turkey	de Lesse 1960
65	<i>S. sertorius</i> (Hoffmannsegg, 1804)	31	Slovenia	Lorkovic 1941
Tribe Erynnini				
66	<i>Chiomana asychis georgina</i> (Reakirt, 1868)	31	Mexico	de Lesse 1970a
	<i>Ch. asychis georgina</i> (Reakirt, 1868)	32	USA (Texas)	Emmel and Trew 1973
67	<i>Chiomana</i> sp.	31	Trinidad	Wesley and Emmel 1975
68	<i>Ebrietas anacreon</i> (Staudinger, 1876)	31	Argentina	de Lesse 1967a
69	<i>E. osyris</i> (Staudinger, 1876)	31	Argentina	de Lesse 1967a
70	<i>Erynnis baptisiae</i> (W. Forbes, 1936)	31	USA (Connecticut)	Maeki 1961
71	<i>E. funeralis</i> (Scudder et Burgess, 1870)	31	Argentina	de Lesse 1967a
72	<i>E. boratius</i> (Scudder et Burgess, 1870)	31	USA (Florida)	Maeki 1961
73	<i>E. icelus</i> (Scudder et Burgess, 1870)	30	USA (Connecticut)	Maeki 1961
74	<i>E. juvenalis juvenalis</i> (Fabricius, 1793)	30	USA (Connecticut)	Maeki 1961
75	<i>E. lucilius</i> (Scudder et Burgess, 1870)	31	USA (Connecticut)	Maeki and Remington 1960a
76	<i>E. marloyi</i> (Boisduval, [1834])	31	Lebanon	de Lesse 1960
77	<i>E. montanus</i> (Bremer, 1861)	31 (2n=62)	Japan	Abe et al. 2006
	<i>E. montanus</i> (Bremer, 1861)	31	Japan	Maeki 1953

#	Species	Haploid chromosome number	Country	Reference
78	<i>E. persius</i> (Scudder, 1863)	31	USA (Connecticut)	Maeki 1961
79	<i>E. tages</i> (Linnaeus, 1758)	31	Croatia	Lorkovic 1941
		31	France	de Lesse 1960
		31	England	Bigger 1960
80	<i>E. tristis tatus</i> (W. H. Edwards, 1883)	31	USA (Texas)	Emmel and Trew 1973
81	<i>Gesta gesta</i> (Herrich-Schäffer, 1863)	32	Tobago	Wesley and Emmel 1975
82	<i>Gnais stigmaticus</i> (Mabille, 1883)	31	Mexico	Maeki and Remington 1960a
83	<i>Theagenes albiplaga</i> (C. Felder et R. Felder, 1867)	31	Bolivia	de Lesse 1967a
Tribe Achlyodidini				
84	<i>Achlyodes pallida</i> (R. Felder, 1869) (as <i>A. selva</i>)	15	Bolivia	de Lesse 1967a
		15	Mexico	de Lesse 1970a
85	<i>Zera zera zera</i> (Butler, 1870)	34	Brazil	de Lesse and Brown 1971
Tribe Pyrgini				
86	<i>Anisochoria sublimbata</i> Mabille, 1883	31	Argentina	de Lesse 1967a
87	<i>Antigonus erosus</i> (Hübner, [1812])	31	Mexico	de Lesse 1970a
88	<i>A. liborius</i> Plötz, 1884	31	Argentina	de Lesse 1967a
89	<i>Celotes nessus</i> (W. H. Edwards, 1877)	14, 13	USA (Texas)	Emmel and Trew 1973
90	<i>Heliopetes arsalte</i> (Linnaeus, 1758)	30	Bolivia	de Lesse 1967a
	<i>H. arsalte</i> (Linnaeus, 1758)	30	Mexico	de Lesse 1970a
91	<i>H. laviana</i> (Hewitson, 1868)	29	USA (Texas)	Emmel and Trew 1973
92	<i>H. macaira</i> (Reakirt, [1867])	29	USA (Texas)	Emmel and Trew 1973
93	<i>H. omrina</i> (Butler, 1870)	30	Argentina	de Lesse 1967a
94	<i>Heliopyrgus americanus</i> (Blanchard, 1852)	30	Chile	de Lesse 1967a
95	<i>Paches loxus</i> (Westwood, [1852])	31	Guatemala	de Lesse 1970a
96	<i>Pyrgus aladaghensis</i> De Prins et van der Poorten, 1995	ca 18–21	Turkey	Lukhtanov and Kandul 1995 (in Hesselbarth et al. 1995)
97	<i>P. albescens</i> Plötz, 1884	30 (2n=60)	USA (Texas)	Goodpasture 1976
	<i>P. albescens</i> Plötz, 1884	28	USA (Texas)	Emmel and Trew 1973
98	<i>P. alveus</i> (Hübner, [1803])	24	Finland	Federley 1938
		24	Croatia	Lorkovic 1941
		24	Turkey	Lukhtanov and Kandul 1995 (in Hesselbarth et al. 1995)
99	<i>P. bellieri</i> (Oberthür, 1910)	27	France	de Lesse 1960
100	<i>P. bocchoris</i> (Hewitson, 1874)	30	Argentina	de Lesse 1967a
101	<i>P. bolkariensis</i> De Prins et van der Poorten, 1995	30	Turkey	Lukhtanov and Kandul 1995 (in Hesselbarth et al. 1995)
102	<i>P. cacaliae</i> (Rambur, 1839)	30	Italy	de Lesse 1960
103	<i>P. carlinae</i> (Rambur, [1839])	30	Italy	de Lesse 1960
104	<i>P. carthami</i> (Hübner, [1813])	29	Italy	de Lesse 1960

#	Species	Haploid chromosome number	Country	Reference
105	<i>P. cirsii</i> (Rambur, [1839])	30	France (Peyreleau, Aveyron)	de Lesse 1960
106	<i>P. fides</i> Hayward, 1940	30	Chile	de Lesse 1967a
107	<i>P. maculates</i> (Bremer et Grey, 1852)	31 (2n=62)	Japan	Abe et al. 2006
108	<i>P. malvae</i> (Linnaeus, 1758)	31	Finland	Federley 1938
		33	England	Bigger 1960
109	<i>P. oileus</i> (Linnaeus, 1767)	30 (2n=60)	USA (Texas)	Goodpasture 1976
		32	USA (Texas)	Emmel and Trew 1973
110	<i>P. onopordi</i> (Rambur, [1839])	30	France	Lorkovic 1941
111	<i>P. serratulae</i> (Rambur, [1839])	30	France	Lorkovic 1941
112	<i>Trina geometrina geometrina</i> (C. Felder et R. Felder, 1867)	31	Brazil	de Lesse and Brown 1971
Subfamily Heteropterinae				
113	<i>Butleria quilla</i> Evans, 1939	29	Chile	de Lesse 1967a
Subfamily Trapezitinae				
114	<i>Trapezites eliena</i> Hewitson, 1868	31	Australia	Maeki and Ogata 1971
Subfamily Hesperiniinae				
Tribe Aeromachini				
115	<i>Aegiale hesperiaris</i> (Walker, 1856)	24	Mexico	Freeman 1969
116	<i>Agathymus alliae</i> (Stallings et Turner, 1957)	38	USA (Arizona)	Freeman 1969
117	<i>A. aryxna</i> (Dyar, 1905)	5	Mexico	Freeman 1969
118	<i>A. baueri</i> (Stallings et Turner, 1954)	15	USA (Arizona)	Freeman 1969
119	<i>A. chisosensis</i> (Freeman, 1952)	18	USA (Texas)	Freeman 1969
120	<i>A. estelleae valverdiensis</i> Freeman, 1966	9	USA (Texas)	Freeman 1969
	<i>A. e. estelleae</i> (Stallings et Turner, 1958)	9	Mexico	Freeman 1969
121	<i>A. freemani</i> Stallings, Turner et Stallings, 1960	15	USA (Arizona)	Freeman 1969
122	<i>A. gilberti</i> Freeman, 1964	21	USA (Texas)	Freeman 1969
123	<i>A. mariae chinatiensis</i> Freeman, 1964	22	USA (Texas)	Freeman 1969
	<i>A. mariae lajitaensis</i> Freeman, 1964	22	USA (Texas)	Freeman 1969
	<i>A. mariae mariae</i> (Barnes et Benjamin, 1924)	22	USA or Mexico	Freeman 1969
	<i>A. mariae rindgei</i> Freeman, 1964	22	USA (Texas)	Freeman 1969
124	<i>A. micheneri</i> Stallings, Turner et Stallings, 1961	20	Mexico	Freeman 1969
125	<i>A. neuvoegeni florenceae</i> (Stallings et Turner, 1957)	10	USA (Texas)	Freeman 1969
	<i>A. neuvoegeni macalpinei</i> (Freeman, 1955)	10	USA (Texas)	Freeman 1969
126	<i>A. polingi</i> (Skinner, 1905)	10	USA (Arizona)	Freeman 1969
127	<i>A. remingtoni</i> (Stallings et Turner, 1958)	9	Mexico	Freeman 1969

#	Species	Haploid chromosome number	Country	Reference
128	<i>Alera vulpina</i> (C. Felder et R. Felder, 1867)	ca27	Ecuador	de Lesse 1967a
129	<i>Ankola fan</i> (Holland, 1844)	10	Uganda	De Lesse 1968
130	<i>Arotis derasa</i> (Herrich-Schäffer, 1870) (as <i>Euphyes</i>)	28	Brazil	de Lesse and Brown 1971
131	<i>Erionota thrax thrax</i> (Linnaeus, 1767)	29	Malaysia	Saitoh and Kumagai 1974
132	<i>Euphyes leptosema</i> Mabille, 1891	ca28	Argentina	de Lesse 1967a
133	<i>Megathymus coloradensis coloradensis</i> Riley, 1877	27	USA	Freeman 1969
134	<i>M. coloradensis kendalli</i> Freeman, 1965	27	USA (South central Texas)	Freeman 1969
	<i>M. coloradensis louiseae</i> Freeman, 1963	27	USA (Western Texas)	Freeman 1969
	<i>M. coloradensis navajo</i> Skinner, 1911	27	USA	Freeman 1969
	<i>M. coloradensis reinthali</i> Freeman, 1963	27	USA (Texas)	Freeman 1969
	<i>M. coloradensis reubeni</i> Stallings, Turner et Stallings, 1963	27	USA (Texas)	Freeman 1969
	<i>M. coloradensis stallingsi</i> Freeman, 1943	27	USA	Freeman 1969
	<i>M. coloradensis wilsonorum</i> Stallings et Turner, 1958	27	?Mexico	Freeman 1969
135	<i>M. violae</i> Stallings et Turner, 1956	27	USA	Maeki 1961, Freeman 1969
136	<i>M. yuccae buchholzi</i> Freeman, 1952	26	USA (Florida)	Freeman 1969
137	<i>Pardaleodes incerta</i> (Snellen, 1872)	17	Uganda	de Lesse 1968
138	<i>Stallingsia maculosus</i> (Freeman, 1955)	50	USA (Texas)	Maeki 1961, Freeman 1969
139	<i>Suastus gremius</i> (Fabricius, 1798)	23	Taiwan	Maeki and Ae 1968b
140	<i>Thoressa varia</i> (Murray, 1875)	31 (2n=62)	Japan	Abe et al. 2006
141	<i>T. varia</i> (Murray, 1875)	31	Japan	Maeki 1953
Tribe Baorini				
142	<i>Gegenes gambica</i> (Mabille, 1878)	41	Yemen	Saitoh 1984
		41	Turkey	de Lesse 1960
		41	Lebanon	Larsen 1982
143	<i>Gegenes nostradamus</i> (Fabricius, 1793)	15	Egypt	Larsen 1982
		15	Israel	Saitoh 1979, Larsen 1982
144	<i>Gegenes pumilio</i> (Hoffmansegg, 1804)	24	France	de Lesse 1960
		24	Alger	de Lesse 1967b
145	<i>Parnara guttata</i> (Bremer et Grey, 1852)	16	Japan	Maeki 1953, Maeki and Makino 1953
		16	China	Saitoh and Abe 1981
146	<i>Pelopidas conjuncta conjuncta</i> (Herrich-Schäffer, 1869)	16	Hong Kong	Maeki and Ae 1968a
147	<i>P. jansonis</i> (Butler, 1878)	16 (2n=32)	Japan	Abe et al. 2006

#	Species	Haploid chromosome number	Country	Reference
148	<i>P. mathias</i> (Fabricius, 1798)	16	Japan	Maeki and Remington 1960
149	<i>P. thnax</i> (Hübner, [1821])	16	Lebanon	Larsen 1975
150	<i>Polytremis lubricans</i> (Herrich-Schäffer, 1869)	16	Taiwan	Maeki and Ae 1968b
151	<i>P. pellucida</i> (Murray, 1875)	16, 17, 18 (2n=32, 33)	Japan	Abe et al. 2006
		16	Japan	Maeki and Remington 1960
152	<i>Zenonia zeno</i> (Trimen, 1864)	16	Uganda	de Lesse 1968
Tribe Taractrocerini				
153	<i>Ocybadistes walkeri sothis</i> Waterhouse, 1933	28	Australia	Maeki and Ogata 1971
154	<i>Potanthus flavus</i> (Murray, 1875)	29 (2n=58)	Japan	Abe et al. 2006
155	<i>Telicota ancilla horisha</i> Evans, 1934	29	Taiwan	Maeki and Ae 1968b
156	<i>Telicota colon stinga</i> Evans, 1949	29	Japan (Okinawa)	Abe et al. 2006
157	<i>T. ohara formosana</i> Fruhstorfer, 1911	29 (2n=58)	Taiwan	Abe et al. 2006
Tribe Thymelicini				
158	<i>Copaeodes minima</i> (W.H. Edwards, 1870)	29	USA (Florida)	Maeki 1961
159	<i>Thymelicus sylvestris</i> (Poda, 1761)	27	England	Bigger 1960
160	<i>Th. sylvaticus</i> (Bremer, 1861)	10 (2n=20)	Japan	Abe et al. 2006
161	<i>Th. acteon</i> (Rottemburg, 1775)	28	Spain	de Lesse 1970c
162	<i>Th. hyrax</i> (Lederer, 1861)	29	Lebanon	Larsen 1975
163	<i>Th. leoninus</i> (Butler, 1878)	9 (2n=18)	Japan	Abe et al. 2006
164	<i>Th. lineola</i> (Ochsenheimer, 1808)	29	Finland	Federley 1938
		29	Lebanon	Larsen 1975
Tribe Calpodini				
165	<i>Ebusus ebusus</i> (Cramer, [1780])	29	Mexico	de Lesse 1970a
166	<i>Lychnuchus celsus</i> (Fabricius, 1793)	30	Brazil	de Lesse and Brown 1971
167	<i>Panoquina hecebolus</i> (Scudder, 1872)	29	USA (Texas)	Emmel and Trew 1973
168	<i>Panoquina ocola</i> (W. H. Edwards, 1863)	29	USA (Texas)	Emmel and Trew 1973
169	<i>P. panoquin</i> (Scudder, 1863)	29	USA (Florida)	Maeki 1961
170	<i>P. panoquinoides</i> (Skinner, 1891)	29	USA (Texas)	Emmel and Trew 1973
Tribe Anthoptini no chromosomal data available				
Tribe Moncini				
171	<i>Amblyscirtes aenus</i> W.H. Edwards, 1878	28, 29	USA (Texas)	Emmel and Trew 1973
172	<i>A. cassus</i> W. H. Edwards, 1883	29	USA (Texas)	Emmel and Trew 1973
173	<i>A. celia</i> (Skinner, 1895)	29	USA (Texas)	Emmel and Trew 1973
174	<i>A. phylace</i> W.H. Edwards, 1878	29	USA (Texas)	Emmel and Trew 1973
175	<i>A. texanae</i> Bell, 1927	29	USA (Texas)	Emmel and Trew 1973
176	<i>A. vialis</i> (W. H. Edwards, 1862)	29	USA (Connecticut)	Maeki 1961
177	<i>Cymaenes</i> sp.	31	Tobago	Wesley and Emmel 1975

#	Species	Haploid chromosome number	Country	Reference
178	<i>Enosis immaculata immaculata</i> (Hewitson, 1868)	29	Ecuador	Kumagai et al. 2010
179	<i>Lerema accius</i> (Smith, 1797)	29 (2n=58)	USA (Texas)	Goodpasture 1976
		29	USA (Texas)	Emmel and Trew 1973
180	<i>Moeris vopiscus</i> (Herrich-Schäffer, 1869)	27	Peru	Kumagai et al. 2010
181	<i>Nastra lherminier</i> (Latreille, [1824])	30	USA (Connecticut)	Maeki 1961
182	<i>Thargella caura</i> (Plötz, 1882)	25	Brazil	de Lesse and Brown 1971
183	<i>Vettius coryna</i> (Hewitson, [1866])	31, ca32	Ecuador	de Lesse 1967a
184	<i>V. phyllus prona</i> Evans, 1955	26	Brazil	de Lesse and Brown 1971
185	<i>V. triangularis</i> (Hübner, [1831])	26	Brazil	Kumagai et al. 2010
Tribe Hesperini				
186	<i>Asbolis capucinus</i> (Lucas, 1857)	48	USA (Florida)	Maeki 1961
187	<i>Cynea iquita</i> (Bell, 1941)	29	Argentina	de Lesse 1967a
188	<i>Hesperia comma</i> (Linnaeus, 1758)	28	Italy	de Lesse 1970c
		28	Lebanon	Larsen 1975
189	<i>H. florinda</i> Butler, 1878	28 (2n=56)	Japan	Abe et al. 2006
190	<i>Hylephila fasciolata</i> (Blanchard, 1852)	29	Argentina	de Lesse 1967a
191	<i>H. phyleus</i> (Drury, 1773)	29	Argentina	de Lesse 1967a
		29	USA (Florida)	Maeki 1961
192	<i>H. signata</i> (Blanchard, 1852)	29	Chile	de Lesse 1967a
193	<i>Ochlodes ochraceus</i> (Bremer, 1861)	29 (2n=58)	Japan	Abe et al. 2006
		24	Japan	Maeki and Remington 1960
194	<i>O. sylvanoides</i> (Boisduval, 1852)	29	USA	Maeki 1961
195	<i>O. sylvanus</i> (Esper, 1777)	29	Finland	Federley 1938
		29	Croatia	Lorkovic 1941
196	<i>O. venatus</i> (Bremer et Grey, 1853) (as <i>sylvanus</i> Esper, 1777)	29 (2n=58)	Japan	Abe et al. 2006
197	<i>Oligoria maculata</i> (W. H. Edwards, 1865)	29	USA (Florida)	Maeki 1961
198	<i>Poanes hobomok hobomok</i> (Harris, 1862)	29	?USA	Lorkovic in Robinson 1971
199	<i>P. taxiles</i> (W. H. Edwards, 1881)	29	USA	Maeki 1961
200	<i>P. zabulon</i> (Boisduval et Le Conte, [1837]) (as <i>Polites zabulon</i>)	29	USA (Connecticut)	Maeki 1961
201	<i>Polites themistocles</i> (Latreille, [1824])	29	USA (Florida)	Maeki 1961
202	<i>P. vibex catilina</i> (Plötz, 1886)	29	Argentina	de Lesse 1967a
	<i>P. vibex praeceps</i> (Scudder, 1872)	27	USA (Texas)	Emmel and Trew 1973
	<i>P. vibex vibex</i> (Geyer, 1832)	29	USA (Florida)	Maeki 1961
203	<i>Wallengrenia egeremet</i> (Scudder, 1863)	28	USA (Texas)	Emmel and Trew 1973
204	<i>W. otho curassavica</i> (Snellen, 1887)	28–30	USA (Texas)	Emmel and Trew 1973
205	<i>W. premnas</i> (Wallengren, 1860)	27	Argentina	de Lesse 1967

Table 1. The haploid chromosome numbers for the South American representatives of the Nymphalid subfamilies Charaxinae, Morphinae (including Brassolini) and Satyrinae. Question marks indicate uncertain data

Genus	Species, subspecies	<i>n</i>	Number of studied populations/ individuals	Locality
Subfamily CHARAXINAE				
Tribe Anaeni				
<i>Consul</i>	<i>electra</i>	20	1/1	OX
	<i>fabius</i>	21 + 1–2 small	1/1	AN
	<i>fabius</i>	27	1/1	RG
	<i>f. albinotatus</i>	19–20	1/1	Colombia (a)
	<i>fabius</i> ssp.	19–20	1/1	EE
	<i>panariste</i>	11	1/1	VC
	<i>Hypna clytemnestra</i>	7	2/2	EE, PA
	<i>c. clytemnestra</i>	7	1/1	AM
	<i>c. corumbaensis</i>	8	1/1	MT
	<i>c. forbesi</i>	7	1/2	BA
<i>Hypna</i>	<i>c. huebneri</i>	6	1/1	RJ (e)
	<i>Polygrapha suprema</i>	29, 30	1/1, 1/1	SP2
	<i>Siderone galanthis</i>	21	2/2	DF, MG
<i>Siderone</i>	<i>g. nemesi</i>	21	1/1	GO
	<i>Zaretis isidora</i>	21, 29	1/2	RO
	<i>itys</i>	21	4/7	AC, AN, GO, MT
<i>Zaretis</i>	<i>itys</i> ssp.	21	1/2	MT
	<i>Anaea troglodyta</i>	30	1/3	Mexico (h)
	<i>Fountainea centaurus</i>	27	1/1	VC
<i>Fountainea</i>	<i>eurypyle confusa</i>	31	2/2	Mexico2 (c)
	<i>glycerium</i>	31	1/1	TV
	<i>g. cratais</i>	30	1/1	GO
	<i>halice evelina</i>	31	1/2	AC
	<i>h. moretta</i>	31	1/2	BA
	<i>nessus</i>	16	4/4	Ecuador (a), EE2, VC
	<i>nobilis titan</i>	26	1/1	AN
	<i>ryphea phidile</i>	31	2/3	ES, MG
	<i>r. ryphea</i>	31	2/2	Argentina (a), CC
	<i>Memphis acidalia</i> ssp.	28	1/2	MT
<i>Memphis</i>	sp. nr <i>acidalia</i>	18	1/1	VC
	<i>anna</i>	36	1/1	EE
	<i>appias</i>	30, 30–31	2/3, 1/1	BA, ES, BA
	<i>arginussa</i> (?)	31	1/1	VV
	sp. nr <i>arginussa</i>	35	1/1	TV
	<i>cleomestra</i>	15	1/1	AN
	sp. falcate FW	12	1/2	CM
	<i>glauce</i>	11	1/1	VV
	<i>glauce</i>	16	1/1	RO
	<i>g. felderi</i>	50	1/1	PT
<i>Memphis</i>	sp. nr <i>glauce</i>	12	1/1	VV
	<i>laertes</i>	28	1/2	AM
	<i>laertes</i> var. <i>laertes</i>	24, 27	1/1	AM
	<i>laura</i>	26	1/1	VC
	<i>laura balboa</i>	26	1/1	CZ
	<i>leonida</i>	29	1/1	RJ
	<i>leonida editha</i>	29	1/1	RJ
	<i>lineata</i>	29	1/1	EE
	<i>lyceus</i>	14	1/1	VC
	<i>moruus</i>	26, 27, 28	1/1, 1/1, 3/3	VC, AC, AC, DF, VV
<i>Memphis</i>	<i>m. stheno</i>	28, 29	2/2, 1/1	DF, MT, ES

Table 1. *Continued*

Genus	Species, subspecies	<i>n</i>	Number of studied populations/ individuals	Locality
	sp. nr <i>moruus</i>	28	1/1	AN
	sp. nr <i>nenia</i> a	26	1/1	AC
	sp. nr <i>nenia</i> b	31	1/1	VV
	<i>offa</i>	26	*	*
	<i>otrere</i>	29	3/4	ES, RJ, SP
	<i>perenna austrina</i>	30	1/1	TV
	<i>polycarmes</i>	14	1/1	AM
	<i>pseudiphis</i>	25	1/1	VC
	<i>xenocles</i>	33	1/1	AM
	sp. nr <i>xenocles</i>	30	1/1	TV
Anaeini	sp.	9	1/2	VV
Anaeini	sp.	26	1/1	EE
Anaeini	sp.	26	1/2	VV
Tribe Preponini				
<i>Noreppa</i>	<i>chromus</i>	16	2/2	Bolivia (a), VC
<i>Archaeoprepona</i>	<i>amphimachus</i>	9	4/5	DF, MT2, TV
	<i>a. pseudomeander</i>	9	1/1	RJ
	<i>amphimachus</i> (dark)	14	2/2	ES2
	<i>demophon</i>	16	3/6	DF (e), Mexico (c), PE
	<i>d. thalpius</i>	16	1/1	MT
	<i>demophoon</i>	15	3/5	DF, ES, PE,
	<i>andicola</i>			
	<i>d. antimache</i>	15	2/3	DR, PR
	<i>meander</i>	9	1/1	TV
<i>Prepona</i>	<i>d. deiphile</i>	12	2/3	ES, RJ
	<i>laertes demodice</i>	19	2/2	DF, PE
	<i>l. laertes</i>	19 (?)	1/1	PE
	<i>l. laertes</i> ssp.	19, 25	1/1, 1/1	AN, AM
	sp. nr <i>laertes</i>	18	1/1	AC
	<i>pheridamas</i>	11–13	1/1	MT
	<i>pylene bahiana</i>	12	1/1	ES
	<i>pylene eugenes</i>	12	1/1	AM
	' <i>pylene laertides</i> '	11	1/1	DF
<i>Agrias</i>	<i>amydon</i>	12	1/1	PE
	<i>ferdinandi</i>			
	<i>amydon</i> ssp.	12	1/1	AM
	<i>narcissus</i>	12	1/2	AM
	<i>tapajonus</i>			
Subfamily MORPHINAE				
Tribe Morphini				
Subtribe Antirrheina				
<i>Antirrhea</i>	<i>archaea</i>	13	1/2	RJ (e)
	<i>phasiana</i>	25	1/1	CM
	<i>philoctetes</i>	29–30?	1/1	EE
	<i>p. avernus</i>	30	1/1	AM
	<i>p. lindigii</i>	29	2/2	CC, Colombia (a)
	<i>taygetina</i>	25	1/1	AC
<i>Caerois</i>	<i>chorinaeus</i>	29	1/1	CC
Subtribe Morphina				
<i>Morpho</i>	<i>achilles</i>	27 or 28	1/1	RO
	<i>achilles</i> ssp. (much blue)	28	1/1	EB

Table 1. Continued

Genus	Species, subspecies	<i>n</i>	Number of studied populations/ individuals	Locality
	<i>achilles</i> ssp.	28	1/1	EE
	<i>anaxibia</i>	28	1/1	ES
	<i>athena</i>	31	1/1	SP
	<i>athena</i>	28	1/1	DF
	<i>athena</i>	c. 30	1/1	RJ
	<i>athena</i>	34	1/1	RJ
	<i>cisseis</i>	28, 46	1/1, 1/1	PA
	<i>epistrophus</i>	28	2/2	RJ (e), RJ
	<i>hecuba</i>	28	1/1	AM (i)
	<i>helenor</i>	28	1/1	Guyane (d)
	<i>h. achillaena</i>	28	3/7	DF, MG, RJ
	<i>h. achillides</i>	28	2/2	Argentina (a), VV
	<i>h. anakreon</i>	28	2/4	PE2
	<i>h. helenor</i>	28	2/2	PA, RO
	<i>h. insularis</i>	28	1/1	Trinidad (f)
	<i>h. leontius</i>	28	1/2	Bolivia (a)
	<i>h. peleides</i>	28	3/7	Colombia (a), Mexico (g), RG
	<i>h. pindarus</i>	28	2/5	EB, MT
	<i>h. rugitaeniatus</i>	28	1/1	VC
	<i>h. violaceus</i>	28	1/1	SC (a)
	<i>menelaus</i>	27, 46	2/3, 1/1	EE, RJ, RJ
	<i>m. amathonte</i>	27	1/1	Colombia (a)
	<i>m. coeruleus</i>	30	1/1	DF (e)
	<i>m. menelaus</i>	28	2/2	Guyane (d), RO
Tribe Brassolini				
Subtribe Brassolina				
<i>Blepolenis</i>	<i>batea</i>	29, 30	1/2, 1/1	ES
<i>Brassolis</i>	<i>astyra</i>	28	1/1	RJ
	<i>sophorae</i>	29	1/1	BA
<i>Caligo</i>	<i>atreus</i>	29	3/3	Colombia (a), TV, WE
	<i>beltrao</i>	29	1/1	RJ (e)
	<i>euphorbus</i>	27	1/1	AM
	sp. nr <i>euphorbus</i> ?	29	1/1	AC
	<i>brasiliensis</i>	29	1/2	RJ (e)
	<i>idomeneus</i>	29	1/1	VV
	<i>illioneus</i>	29	1/1	Ecuador (a)
	<i>i. illioneus</i>	29	1/1	DF (e)
	<i>teucer</i>	28	1/2	RG
	<i>teucer</i>	29	2/2	AN, PE
	<i>teucer</i>	c. 30–31, 30, 31	3/3	Colombia (a), MT2
	<i>t. japedus</i>	30	1/2	MT
	<i>teucer</i> ssp.	28	1/1	EE
	sp. nr <i>teucer</i>	29	1/1	EE
	sp. nr <i>teucer</i>	30	1/1	VC
	<i>zeuxippus</i>	29	1/2	VC
	sp.	29	1/1	VC
	sp. (yellow band)	29	1/1	VC
<i>Catoblepia</i>	<i>amphirhoe</i>	29	1/1	RJ (e)
<i>Dynastor</i>	<i>darius</i>	28	2/4	MT, RJ
<i>Eryphanis</i>	<i>automedon</i>	29	1/1	MT
	<i>amphimedon</i>			
	<i>reevesii</i>	31	1/1	ES

Table 1. *Continued*

Genus	Species, subspecies	<i>n</i>	Number of studied populations/ individuals	Locality
<i>Ooptera</i>	<i>aorsa</i>	29	1/1	ES
	<i>syme</i>	29	1/2	RJ
<i>Opsiphanes</i>	<i>boisduvallii</i>	29	1/2	OX
	<i>cassiae crameri</i>	29	1/1	ES
	<i>c. strophios</i>	29	1/1	VV
	<i>invirae</i>	29	1/1	Argentina (a)
	<i>i. remoliatus</i>	29	1/1	DF (e)
	<i>quiteria</i>	31	1/2	RO
	<i>q. meridionalis</i>	29	1/2	DF (e)
	<i>tamarindi</i>	29	2/2	OX, VC
<i>Penetes</i>	<i>pamphanis</i>	50	1/1	PN
<i>Selenophanes</i>	<i>cassiope</i>	50	1/1	RO
Subtribe Naropina				
<i>Narope</i>	<i>cyllarus</i>	29	1/1	MT
	<i>cyllabarus</i>	31	1/1	VV
	<i>cyllastros</i>	28?, 29	2/2	ES, RJ (e)
	<i>panniculus</i>	29	1/1	MT
Subfamily SATYRINAE (nomenclature according to Peña <i>et al.</i> , 2006; Fig. 1)				
Tribe Melanitini				
<i>Manataria</i>	<i>hercyna</i>	28	1/1	Argentina (a)
	<i>h. hyrneathia</i>	28	1/1	MT
Tribe Haeterini				
<i>Cithaerias</i>	<i>pireta</i>	25	1/1	Colombia (a)
	<i>p. aurora</i>	12	2/3	AM, EE
<i>Haetera</i>	<i>macleanania</i>	24, 25	2/2	VC2
	<i>piera</i>	25	2/2	PA, VV
	sp. (blue-spot)	25	1/2	EB
<i>Pierella</i>	<i>helvina</i>	30	1/1	VC
	<i>lamia</i>	20	1/1	PE
	<i>lamia</i>	29, 26–30, 28–30	3/3	BA, VV, PA
	<i>l. chalybaea</i>	29	1/1	MT
	sp. nr <i>helvina</i>	30	1/2	CC
	<i>lena</i>	27	1/2	PA
	<i>luna</i>	29	1/2	Colombia (a)
	<i>l. rubecula</i>	29	1/1	Mexico (c)
Hypocystina <i>sensu</i> Miller				
<i>Oressinoma</i>	<i>typhla</i>	28–29	1/1	RG
Subtribe Pronophilina, clade 1				
<i>Corades</i>	<i>enyo</i>	29	1/5	Ecuador (a)
	<i>iduna</i>	29	1/1	Bolivia (a)
	<i>i. procellaria</i>	29	1/2	Argentina (a)
<i>Oxeoschistus</i>	<i>puerta simplex</i>	29	1/2	Colombia (a)
	sp.	28	1/1	EE
	sp.	28	1/1	VV
<i>Pedaliodes</i>	<i>palaepolis</i>	29	1/1	Peru (a)
	<i>pisonia</i>	29	1/1	Ecuador (a)
	sp.	29	1/1	Bolivia (a)
	sp.	29	1/1	Ecuador (a)
<i>Praepedaliodes</i>	<i>phanias</i>	29	2/2	Argentina2 (a)

Table 1. Continued

Genus	Species, subspecies	<i>n</i>	Number of studied populations/ individuals	Locality
<i>Pronophila</i>	<i>cordillera</i>	8?	1/1	Bolivia (a)
	<i>cordillera</i>	29	1/1	Bolivia (a)
	<i>intercidona</i>	29	1/1	Colombia (a)
	<i>thelebina</i>			
	<i>timanthes</i>	29	1/1	Ecuador (a)
Subtribe Pronophilina, clade 2				
<i>Auca</i>	<i>coctei</i>	20	1/1	Chile (a)
	<i>nycteropus</i>	7	1/2	Chile (a)
	<i>nycteropus</i>	7–8, 8	1/2	Chile (a)
	<i>nycteropus</i>	9–10	1/1	Chile (a)
<i>Chillanella</i>	<i>stelligera</i>	17	1/1	Argentina (a)
	<i>stelligera</i>	17–18	1/1	Chile (a)
<i>Etcheverrius</i>	<i>chiliensis</i>	c. 60	1/1	Chile (a)
<i>Faunula</i>	<i>leucoglène</i>	29	1/7	Argentina (a)
<i>Homoeonympha</i>	<i>boisduvalii</i>	c. 29–30	1/2	Argentina (a)
	<i>schajovskoi</i>	27	1/4	Argentina (a)
<i>Nelia</i>	<i>nemyroides</i>	27	1/4	Chile (a)
<i>Pampasatyris</i>	<i>nilesi</i>	c. 41	1/1	Argentina (a)
	<i>ocelloides</i>	10	1/1	GO (e)
<i>Steroma</i>	<i>bega</i>	13	1/1	Bolivia (a)
	<i>bega andensis</i>	c. 12–13	1/1	Bolivia (a)
	<i>modesta</i>	13	1/2	Bolivia (a)
<i>Steremnia</i>	<i>pronophila</i>	13	1/1	Colombia (a)
Subtribe Euptychiina				
<i>Amphidecta</i>	<i>calliomma</i>	8	1/1	MT
	<i>calliomma</i>	9	1/2	MG
	<i>pignerator</i>	9	1/1	MT
	<i>reynoldsi</i>	c. 50, 51	2/2	MT, GO
<i>Archeuptychia</i>	<i>cluena</i>	6	2/3	RJ (e)
<i>Chloreuptychia</i>	<i>arnaca</i>	13	1/1	CC
<i>Cissia</i>	<i>occypede</i>	9	1/1	RJ (i)
	<i>penelope</i>	30, 36, 50–51	1/1, 1/1, 1/1	RO, Trinidad (f), WE
	sp. nr <i>palladia</i>	105	1/1	TV
	sp. nr <i>penelope</i>	16	1/1	CZ (i)
	sp.	6	1/1	MT
<i>Erichthodes</i>	<i>antonina</i>	c. 13–14	1/1	Bolivia (a)
	<i>s.l. arius</i>	38	1/1	Bolivia (a)
<i>Euptychia</i>	<i>jesia</i>	25	1/1	AM (i)
<i>Euptychoides</i>	<i>albofasciata</i>	50	1/3	Ecuador (a)
	<i>griphe</i>	25	2/3	Colombia (a), Ecuador (a)
<i>Godartiana</i>	<i>muscosa</i>	36	1/1	MG
<i>Harjesia</i>	sp.	13	1/1	GO (i)
<i>Hermeuptychia</i>	<i>hermes</i>	13	1/1	Trinidad (f)
	<i>hermes</i>	18, 23, 25	1/1, 1/1, 1/2	Tobago (f)
<i>Magneuptychia</i>	<i>libye</i>	25–26	1/1	Mexico (c)
	<i>libye</i>	29	1/1	WE
	<i>libye</i>	35	1/1	CC
	<i>libye</i>	39	1/1	Guatemala (c)
	sp.	c. 70	1/1	RO
<i>Moneyuptychia</i>	<i>paeon</i>	25–29	1/1	RJ (i)
	<i>soter</i>	24	1/1	ES (i)

Table 1. *Continued*

Genus	Species, subspecies	<i>n</i>	Number of studied populations/ individuals	Locality
<i>Pareuptychia</i>	<i>metaleuca</i>	17	1/1	Mexico (c)
	<i>ocirrhoe</i>	12	1/1	MT
	<i>ocirrhoe</i>	13	4/5	DF (e), MT, PA, RJ (e)
	<i>ocirrhoe</i>	18	2/2	RG, Trinidad (f)
	<i>ocirrhoe</i>	23	1/1	Mexico (c)
	<i>ocirrhoe</i>	24	1/1, 6/15	Guatemala (c), Mexico (c)
	<i>ocirrhoe</i>	26	1/1	BA
	<i>ocirrhoe s.l.</i>	13	1/3	Argentina (a)
	<i>ocirrhoe s.l.</i>	15	1/1	Argentina (a)
	<i>ocirrhoe s.l.</i>	21	1/1	Ecuador (a)
	<i>ocirrhoe s.l.</i>	24	1/1	Colombia (a)
	<i>ocirrhoe s.l.</i>	42–43	1/1	Ecuador (a)
	<i>ocirrhoe s.l.</i>	44	1/2	Ecuador (a)
	sp.	8	*	*
	sp.	12	2/2	CM, CZ
	sp.	13	1/1	EE
	' <i>ocirrhoe</i> '	13	2/4	DF, ES
	<i>summandosa</i>	15	1/1	MT
<i>Paryphthimoides</i>	<i>poltyis</i>	13	1/1	RJ (i)
<i>Pharneuptychia</i>	<i>pharnaces</i>	25	1/1	ES
<i>Praefaunula</i>	<i>armilla</i>	c. 12	1/1	GO (e)
<i>Splendeuptychia</i>	<i>cosmophila</i>	35	1/1	ES
	sp.	6	1/1	MG
	sp. (dark)	7	1/1	AM (i)
<i>Yphthimoides</i>	<i>celmis</i>	12	1/1	MG (i)
	<i>celmis</i>	27	2/2	Argentina (a), Peru (b)
	<i>renata</i>	27	1/1	CZ (i)
	sp.	14	1/1	WE
<i>Yphthimoides?</i>	sp. nov.	29	1/1	MT

The nomenclature follows the list of Lamas *et al.* (2004), except for the tribal and subtribal division of the Satyrinae, where we follow Peña *et al.* (2006); note that the species names used in some original publications may differ from the names used here. A comma between chromosome numbers shows that the numbers come from different individuals and a dash indicates variation within individuals. In a few cases, a single individual had different chromosome numbers in different cells; in these cases, the chromosome numbers have been separated with a semicolon. Additional data: voucher codes, the name of the specimen in the original reference and an exact reference to the locality are given in <http://www.fmnh.helsinki.fi/english/zoology/entomology/research/satyroid-clade/>.

Localities are grouped by region; a number at the end of locality codes indicates the number of populations sampled within a region. A letter in parentheses indicates previous work (a, de Lesse, 1967a; b, de Lesse, 1967d; c, de Lesse, 1970a; d, de Lesse, 1970b; e, de Lesse & Brown, 1971; f, Wesley & Emmel, 1975; g, Maeki & Remington, 1960a; h, Maeki & Remington, 1960b; i, T. C. Emmel, pers. comm.). Numbers with an asterisk without locality and number of individuals are derived from the unpublished notes left by the late Dr H. de Lesse.

Locality codes: AC, Acre (extreme western Brazil); AM, Amazonas (north-western Brazil); AN, Andes of north-central Colombia; BA, Bahia (eastern Brazil); CC, Chocó (western Colombia); CM, Chanchamayo (central Peru); CT, Catatumbo (north-western Venezuela); CZ, Canal Zone (central Panamá); DF, Brasília (central Brazil); DR, Dominican Republic; EB, eastern Bolivia; EE, eastern Ecuador; ES, Espírito Santo (eastern Brazil); GO, Goiás (central Brazil); MG, Minas Gerais (central Brazil); MT, Mato Grosso (central Brazil); OX, Oaxaca (southern Mexico); PA, Pará (northern Brazil); PE, Pernambuco (extreme eastern Brazil); PN, Paraná (southern Brazil); PR, Puerto Rico; PT, Putumayo (southern Colombia); RG, Aragua, northern Venezuela; RJ, Rio de Janeiro (south-eastern Brazil); RO, Rondônia (western Brazil); SC, Santa Catarina (southern Brazil); SP, São Paulo (south-eastern Brazil); TV, Táchira (south-western Venezuela); VC, Valle de Cauca (western Colombia); VV, Villavicencio, Meta (eastern Colombia); WE, western Ecuador.

Table 1. Summary of chromosome numbers in the Heliconiini

Genus	Species	n =	No. ssp. recogn./fixed		No. fixed pops./inds	Localities	Testis sizes	Testis colors
<i>Philaethria</i>	<i>pygmalion</i>	29	1	1	6/11	MT/PA/AM	m/ms	R/r/dR
	<i>wernickei</i>	29	1	1	14/22	RJ4/SP5/ES/BA/SC	m/ms	R/Rr
	<i>dido</i>	88	4	4	38/106	AM10/MT2/PA5/ RO6/AC/PE/PB/ EE/AV/DA2/CH/ CZ3/AC/CC	m/ms/s	R/Rr/r
	<i>diatonica</i>	72	2	2	3/17	OX/TV2	m/ms	R/Rr/r/G/yG
		67–68	4+	4	9/149	ES4/SP/RJ/BA/ PE/PA/OX/TV		
	<i>constantinoi</i>	62	1	1	1/1	CC	ms	G
<i>Podotricha</i>	sp. nov.?	52	3+	3	7/25	ES/PA2/TV2	m/ms	R/Rr/r
	<i>ostara?</i>	21	2+	2	3/6	TR/TV/ES	ms	Rr
	sp. nov.?	12 + 19–25mc	2+	2	8/17	PA6/BO	s/ms/m	R/r
<i>Podotricha</i>	<i>telesiphe</i>	28–29	2	2	2/16	EE2	ml/m/ms	R/Rr/G
		26–27	1	1	1/2	CP	ml	dR
<i>Podotricha</i>	<i>euchroia</i>	9	4	3	7/25	VC2/CC/WE/EE2	m/ml	R/dR/Rr
<i>Dione</i>	<i>juno</i>	31	5	5	12/23	WP/CV/WE2/MX/DF/ EB/EE/TR/CR/MT	m/ml/l	B/RB
<i>Dione</i>	<i>moneta</i>	31	3	3	4/5	SP/MX/OX	l/m	B/dB
	<i>glycera</i>	31	1	1	4/4	CP/VC	l/ml	B/RB
<i>Agraulis</i>	<i>vanillae</i>	31	8	7	13/28	MX2/TR/EE/AR/ CB2/WE/WP/C12	m/ml/l	B/RB/R
<i>Dryadula</i>	<i>phaetusa</i>	31	1	1	6/9	CR/TR/AR/ES	ml	R
<i>Dryas</i>	<i>idia</i>	31	12	4	14/17	MX2/CR2/C13/ TX/EE/AN/TR/ GY/AR/WE	m/l	R
<i>Eueides</i>	<i>vibilia</i>	31	6	3	9/15	ES/GO/VV/RR/ TV/RD/PA/AM	m/ms/s	R/Rr
	<i>pavana</i>	31	1	1	1/1	RJ	m	r
	<i>lineata</i>	31–32	4	1	1/2	AN	s/ms	R/Rr
	<i>procula</i>	31	7	2	6/13	RG/VC/EE	m/ms/s	R/Rr
	<i>lampeto</i>	31	10	1	1/1	AM	ms	r
	<i>eanes</i>	31	5	1	1/4	AC	ms	R
	<i>isabella</i>	31	17	5	5/23	OX/AN/TR/MG/WE	m/ms	R/Rr/G
	<i>lybia</i>	31	6	5	12/34	CT/CR/CZ/CC/ GY/VV/PA/AM/ MT/GO/TV	m/ms/s	Rr/R
<i>Eueides</i>	<i>tales</i>	31	13	7	12/30	VV/TV3/AM/PA/ RO/AM/AN	m/ms/ s/vs	Rr/r/ cr/OR/y/lr
		37			1/1	AM		
	<i>aliphera</i>	31	3	2	7/10	EE/CR/CZ/TR/AR	s/ms/m	R/Rr/r
<i>Neruda</i>	<i>metharme</i>	31	3	3	3/10	RO2/AC	m/ml/l	R/Rr/r/cr/dR
		26–27 + 2–4mc			7/12	AM/RR/RO2/AV/AC		
	<i>godmani</i>	21–22 + 5–10mc	1	1	3/14	CC	ms/m/ml	R/dR/RB
<i>Neruda</i>	<i>aoede</i>	21 + 1–5mc	11	8	29/56	AP/AM6/RR2/PA7/ RO5/GY/EE/MT3	m/ml/l	R/r/rB/ RB/dR/Or
<i>Luparus</i>	<i>doris</i>	25–27	8	8	59/154	PA10/CR/RO6/ CZ3/WE/CH/AN/RG/ EV/AB/BO/AM8/TR/ PA/VV/EE2/MT3/LP/ AC/TV2/AP2/CP/CC2	l/ml/vl	R/Rr/r/cr/rB
		20, 24–27			1/1	CR		
		21, 25			1/1	RO		
		22			1/3	RG		
		24–30, 38			1/25	TR		
		24, 30			1/3	RO		
<i>Heliconius</i>	<i>hierax</i>	21, 22	2	2	3/3	VV/EE	m/ml/l	r/Rr
	<i>hecuba</i>	22–24	7	1	2/2	VV	l	dR
<i>xanthocles-</i> <i>-wallacei</i> group	<i>xanthocles</i>	21–22	14	6	15/26	RO3/PA/MT/EE3/ VV/AV/AM	ms/m/ml	R/Rr/r/c
	<i>egeria</i>	21	4	2	4/4	PA/AM2	ms/m/ml	R/Rr
	<i>astraea</i>	21	2	1	4/6	AM/RO3	ml/l/vl	Rr/r
		24–25			1/1	RO		
	<i>burneyi</i>	21	7	5	12/23	AV2/AM2/RO2/ EB/PA2	m/ml/l	Y/G/cr/Rr
<i>Heliconius</i>	<i>wallacei</i>	21	5	4	8/17	TR/GY/VV/EE/ AV/RO/RR/AP	m/ml	R/Rr/r/cOr

(Table 1, continued)

Genus	Species	n =	No. ssp. recogn/fixed		No. fixed pops/inds	Localities	Testis sizes	Testis colors
<i>silvaniform</i> group	<i>nattereri</i>	21*	1	1	2/15	ES/BA	ms/m/ml	Rr/R/r/G/W
	<i>numata</i>	***21	25	14	26/52	RO3/VV/EE/EB/MT/ RJ/PA/AM2/AC/RR/ MP/TV/ES/BA2	ms/m/ml	Rr/R/r
	<i>isemenius</i>	21	7	4	7/14	OX/AN/DA/CT	m/ml	R/r
	<i>pardalinus</i>	21*	10	5	6/19	LP/AC/VV/AM3	m/ml	R/Rr/r
	<i>hecale</i>	21	29	14	19/35	CZ/CH/AN/VV/WE/ EE/BO/CT/RO2/ AC/RR/PA4	m/ml/l/vl	R/Rr/r
	<i>ethilla</i>	21 + 3mc 21	22	11	1/1 19/28	RO VV/TR/MT/DF/RJ2/ HU/AM/TV/RO/PA3	m/ml/l	R/Rr/r/RB
	<i>atthis</i>	21	1	1	2/9	WE	ml	R
	<i>besckei</i>	21	1	1	4/7	DF/MG/RJ/SP	ml	R/r/dR
	<i>elevatus</i>	21	8	4	6/8	GY/RO3/PA/AM	m/ml/l	R/Rr/r
	<i>luciana</i>	21	2	2	4/10	AV2/RR2	m/ml	R/dR
<i>cydno- melpomene</i> group	<i>luciana</i>	21	2	2	4/10	AV2/RR2	m/ml	R/dR
	<i>timareta</i>	21	2	2	2/7	EE2	l	R/Rr
	<i>heurippa</i>	21	1	1	1/5	VV	m/l	R
	<i>(cydno) pachinus</i>	21	1	1	1/11	CR	ml/l	r
	<i>cydno</i>	21	11	6	8/19	CZ/AN/WE2/CV/ PT/TV	m/ml	R/r
	<i>cydno × melpomene</i>	21	(—)	(—)	4/4	AN/TV2	m/ml/l	R/Rr/r/lr
	<i>melpomene</i>	**21	29	13	22/45	CR/AN2/WE/TR2/ VV/EE/AV/GY/RR/ DA/RG/RO/AM2/PA2	m/ml/l	R/Rr/r/dR
	<i>erato- group</i>	21	9	3	6/15	CI/WE/EE/WP/AN2	ms/s	R/Rr
	<i>hermathena</i>	21	6	2	2/3	PA/AM	ms	R/r/dR
	<i>hecalesia</i>	21	6	3	3/6	CH/TV	m/ms	R/r
<i>erato- group</i>	<i>clysonymus</i>	21	4	2	5/10	EE/CC/WE2	ml/l	R/r
	<i>hortense</i>	21	1	1	3/4	MX/OX	m	R
	<i>telesiphe</i>	21	4	2	4/11	EE4	m/ml	R/dR
	<i>erato</i>	21	28	17	23/43	MX/OX/GU/AN/TR/ EE/WE/GY2/EB/AR DF/RR2/MP2/HU/RO	m/ms/s	R/Rr/r/dR/RB
	<i>erato</i>	21	28	17	23/43	MX/OX/GU/AN/TR/ EE/WE/GY2/EB/AR DF/RR2/MP2/HU/RO	m/ms/s	R/Rr/r/dR/RB
	<i>erato</i>	21	28	17	23/43	MX/OX/GU/AN/TR/ EE/WE/GY2/EB/AR DF/RR2/MP2/HU/RO	m/ms/s	R/Rr/r/dR/RB
	<i>erato</i>	21	28	17	23/43	MX/OX/GU/AN/TR/ EE/WE/GY2/EB/AR DF/RR2/MP2/HU/RO	m/ms/s	R/Rr/r/dR/RB
	<i>erato</i>	21	28	17	23/43	MX/OX/GU/AN/TR/ EE/WE/GY2/EB/AR DF/RR2/MP2/HU/RO	m/ms/s	R/Rr/r/dR/RB
	<i>erato</i>	21	28	17	23/43	MX/OX/GU/AN/TR/ EE/WE/GY2/EB/AR DF/RR2/MP2/HU/RO	m/ms/s	R/Rr/r/dR/RB
	<i>erato</i>	21	28	17	23/43	MX/OX/GU/AN/TR/ EE/WE/GY2/EB/AR DF/RR2/MP2/HU/RO	m/ms/s	R/Rr/r/dR/RB
<i>sara- -sapho</i> group	<i>ricini</i>	21*	1	1	4/6	TR2/RO	ms	r/cr
	<i>demeter</i>	21	10	4	10/18	AM2/RO3/EB/PA	ms/s	R/Rr/r/cr/cY
	<i>leucadia</i>	21*	2	1	7/9	EE/MT/AM/RO2/ AC/PA	ms	R/Rr/r
	<i>sara</i>	**21	7	5	15/31	CZ/AN/WE2/VV/TR2/ GY/DF/CC/RJ/EE/RO	s/ms/m/ml	R/cr/Rr/cY/Or/r
	<i>sara</i>	29			1/1	TR		
	<i>hewitsoni</i>	21	1	1	2/2	CR	m	R
	<i>antiochus</i>	21*	6	5	18/32	RG2/VV/RR/RO/AM/ PA3/LP/GO/BO/TV	s/ms/m/ml	R/r/G/Y/Or
	<i>congener</i>	33	3	2	3/16	EE2/VV	m/ms	R/Rr/r/cr
	<i>eleuchia</i>	*37	1	1	3/5	CZ/AN/VC	m/ms	r/G
	<i>eleusinus</i>	*59–60*	2	2	5/18	CC3/WE2	m/ms/s	R/r/cr/ly/G
<i>sapho</i>	<i>sapho</i>	*56–57	4	4	6/26	OX/CC/AN/CZ/WE2	m/ms/s	Rr/r/cr
	<i>sapho</i>	*56–57	4	4	6/26	OX/CC/AN/CZ/WE2	m/ms/s	Rr/r/cr
	<i>sapho</i>	*56–57	4	4	6/26	OX/CC/AN/CZ/WE2	m/ms/s	Rr/r/cr
	<i>sapho</i>	*56–57	4	4	6/26	OX/CC/AN/CZ/WE2	m/ms/s	Rr/r/cr
	<i>sapho</i>	*56–57	4	4	6/26	OX/CC/AN/CZ/WE2	m/ms/s	Rr/r/cr
	<i>sapho</i>	*56–57	4	4	6/26	OX/CC/AN/CZ/WE2	m/ms/s	Rr/r/cr
	<i>sapho</i>	*56–57	4	4	6/26	OX/CC/AN/CZ/WE2	m/ms/s	Rr/r/cr
	<i>sapho</i>	*56–57	4	4	6/26	OX/CC/AN/CZ/WE2	m/ms/s	Rr/r/cr
	<i>sapho</i>	*56–57	4	4	6/26	OX/CC/AN/CZ/WE2	m/ms/s	Rr/r/cr
	<i>sapho</i>	*56–57	4	4	6/26	OX/CC/AN/CZ/WE2	m/ms/s	Rr/r/cr
	<i>sapho</i>	*56–57	4	4	6/26	OX/CC/AN/CZ/WE2	m/ms/s	Rr/r/cr

Chromosome number: A comma between numbers indicates different individuals; a dash, variation within individuals. Superscript dots before and after a number indicate variation in the number, as much as 3 over or under the given figure, infrequent but regular

Localities: Localities grouped by region; the number following indicates more than one population fixed within the region. Codes: AC = Acre, AM = Amazonas (Brazil), AN = north-central Colombia, AP = Amapá (Brazil), AR = northern Argentina, AV = Amazonas (Venezuela), BA = Bahia (Brazil), BO = Bolívar (Venezuela), CC = Chocó (W. Colombia), CH = W. Panamá, CI = Caribbean islands, CH = Chanchamayo (Peru), CR = Costa Rica, CT = N.W. Venezuela, CZ = Canal Zone, DA = E. Panamá, DF = Brasília (Brazil), EB = E. Bolivia, EE = E. Ecuador, ES = Espírito Santo (Brazil), EV = E. Venezuela, GO = Goiás (Brazil), GU = Guatemala, GY = Guianas, HU = Huallaga valley (Peru), LO = N.E. Peru, MG = Minas Gerais (Brazil), MP = upper Rio Marañón (Peru), MT = Mato Grosso (Brazil), MX = eastern Mexico, OX = S. Mexico, PA = Pará (Brazil), PB = Paraíba (Brazil), PE = Pernambuco (Brazil), PT = South Colombia, RG = N. Venezuela, RJ = Rio de Janeiro (Brazil), RO = Rondônia (Brazil), RR = Roraima (Brazil), SC = Santa Catarina (Brazil), SP = São Paulo (Brazil), TR = Trinidad, TV = Táchira (Venezuela), TX = S. Texas, VC = Valle de Cauca, W. Colombia, VV = Meta, E. Colombia, WE = West Ecuador, WP = western Peru

Testis sizes: vs = very small (less than 0.4 mm), s = small (0.4–0.7 mm), ms = medium small (0.7–1.0 mm), m = medium (1.0–1.3 mm), ml = medium large (1.3–1.6 mm), l = large (1.6–2.0 mm), vl = very large (2.0–3.0 mm) in fresh material

Testis colors: B = brown, cOr = clear orange, cr = clear rose, cY = clear yellow, DB = dark brown, dR = dark red, G = green, lr = light rose, ly = light yellow, Or = orange, R = red, r = rose, RB = red brown, rB = rose brown, Rr = rose red, W = white, y = yellow

Table 1. Karyotype numbers (2n) in Tortricidae.

Tribe	Species ^a	2n	Reference(s)
Subfamily Tortricinae			
Archipini	<i>Adoxophyes orana</i>	60	[5,23]
	<i>Aphelia paleana</i>	60	[24]
	<i>Archips breviplicanus</i>	60	[5,23]
	<i>Archips cerasivorana</i> ^b	60	[5,23,25]
	<i>Archips crataegana</i>	60	[27]
	<i>Archips fervidana</i>	60	[25]
	<i>Archips fuscocupreanus</i>	60	[5,23]
	<i>Choristoneura biennis</i>	60	[25,28]
	<i>Choristoneura conflictana</i>	60	[25]
	<i>Choristoneura fumiferana</i>	60	[5,25,28]
	<i>Choristoneura lambertiana</i>	60	[28]
	<i>Choristoneura occidentalis</i>	60	[25,28]
	<i>Choristoneura orae</i>	60	[28]
	<i>Choristoneura pinus</i>	60	[5,25,28]
	<i>Choristoneura retiniana</i>	60	[28]
	<i>Clepsis senecionana</i>	58	[24]
	<i>Homona coffearia</i> ^c	60	[5]
	<i>Homona magnanima</i>	60	[5,23]
	<i>Lozotaenia forsterana</i>	60	[24]
	<i>Pandemis heparana</i>	60	[5,23]
Cochylini	<i>Eupoecilia ambiguella</i>	60	this study
Sparganothini	<i>Cenopis penitana</i>	60	[25]
	<i>Sparganothis directana</i>	60	[25]
Tortricini	<i>Acleris forsskaeana</i>	60	[24]
	<i>Acleris variana</i>	60	[25]
	<i>Tortrix viridana</i>	60	[26]
Subfamily Olethreutinae			
Bactrini	<i>Bactra furfurana</i>	33/32 ⁱ	[30]
	<i>Bactra lacteana</i>	31/30 ⁱ	[30]
	<i>Bactra robustana</i>	46	[30]
Eucosmini	<i>Blastesthia tessulatana</i> ^d	56	[26]
	<i>Epinotia radicana</i> ^e	58	[25]
	<i>Epinotia solandriana</i>	56	[25]
	<i>Gypsonoma haimbachiana</i>	50	[25]
	<i>Retinia albicapitana</i> ^f	54	[25]
	<i>Rhyacionia buoliana</i>	56	[25]
	<i>Zeiraphera canadensis</i>	56	[25]
	<i>Zeiraphera fortunana</i>	56	[25]
	<i>Zeiraphera griseana</i> ^g	56	[31]
Grapholitini	<i>Cydia pomonella</i>	56	[26,32]
	<i>Grapholita funebrana</i>	56	this study
	<i>Grapholita molesta</i>	56	this study
Olethreutini	<i>Lobesia botrana</i>	56	this study

Table 1. Cont.

Tribe	Species ^a	2n	Reference(s)
	<i>Phiaris mori</i>	44	[29]
	<i>Pseudosciaphila duplex</i> ^h	56	[25]

^aSpecies names are used according to [19];^bsyn. *Choristoneura cerasivorana*;^csyn. *Homona menciata*;^dsyn. *Pseudococcyx tessulatana*;^esyn. *Epinotia (Griselda) radicana*;^fsyn. *Petrova albicapitana*;^g*Zeiraphera diniana*;^h*Sciaphila duplex*;ⁱspecies with multiple sex chromosomes W₁W₂Z/ZZ (female/male).

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located in the originally autosomal part of the neo-sex chromosomes [53]. However, the sex-chromosome location of rDNA in other insects seems to be rather common as shown, for example, in tiger beetles of the genus *Cicindela* [54], bushcrickets of the genus *Odontura* [55], and Triatominae bugs [56]. In dipteran insects, the association of rDNA with sex chromosomes even seems to be an ancestral character for the whole order [57–60]. The rare occurrence on the sex chromosomes in Lepidoptera suggests that the sex-linkage of rDNA is not favorable, possibly due to the inactivation of the W chromosome in somatic nuclei of females [44].

The sex chromosomes of tortricids examined here showed some common features in addition to their large size. Similar to codling moth, the W chromosomes were largely composed of heterochromatin, and in CGH experiments they were differentiated by both the female and male genomic DNA probes, with slight preference for the female probes. These results suggest preponderance of common repetitive sequences and transposons and a low amount of W-specific sequences on the W chromosome (cf. [32,37,40]). However, a detailed analysis carried out in this study revealed considerable between-species differences in the formation of W chromatin bodies in the highly polyploid somatic nuclei of females (see Results), in the level of W-chromosome heterochromatinization, and in the pattern of molecular differentiation of the W and Z chromosomes. Only the codling moth W chromosome showed a conspicuous heterochromatinization and uniform CGH pattern along the entire W thread of the pachytene WZ bivalents ([32]; this study), unlike the indistinctive and scattered pattern of the W chromosome in the closely related *G. molesta*.

On the contrary, the CGH patterns in *L. botrana* and *E. ambiguella* suggest that their W chromosomes are composed of two parts, the highly differentiated and poorly differentiated parts. The latter finding strongly suggests that not only the Z chromosome (see above) but also the tortricid W chromosome had originated by fusion between an ancestral W chromosome (the highly differentiated part) and an autosome (the weakly differentiated part), most probably also corresponding to the *B. mori* chromosome 15 (see [41]). Following the W chromosome-autosome fusion event, the complete absence of meiotic recombination in lepidopteran females resulted in independent molecular degeneration of the autosomal part of the neo-W

Абсолютные размеры хромосом чешуекрылых

Виды	Число хромосом	Средняя площадь одного гомолога, мкм ²		Средняя суммарная площадь гаплоидного набора на стадии максимальной спирализации хромосом, мкм ²	
		минимальная	максимальная	N	$\bar{x} \pm S. E.$
Надсем. Gelechioidea					
1. <i>Sitotroga cerealella</i>	30	0.29 ± 0.017	0.50 ± 0.028	9	10.0 ± 0.20
Надсем. Yponomeutoidea					
2. <i>Yponomeuta malinellus</i>	31	0.42 ± 0.026	0.69 ± 0.029	8	15.3 ± 0.34
Надсем. Tortricoidea					
3. <i>Archips crataegana</i>	30	0.40 ± 0.036	1.06 ± 0.069	8	13.2 ± 0.42
4. <i>Tortrix viridana</i>	30	0.34 ± 0.21	0.61 ± 0.053	7	12.1 ± 0.53
Надсем. Zygaenoidea					
5. <i>Zygaena doricnii</i>	30	0.32 ± 0.017	0.61 ± 0.030	6	10.6 ± 0.33
6. <i>Zygaena carniolica</i>	30	0.33 ± 0.028	0.46 ± 0.020	12	11.2 ± 0.33
7. <i>Zygaena filipendulae</i>	30	0.30 ± 0.027	0.39 ± 0.015	12	9.9 ± 0.18
Надсем. Pyraloidea					
8. <i>Galleria mellonella</i>	30	0.54 ± 0.024	1.01 ± 0.046	5	18.7 ± 0.80
9. <i>Plodia interpunctella</i>	31	0.51 ± 0.028	0.95 ± 0.059	6	18.6 ± 0.91
Надсем. Noctuoidea					
10. <i>Mamestra brassicae</i>	31	0.34 ± 0.024	0.85 ± 0.038	10	16.9 ± 1.24
11. <i>Acronicta rumicis</i>	31	0.25 ± 0.016	0.65 ± 0.032	14	11.5 ± 0.44
12. <i>Olene fascelina caucasica</i>	16	0.78 ± 0.065	1.29 ± 0.162	11	14.3 ± 0.31
Надсем. Bombycoidea					
13. <i>Bombyx mori</i>	28	0.36 ± 0.016	0.54 ± 0.023	13	11.7 ± 0.34
Надсем. Papilionoidea					
14. <i>Pieris brassicae</i>	15	0.48 ± 0.040	0.98 ± 0.067	6	10.0 ± 0.58
15. <i>Melitaea didyma</i>	27	0.59 ± 0.027	1.06 ± 0.058	—	—

Примечание. N — число измеренных пластинок.

ставители сем. *Noctuidae*, даже относящиеся к одному роду, существенно отличаются по абсолютным размерам хромосом. Автор исследовала этот признак у 20 видов совок и обнаружила, что средние суммарные длины метафазных хромосом в их кариотипах варьируют от 0.66 до 1.00 мкм, что соответствует примерно 5-кратным различиям в объемах хромосом. Также и по нашим данным, два вида совок из разных родов — *Mamestra brassicae* и *Acronicta rumicis* — резко различаются по абсолютным площадям хромосом (табл. 1, рис. 3, а и б). Следует, правда, иметь в виду, что роды *Mamestra* и *Acronicta* относятся к разным подсемействам *Noctuidae*.

Таким образом, имеющиеся данные весьма противоречивы. В целом приходится признать, что количество видов, у которых известны абсолютные размеры хромосом, в настоящее время еще ничтожно и не позволяет прийти к каким-либо выводам.

Мы специально исследовали вопрос о возможности использования признака «суммарные размеры хромосом» для систематики близких форм бабочек. Оказалось, что по этому признаку между видами одного рода — *Zygaena carniolica* и *Z. filipendulae* — имеются статистически значимые различия ($P < 0.01$). Эти данные, а также упомянутые выше данные Вернер (Werner, 1975), свидетельствуют о том, что в процессе видообразования у бабочек происходят изменения абсолютных размеров хромосом.

Природа изменений размеров хромосом без изменения их числа неизвестна. Они могут быть связаны с различными способами упаковки ДНК или с изме-

RESEARCH ARTICLE

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Dynamic karyotype evolution and unique sex determination systems in *Leptidea* wood white butterflies

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Abstract

Background: Chromosomal rearrangements have the potential to limit the rate and pattern of gene flow within and between species and thus play a direct role in promoting and maintaining speciation. Wood white butterflies of the genus *Leptidea* are excellent models to study the role of chromosome rearrangements in speciation because they show karyotype variability not only among but also within species. In this work, we investigated genome architecture of three cryptic *Leptidea* species (*L. juvernica*, *L. sinapis* and *L. reali*) by standard and molecular cytogenetic techniques in order to reveal causes of the karyotype variability.

Results: Chromosome numbers ranged from $2n = 85$ to 91 in *L. juvernica* and $2n = 69$ to 73 in *L. sinapis* (both from Czech populations) to $2n = 51$ to 55 in *L. reali* (Spanish population). We observed significant differences in chromosome numbers and localization of cytogenetic markers (rDNA and H3 histone genes) within the offspring of individual females. Using FISH with the $(TTAGG)_n$ telomeric probe we also documented the presence of multiple chromosome fusions and/or fissions and other complex rearrangements. Thus, the intraspecific karyotype variability is likely due to irregular chromosome segregation of multivalent meiotic configurations. The analysis of female meiotic chromosomes by GISH and CGH revealed multiple sex chromosomes: $W_1W_2W_3Z_1Z_2Z_3Z_4$ in *L. juvernica*, $W_1W_2W_3Z_1Z_2Z_3$ in *L. sinapis* and $W_1W_2W_3W_4Z_1Z_2Z_3Z_4$ in *L. reali*.

Conclusions: Our results suggest a dynamic karyotype evolution and point to the role of chromosomal rearrangements in the speciation of *Leptidea* butterflies. Moreover, our study revealed a curious sex determination system with 3–4 W and 3–4 Z chromosomes, which is unique in the Lepidoptera and which could also have played a role in the speciation process of the three *Leptidea* species.

Keywords: Lepidoptera, Wood white butterflies, Karyotype variability, Fluorescence *in situ* hybridization Chromosome fusion and fission, Multiple sex chromosomes, Speciation

Background

Speciation, *i.e.* the origin of new species, is a complex evolutionary process which leads to the formation of barriers preventing gene flow between emerging species. Defining the factors that generate such barriers is a central goal for evolutionary biologists. Among animals, moths and butterflies (insect order Lepidoptera) represent an ideal model group for the study of various

aspects of speciation. This is mainly due to the immense diversity of Lepidoptera, which include nearly 160,000 species and belong to the most speciose groups of animals [1]. Moreover, the study of moths and butterflies provides a number of practical advantages. Many species can be easily collected in the field, reared and hybridized in laboratory conditions and experiments can be replicated fairly often due to the relatively short generation time of many species.

Among traditional models, the *Heliconius* butterflies have been the subject of a high number of evolutionary studies showing that various wing patterns, resulting from predator-induced selection through Müllerian mimicry, ultimately lead to divergence and speciation

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Table 1. Haploid chromosome numbers for species and recognized additional subspecies of South American HesperIIDae and Pieridae. A comma between chromosome numbers indicates different individuals, a dash indicates uncertain alternative numbers within an individual. A voucher code is given for each new chromosome number. The identity of species which is uncertain is marked as "sp". Localities are grouped by region; lower case letters in parentheses indicate previous work (a = DE LESSE 1967, b = DE LESSE 1970a, c = DE LESSE 1970b, d = DE LESSE and BROWN 1971, e = MAEKI and REMINGTON 1960a, f = WESLEY and EMMEL 1975). Locality codes: AM = Amazonas (northwestern Brazil), CC = Chocó (western Colombia), DF = Brasília (central Brazil), EE = eastern Ecuador, ES = Espírito Santo (eastern Brazil), GO = Goiás (central Brazil), MG = Minas Gerais (central Brazil), MT = Mato Grosso (central Brazil), PA = Pará (northern Brazil), PE = Pernambuco (northeastern Brazil), RG = Aragua (northern Venezuela), RJ = Rio de Janeiro (southeastern Brazil), RO = Rondônia (western Brazil), SP = São Paulo (southeastern Brazil), VC = Valle de Cauca (western Colombia), WE = western Ecuador.

Genus	Species	n =	No. studied pop./ind.	Locality
Family HESPERIIDAE				
Subfamily Pyrginae				
Tribe Pyrrhopygini				
<i>Elbella</i>	<i>lamprus</i>	40 (39 + 1 s)	1/1	DF(d)
<i>Jemadia?</i>	sp. (blue/white) 1261	32?	1/1	RO
<i>Mimoniades</i>	<i>montana</i> 1574	27	1/3	SP
	<i>nurscia</i>	28	1/1	Ecuador(a)
	<i>nurscia malis</i> Hesp 3	28	1/2	CC
	<i>versicolor</i>	28	1/1	DF(d)
	sp. 948	21	1/1	VC
	sp. 948	28	1/1	VC
<i>Pyrrhopyge</i>	<i>charybdis</i> 1571	14?	1/1	SP
	<i>pelota</i>	28	1/1	Argentina(a)
	sp. (UNH white at base) 1279	15	1/1	RO
<i>Sarbia</i>	sp. (narrow black on HW) 1583	30	1/1	SP
Tribe Pyrgini				
<i>Achlyodes</i>	<i>pallida</i> (selva)	15	1/1, 1/1	Bolivia(a), Mexico(b)
<i>Anisocharia</i>	<i>sublimbata</i>	31	1/1	Argentina(a)
<i>Antigonus</i>	<i>erosus</i>	31	1/1	Mexico(b)
	<i>liborius</i>	31	1/1	Argentina(a)
<i>Chiomara</i>	<i>asychis georgina</i>	31	1/1	Mexico(b)
	sp.	31	1/1	Trinidad(f)
<i>Ebrietas</i>	<i>anacreon</i>	31	1/1	Argentina(a)
	<i>osyris</i>	31	1/1	Argentina(a)
<i>Erynnis</i>	<i>funeralis</i> (E. zarucco f.)	31	1/2	Argentina(a)
<i>Gesta</i>	<i>gesta</i>	32	1/1	Tobago(f)
<i>Grais</i>	<i>stigmaticus</i>	31	1/2	Mexico(e)
<i>Heliopetes</i>	<i>arsalte</i>	30	1/1, 1/1	Bolivia(a), Mexico(b)
	<i>omrina</i>	30	1/1	Argentina(a)
<i>Heliopyrgus</i>	<i>americanus</i> (Pyrgus a.)	30	1/1	Chile(a)
<i>Oechydus</i>	<i>chersis</i>	31	1/1	Bolivia(a)
<i>Paches</i>	<i>l. loxus</i> (P. l. zonula)	31	1/2	Guatemala(b)
<i>Pyrgus</i>	<i>bocchoris</i>	30	1/2	Argentina(a)
	<i>fides</i>	30	1/1	Chile(a)
<i>Theagenes</i>	<i>albiplaga</i>	31	1/2	Bolivia(a)
<i>Trina</i>	<i>g. geometrina</i>	31	1/1	RJ(d)
<i>Zera</i>	<i>z. zera</i>	34	1/1	RJ(d)
Subfamily Eudaminae				
<i>Achalarus</i>	<i>toxeus</i>	16 (15 + 1 s)	1/1	Mexico(e)
<i>Astraptus</i>	<i>anaphus</i>	31	1/1	Bolivia(a)
	<i>naxos</i> 1563	31	1/1	SP
	<i>phalaecus</i>	25	1/1	Guatemala(b)

(Continued)

Table 1. (Continued)

Genus	Species	n =	No. studied pop./ind.	Locality
<i>Chioides</i>	<i>catillus</i>	31	1/1	Mexico(e)
	<i>albofasciatus</i> (<i>C. catillus albofasciata</i>)	31	1/1	Mexico(b)
<i>Entheus</i>	<i>priassus pralina</i> 602	22	1/1	PE
<i>Epargyreus</i>	<i>barisses</i>	31	1/4	Argentina(a)
	<i>clavicornis tenda</i>	ca 29–30	1/1	Guatemala(b)
<i>Phocides</i>	<i>polybius phanias</i> 662	16	1/2	RJ
<i>Tarsoctenus</i>	<i>praecia plutia</i> Hesp 1	15	1/2	AM
<i>Udranomia</i>	<i>spitzi</i>	29	1/1	DF(d)
<i>Urbanus</i>	<i>d. dorantes</i>	31	1/1	Mexico(b)
	<i>proteus</i>	31	1/1, 1/1	Bolivia(a), Mexico(b)
	<i>simplicius</i>	31	1/1	Argentina(a)
	<i>teleus</i>	31	1/2, 1/1	Argentina(a), Bolivia(a)
Subfamily Heteropterinae				
<i>Butleria</i>	<i>quilla</i>	29	1/1	Chile(a)
Subfamily Hesperinae				
<i>Alera</i>	<i>vulpina</i>	ca 27	1/1	Ecuador(a)
<i>Arotis</i>	<i>derasa</i> (<i>Euphyes d.</i>)	28	1/1	RJ(d)
<i>Cymaenes</i>	sp.	31	1/1	Tobago(f)
<i>Cynea</i>	<i>iquita</i>	29	1/1	Argentina(a)
<i>Ebusus</i>	<i>ebusus</i>	29	1/1	Mexico(b)
<i>Euphyes</i>	<i>leptosema</i>	ca 28	1/1	Argentina(a)
<i>Hylephila</i>	<i>fasciolata</i>	29	1/1	Argentina(a)
	<i>phyleus</i>	29	1/1	Argentina(a)
	<i>signata</i>	29	1/1	Chile(a)
<i>Lychnuchus</i>	<i>celsus</i>	30	1/1	RJ(d)
<i>Polites</i>	<i>vibex catilina</i>	29	1/2	Argentina(a)
<i>Thargella</i>	<i>caura</i>	25	1/1	RJ(d)
<i>Vettius</i>	<i>coryna</i>	31, ca 32	1/2	Ecuador(a)
	<i>phyllus prona</i>	26	1/1	RJ(d)
<i>Wallengrenia</i>	<i>premnas</i>	27	1/1	Argentina(a)
Family PIERIDAE				
Subfamily Dismorphiinae				
<i>Dismorphia</i>	<i>amphione astynome</i> 191	31	1/1, 1/1	GO, MG
	<i>a. broomeae</i> 823	30	1/1	RG
	<i>a. praxinoe</i>	30	1/1	Mexico(b)
	<i>astyocha</i> 325	16	1/1	ES
	<i>c. crisia</i> 134, <i>c. crisia</i> (<i>D. critomedia</i>)	13, 31	1/1, 1/1	RG, Bolivia(a)
	<i>crisia foedora</i> (<i>D. critomedia</i> <i>foedora</i>)	31	1/1	Colombia(a)
	<i>hyposticta</i>	48	1/1	Colombia(a)
	<i>spio</i> Pr 4	30	1/3	Puerto Rico
	<i>thermesia</i> 161, <i>thermesia</i>	19, 31	1/2, 1/1	RJ, Df(d)
	<i>theucharila</i>	18	1/1	Colombia(a)
	<i>theucharila vitrea</i> (<i>theonoë melanina</i>)	ca 14 + 1 s	1/1	Guyane(c)
	<i>theucharila?</i> ssp. M 2, Pr 1	26	1/1, 1/1	PA, RO
	<i>zathoe demeter</i> 971	31	1/1	WE
	sp. (like <i>Oleria zelica</i>) 1393	21	1/2	WE
	sp. (yellow) 959	22	1/1	WE
	sp. (yellow) 959	24	1/1	WE

(Continued)

Table 1. (Continued)

Subfamily Dismorphiinae				
	sp. (like <i>Oleria zelica</i>) 1523	24	1/1	WE
	sp. 1090	30–31	1/3	EE
	sp. (yellow) M 1	31	1/2	PA
<i>Enantia</i>	<i>jethys</i> (<i>Dismorphia j.</i>)	31	1/6	Mexico(b)
	<i>lina psamathe</i> (<i>Dismorphia p.</i>)	23, 24	1/1, 1/5	Argentina(a)
	<i>lina galanthis</i> 1168, 523	30	1/2, 1/2	GO, MT
	sp. nr <i>melite</i> 1473	31	1/1	EE
<i>Lieinix</i>	<i>nemesis</i> (<i>Dismorphia n.</i>)	31	1/10	Bolivia(a)
<i>Moschoneura</i>	<i>pinthous</i> (<i>Dismorphia p.</i>)	17	1/1	Guyane(c)
	sp. PI 8	15	1/1	VC
<i>Patia</i>	<i>orise</i> M 3	53	1/1	PA
<i>Pseudopieris</i>	<i>nehemia</i>	23	1/3	Argentina(a)
	<i>viridula</i> (<i>P. nehemia v.</i>)	23	1/1	Ecuador(a)
Subfamily Coliadinae				
<i>Abaeis</i>	<i>nicippe</i> (<i>Eurema n.</i>)	31	1/1, 1/2	Mexico(b), Mexico(e)
<i>Anteos</i>	<i>clorinde</i>	31	1/2, 1/5	Colombia(a), Mexico(e)
<i>Aphrissa</i>	<i>statira</i> (<i>Phoebis s.</i>)	31	1/2	Colombia(a)
<i>Colias</i>	<i>dimera</i>	31	1/4	Colombia(a)
	<i>euxanthe hermina</i> (<i>C. hermina</i>)	31	1/3	Peru(a)
	<i>lesbia</i>	31, 32	1/3, 1/1	Argentina(a), Ecuador(a)
	<i>lesbia vautherii</i> (<i>C. vautherii</i>)	31	1/2	Chile(a)
<i>Eurema</i>	<i>albula</i>	ca 28, 29	1/1, 1/1	Argentina(a), Colombia(a)
	<i>arbela boisduvaliana</i> (<i>E. boisduvaliana</i>)	31	1/1	Mexico(b)
	<i>arbela graduata</i> (<i>E. graduata</i>)	31	1/2	Bolivia(a)
	<i>arbela gratioa</i> (<i>E. gratioa</i>)	31	1/1	Colombia(a)
	<i>daira</i>	31	1/1, 1/1	Mexico(b)
	<i>deva</i>	31	1/2	Argentina(a)
	<i>elatheia platescens</i> (<i>E. plataea</i>)	ca 31	1/1	Argentina(a)
	<i>mexicana</i> or <i>E. boisduvaliana</i>	31	1/1	Mexico(e)
	<i>phiale</i>	31	1/1	Bolivia(a)
	<i>reticulata</i>	31	1/2	Ecuador(a)
	<i>salome</i>	31	1/2	Bolivia(a)
	<i>xantochlora</i>	31	1/1	Ecuador(a)
<i>Kricogonia</i>	<i>lyside</i>	31	1/7	Mexico(e)
<i>Nathalis</i>	<i>iote</i>	31	1/1	Mexico(b)
<i>Phoebis</i>	<i>argante</i>	31	1/1, 1/1	Argentina(a), Ecuador(a)
	<i>n. neocypris</i> (<i>P. cipris</i>)	31	1/3, 1/1	Argentina(a)
	<i>philea</i>	31	1/1, 1/7	Mexico(b), Mexico(e)
	<i>sennae</i>	31	1/3	Trinidad(f)
	<i>s. sennae</i> (<i>P. eubule</i>)	31	1/1, 1/4	Bolivia(a), Colombia(a)
<i>Pyrisitia</i>	<i>dina</i> (<i>Eurema leuce d.</i>)	ca 31	1/1	Argentina(a)
	<i>dina westwoodi</i> (<i>Eurema calceolaria</i>)	31	1/1, 1/1	Guatemala(b), Mexico(b)
	<i>leuce</i> (<i>Eurema l.</i>)	31	1/1	Tobago(f)
	<i>nise</i> (<i>Eurema n.</i>)	31	1/2	Bolivia(a)
	<i>nise nelphe</i> (<i>Eurema n. n.</i>)	31	1/1	Guatemala(b)
	<i>proterpia</i>	31	1/3, 1/2	Colombia(a), Mexico(e)
	<i>venusta</i> (<i>Eurema v.</i>)	30	1/1	Trinidad(f)
	<i>v. venusta</i> (<i>Eurema limbica</i>)	31–32	1/2	Bolivia(a)

(Continued)

Table 1. (Continued)

Subfamily Coliadinae				
<i>Rhabdodryas</i>	<i>trite</i> (<i>Phoebis t.</i>)	31	1/1	Argentina(a)
<i>Teriocolias</i>	<i>zelia</i> (<i>Eurema z.</i>)	31	1/3	Argentina(a)
<i>Zerene</i>	<i>cesonia</i>	31	1/1	Mexico(e)
Subfamily Pierinae				
Tribe Anthocharidini				
<i>Cunizza</i>	<i>hirlanda</i> Pi 7, Pr 6	15	1/1, 1/1	ES
	<i>hirlanda</i> ssp. 1277	15	1/1	RO
<i>Hesperocharis</i>	<i>costaricensis</i>	15	1/1	Mexico(b)
	<i>erota</i> 1572	16	1/1	SP
	<i>marchalii</i>	15	1/2	Bolivia(a)
Tribe Pierini				
<i>Archonias</i>	<i>brassolis negrina</i> (<i>A. bellona</i> <i>hyrneto</i>)	25	1/1	Bolivia(a)
	<i>brassolis rosacea</i> (<i>A. tereas r.</i>)	26	1/1	Ecuador(a)
	<i>brassolis tereas</i> (<i>A. tereas</i>)	25	1/1	DF(d)
<i>Ascia</i>	<i>monuste</i>	27	1/4, 1/2	Argentina(a), Mexico(e)
	<i>monuste suasa</i>	27	1/2	Bolivia(a)
<i>Catasticta</i>	<i>ctemene alma</i> (<i>C. albina</i>)	25	1/1	Bolivia(a)
	<i>flisa</i>	25, 26–28	1/1, 1/3	Bolivia(a), Ecuador(a)
	<i>pieris</i>	25	1/3	Bolivia(a)
	<i>reducta</i>	29–31, ca 31	1/1, 1/1	Ecuador(a), Bolivia(a)
<i>Glutophrissa</i>	<i>drusilla</i> (<i>Appias d.</i>)	32	1/2, 1/6	Argentina(a), Mexico(e)
<i>Hypsophila</i>	<i>microdice</i> (<i>Tatochila m. m.</i>)	28	1/1	Argentina(a)
<i>Itaballia</i>	<i>demophile centralis</i>	25	1/1	Mexico(b)
<i>Leptophobia</i>	<i>aripa</i>	ca 26, 26	1/1, 1/1	Bolivia(a), Ecuador(a)
	<i>eleone</i>	26	1/2, 1/4	Ecuador(a), Bolivia(a)
	<i>eleusis</i>	26	1/1	Ecuador(a)
	<i>philoma pastaza</i> (<i>L. subargentea pastaza</i> , <i>L. philoma</i>)	26	1/1	Ecuador(a)
	<i>tovaria</i>	26	1/4	Ecuador(a)
<i>Melete</i>	<i>leucanthe</i>	24	1/1	Ecuador(a)
<i>Melete</i>	<i>lycimnia</i> 1374	24	1/1	EE
	<i>lycimnia paulista</i>	23	1/2	MG(d)
<i>Pieriballia</i>	<i>viardi</i>	26	1/1	Guatemala(b)
	<i>viardi tithoreides</i> (<i>Itaballia</i> <i>tithoreides</i>)	26	1/1	Ecuador(a)
<i>Pereute</i>	<i>swainsoni</i>	ca 26–27	1/1	MG(d)
<i>Perrhybris</i>	<i>pamela eieidias</i>	27, 28–29	1/1, 1/2	RJ(d)
	<i>pamela flava</i> Pie 10	28	1/2	ES
<i>Perrhybris</i> (?)	sp. yellow 1521	26 (?)	1/1	WE
<i>Tatochila</i>	<i>autodice</i>	28	1/1, 1/1	Argentina(a), Bolivia(a)
	<i>mercedis</i>	28	1/2	Argentina(b)
	<i>mercedis arctodice</i> (<i>microdice a.</i>)	28	1/1	Ecuador(a)
	<i>orthodice</i> (or <i>stigmadice</i>)	27 (or 28)	1/1 (or 1/3)	Argentina(a)
	<i>sagittata</i>	27	1/1	Ecuador(a)
	<i>stigmadice</i> (or <i>orthodice</i>)	28 (or 27)	1/3 (or 1/1)	Argentina(a)
	<i>theodice</i>	27	1/5	Chile(a)