Folia biologica (Kraków), vol. **46** (1998), No 3-4

Karyotypic Data on Weevils (Coleoptera, Curculionidae)

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Accepted September 10, 1998

LACHOWSKA D., HOLECOVÁ M., ROŻEK M. 1998. Karyotypic data on weevils (Coleoptera, Curculionidae). Folia biol. (Kraków) **46**: 129-136.

The results of karyological studies of Curculionidae published since 1978 are summarized. Chromosome complements for 189 species are presented. Diploid chromosome number 2n=22, and meioformula n♂=10+Xy_p is the most characteristic chromosome number of weevils occuring in more than one-third of species examined karyologically. In Curculionidae there is a clear tendency towards symmetrization of karyotypes.

Key words: Coleoptera, Curculionidae, chromosome number, sex determining system.

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The karyotype variability, differences in chromosome numbers and morphology permit the investigation of karyotype evolution in closely related groups.

The Curculionidae is one of the largest beetle family with some 50,000 described species. The weevils represent an interesting subject of study owing to the occurrence of geographical parthenogenesis. Chromosomal relationships in parthenogenetic and bisexual species have been investigated by numerous cytologists and geneticists. So far the karyotypes of approximately 500 species (1%) have been described. Most cytogenetic findings on the weevils are referred to the male chromosome numbers and sex determining systems at meiotic metaphase I, the so-called a-karyology (WHITE 1978). The knowledge of the chromosome numbers and karyology in Curculionidae varies greatly from genus to genus and from subfamily to subfamily. There exist many genera, very rich in species, whose karyology has not been examined.

The aim of the present work was to summarize the results of karyotypical studies of weevils. All available chromosomal data published since the SMITH and VIRKKI monograph (1978) are given in Table 1.

Curculionidae are a highly heterogeneous family on chromosomal grounds. The range of variation of diploid chromosome numbers in weevils is depicted in the histogram (Fig. 1). It can be concluded from all data that chromosome numbers in individual genera, and often even within a genus, are very variable. The lowest known chromosome number in weevils was found in *Gelus californicus* (Lec.) (n♂=6+XO) (ENNIS 1972), *Echinocnemus* sp. (n♂=7+Xy_p) (SHARMA *et al.* 1980), *Euthyrhinus yakushimanus* Nakane (n♂=7+NeoX-Y), *Syrotelus umbrosus* (Roel.) (n♂=7+Xy_p), *Amystax fasciatus* Roel. (n♂=7+Xy_p) (TAKENOUCHI 1981a), and the highest one in *Baris* sp. (n♂=26+Xy_p) (TAKENOUCHI 1958). Among examined species the majority have n♂=11. The diploid chromosome number 2n=22 is the one most characteristic of weevils occurring in 33.5% of species examined karyologically (SMITH & VIRKKI 1978; SHARMA *et al.* 1980; TAKENOUCHI 1981a; VIDAL 1984; HOLECOVÁ *et al.* 1997a, b) and seems to be ancestral for the Curculionidae family, or at least for the group Adelognathi. In Phanerognathi there is a large range of chromosome numbers. In weevils there is a very wide array of magnitudes from the smallest dot-like y chromosomes to the largest heterochromosomes X or autosomes. The great majority of chromo-

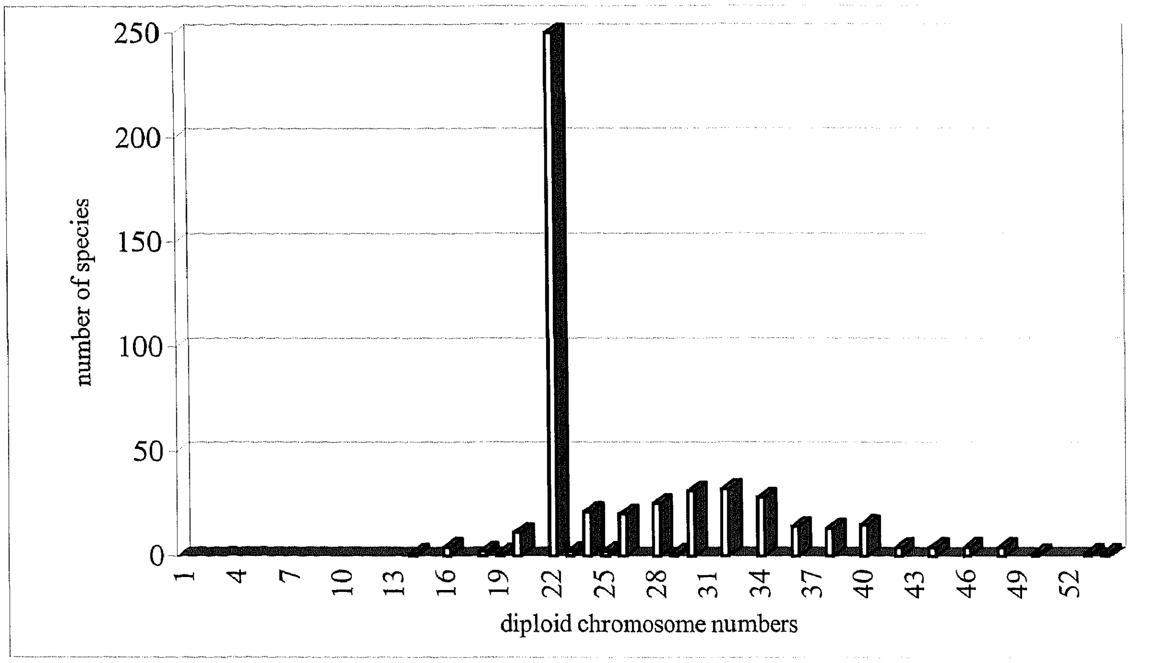

Fig. 1. Histogram of diploid chromosome numbers in Curculionidae.

somes of weevils have median or submedian centromeres, following the general rule of metacentry characteristic of the beetle chromosomes (SMITH & VIRKKI 1978). Accordingly, the species having a high number of acro-, subtelo- or telocentric chromosomes are very unusual. In the weevils there is a tendency towards symetrization of karyotypes as a result of Robertsonian translocations, pericentric inversion, or chromation accretions. The common rule in Curculionidae is one or two chiasmata per bivalent, frequently limited to the distal ends of chromosomes.

The "parachute-like" system, Xy_p, is clearly predominant in the weevils, having been found in every subfamily. The Xy_p system is considered to be the most primitive for the coleopterans.

The information coming from banding analyses is still very meagre for Curculionidae. The C-banded karyotypes have been described only for *Hypera postica* (Gyll.) – intercalary C-bands (HSIAO & HSIAO 1984) and for *Otiorhynchus corvus* Boh. – pericentromeric position of constitutive heterochromatin (HOLECOVÁ *et al.* 1997a).

A total of 75 different parthenogenetic taxa of weevils have been described so far. Almost all of them are polyploid, the majority being triploid (SAURA *et al.* 1993).

To obtain a clearer karyological picture of Curculionids the analyses of some genus are very much needed, a wider knowledge of all subfamilies is also highly desirable. Chromosome banding, molecular and cytochemical techniques should be used in the forthcoming years.

Table 1

Chromosome numbers in Curculionidae

Taxa	2n	n	Chromosome form	References
Otiorhynchinae				
Macrocorynus griseoides Zumpt	33 parth.		all meta	Takenouchi 1981c
Otiorhynchus alpicola atterimus Boh.	22	$10+Xy_p$	all meta	Tucić & Mesaroš 1992
Otiorhynchus alpicola ssp.	22	$10+Xy_p$	all meta	Tucić & Mesaroš 1992
Otiorhynchus atripes Apfelbeck	22	$10+Xy_p$	all meta	Tucić & Mesaroš 1992
Otiorhynchus aurosignatus vlasuljensis Apfelbeck	22	$10+Xy_p$	all meta	Tucić & Mesaroš 1992
Otiorhynchus corvus Boh.	22	$10+Xy_p$	meta, submeta	Holecová *et al.* 1997a

Table 1 continued

Otiorhynchus croaticus Stierlin	22,33 parth.		.	Tucić & Mesaroš 1992
Otiorhynchus dryadis Apfelbeck	22	$10+Xy_p$	all meta	Tucić & Mesaroš 1992
Otiorhynchus koritnicensis Apfelbeck	22	$10+Xy_p$	all meta	Tucić & Mesaroš 1992
Otiorhynchus mendax Apfelbeck	44 parth.		.	Tucić & Mesaroš 1992
Otiorhynchus minutesquamosus Sol. & Sol.	22	$10+Xy_p$	.	Holecová *et al.* 1997b
Otiorhynchus opulentus Germ.	22	$10+ Xy_p$	.	Holecová *et al.* 1995
Otiorhynchus praecellens bosnarum Csiki	22	$10+Xy_p$	all meta	Tucić & Mesaroš 1992
Otiorhynchus retifer Apfelbeck	22	$10+Xy_p$	all meta	Tucić & Mesaroš 1992
Otiorhynchus speiseri Apfelbeck	22	$10+Xy_p$	all meta	Tucić & Mesaroš 1992
Otiorhynchus strumosus Heller	22	$10+Xy_p$	all meta	Tucić & Mesaroš 1992
Rhinomias forticornis (Boh.)	22	$10+Xy_p$	meta, submeta	Holecová *et al.* 1995
Diaprepes abbreviatus (L.)	22	$10+Xy_p$	X-acro	Virkki & Sepulveda 1990
Phyllobius arborator (Herbst)	22	$10+Xy_p$	.	Holecová *et al.* 1995
Phyllobius argentatus (L.)	22	$10+Xy_p$	meta, submeta, subtelo	Holecová *et al.* In press
Phyllobius armatus Roel.	22	$10+Xy_p$	.	Takenouchi 1981a
Phyllobius brevitarsis Kôno	22	$10+Xy_p$	.	Takenouchi 1981a
Phyllobius intrusus Kôno	22	$10+Xy_p$	.	Takenouchi 1981a
Phyllobius longicornis Roel.	.	$10+Xy_p$	.	Takenouchi 1980b
Phyllobius maculicornis Germ.	22	$10+Xy_p$	.	Holecová *et al.*, in press
Phyllobius oblongus (L.)	22	$10+Xy_p$	meta, submeta	Holecová *et al.* 1995
Phyllobius pyri (L.)	22	$10+Xy_p$	.	Rożek *et al.* 1994
Phyllobius urticae (Deg.)	22	$10+Xy_p$	meta, submeta, subtelo	Rożek *et al.* 1994
Arrhines languidus Gyll.	.	$10+Xy_p$	.	Sharma *et al.* 1980
Corigetus chandigarhensis Pajni&Singal	22	$10+Xy_p$	.	Sharma *et al.* 1980
Cyrtepistomus jucundus Redt.	22	$10+Xy_p$	.	Sharma *et al.* 1980
Cyrtepistomus sp.	.	$10+Xy_p$	.	Sharma *et al.* 1980
Diatropus marshalli Pajni	22	$10+Xy_p$	.	Sharma *et al.* 1980
Hemerus sp.	22	$10+Xy_p$	.	Sharma *et al.* 1980
Hilaus sp.	.	$8\text{-}11+Xy_p$	.	Sharma *et al.* 1980
Hypermias sp.	.	$10+Xy_p$	.	Sharma *et al.* 1980
Lepidospyris demissus Mshl.	22,23	$10+Xy_p$,$10+Xyy_p$	.	Sharma *et al.* 1980
Lepropus chrysochlorus Wied.	.	$10+Xy_p$	.	Sharma *et al.* 1980
Lepropus flavovittatus Pasc.	.	$10+Xy_p$	.	Sharma *et al.* 1980
Lepropus lateralis F.	22	$10+Xy_p$	.	Sharma *et al.* 1980
Myllocerus kashmiriensis Mshl.	22	$10+Xy_p$	meta, submeta, X-meta	Gulati & Gill 1992
Myllocerus dorsatus F.	22	$10+Xy_p$	meta, X-meta	Gulati & Gill 1992
Myllocerus dentifer F.	22	$10+Xy_p$	meta, submeta, X-meta	Gulati & Gill 1992
Myllocerus conspersus Mshl.	22	$10+Xy_p$	meta, submeta, X-meta.	Gulati & Gill 1992
Myllocerus subfasciatus Guer.	22	$10+Xy_p$	meta, submeta, X-meta.	Gulati & Gill 1992
Myllocerus viridanus F.	22	$10+Xy_p$	meta, submeta	Gulati & Gill 1992
Myllocerus angulatipes Mshl.	22	$10+Xy_p$	.	Sharma *et al.* 1980
Myllocerus blandus Fst.	22	$10+Xy_p$	meta, submeta	Sobti & Singla 1986
Myllocerus blandus Fst.	.	$10+Xy_p$	.	Sharma *et al.* 1980
Myllocerus discolor Boh.	22	$10+Xy_p$	.	Sharma *et al.* 1980
Myllocerus fumosus Fst.	33 parth.		all meta	Takenouchi 1981c

Table 1 continued

Myllocerus II-pustulatus Var. Maculosus Desbt.	22	10+Xy$_p$	.	Sharma *et al.* 1980
Myllocerus leativirens Mshl.	22	10+Xy$_p$	.	Sharma *et al.* 1980
Myllocerus lefroi Mshl.	22	10+Xy$_p$	.	Sharma *et al.* 1980
Myllocerus paetus Mshl.	.	10+Xy$_p$	.	Sharma *et al.* 1980
Myllocerus pauper Fst.	.	10+Xy$_p$	.	Sharma *et al.* 1980
Myllocerus sabulosus Mshl.	22	10+Xy$_p$	.	Sharma *et al.* 1980
Myllocerus sp.	22	10+Xy$_p$	.	Takenouchi 1981a
Myllocerus sp.	.	10+Xy$_p$	.	Sharma *et al.* 1980
Myllocerus transmarinus Hbst.	22	10+Xy$_p$	.	Sharma *et al.* 1980
Myllocerus tusicollis Mshl.	.	10+Xy$_p$	.	Sharma *et al.* 1980
Metacopyrtus yonagunianus Chujô	22,42	10+Xy$_p$, 20+Xy$_p$	.	Takenouchi 1981a
Pachyrhynchus infernalis Fairmaire	22	10+Xy$_p$	.	Takenouchi 1981a
Ectemnorrhininae				
Canonopsis sericea (Waterhouse)	22	10+Xy$_p$	meta	Dreux *et al.* 1995
Disker tenuicornis (Jeannel)	22	10+Xy$_p$	.	Dreux *et al.* 1997
Christensenia antarctica Brinck	.	10+Xy$_p$	.	Bailly & Dreux 1992
Dusmoecetes marioni (Jeannel)	22	10+Xy$_p$	meta	Dreux *et al.* 1995
Dusmoecetes richtersi (Jeannel)	22	10+Xy$_p$	.	Bailly *et al.* 1990
Ectemnorrhinus angusticollis (Waterhouse)	22	10+Xy$_p$	meta	Dreux *et al.* 1995
Ectemnorrhinus drygalski Enderlein	22	10+Xy$_p$	.	Bailly *et al.* 1990
Ectemnorrhinus viridis Waterhouse	22	10+Xy$_p$	meta	Bailly *et al.* 1990
Xanium vanhoeffenianum Enderlein	22	10+Xy$_p$	.	Dreux *et al.* 1997
Bothrometopus fasciatus Jeannel	22	10+Xy$_p$	.	Dreux *et al.* 1997
Neocanonopsis dreuxi Hoffmann	.	10+Xy$_p$	.	Bailly & Dreux 1992
Brachyderinae				
Polydrusus atomarius (Ol.)	22	10+Xy$_p$	.	Holecová *et al.* 1997b
Polydrusus calabricus Fst.	20	9+Xy$_p$	.	Holecová *et al.* 1997b
Polydrusus marginatus Steph.	22	10+Xy$_p$	meta, submeta, subtelo	Lachowska *et al.* 1998
Polydrusus ruficornis (Bonsd.)	22	10+Xy$_p$	.	Holecová *et al.* 1995
Polydrusus sericeus (Schall.)	22	10+Xy$_p$	.	Holecová *et al.*, in press
Polydrusus sicanus Chevr.	22	10+Xy$_p$	.	Holecová *et al.* 1997b
Polydrusus viridicintus Gyll.	22	10+Xy$_p$	meta, submeta, subtelo	Lachowska *et al.* 1998
Liophloeus gibbus Boh.	22	10+Xy$_p$	.	Lachowska *et al.* 1998
Liophloeus lentus Germ.	22	10+Xy$_p$	meta, submeta, subtelo	Lachowska *et al.* 1998
Barypeithes chevrolati (Boh.)	22	10+Xy$_p$	.	Holecová *et al.*, in press
Barypeithes interpositus Roubal.	22	10+Xy$_p$	meta, submeta	Holecová *et al.*, in press
Barypeithes liptoviensis Weise	28	13+Xy$_p$	.	Holecová *et al.*, in press
Blosyrus asellus Ol.	24	11+Xy$_p$	.	Takenouchi 1981a
Eugnathus distincyus Roel.	22	10+Xy$_p$	.	Takenouchi 1980b
Sitona humeralis Steph.	22	10+Xy$_p$	.	Holecová *et al.*, in press
Dermatoxenus sp.	22	10+Xy$_p$	.	Takenouchi 1980b
Indomias acutipennis Boh.	22	10+Xy$_p$	.	Sharma *et al.* 1980
Indomias acutipennis Boh.	22	10+Xy$_p$	meta	Gill 1982b
Catapions modestus Roel.	22	10+Xy$_p$	meta, submeta	Takenouchi 1981b
Catapions obscurus Sharp.	22	10+Xy$_p$,10+y	meta	Takenouchi 1981b
Catapionus gracilicornis Roel.	22,33,44,55, 66 parth.	.	.	Takenouchi 1980a

Table 1 continued

Naupactus bruchi Heller		$10+Xy_p$	.	Vidal 1984
Naupactus xantographus (Germ.)	22	$10+Xy_p$	.	Vidal 1984
Tanymecinae				
Chlorophanus viridis (L.)	22	$10+Xy_p$	meta, submeta,	Lachowska unpubl.
Tanymecus indicus Fst.	22	$10+Xy_p$	meta	Gill 1982b
Tanymecus indicus Fst.	22	$10+Xy_p$	.	Sharma *et al.* 1980
Tanymecus cephalotes Fst.	22	$10+Xy_p$	.	Sharma *et al.* 1980
Tanymecus feae Fst.	22	$10+Xy_p$	.	Sharma *et al.* 1980
Tanymecus feae Fst.	22	.	meta, acro	Gill 1982b
Tanymecus longulus Fhs.	22	$10+Xy_p$	meta, acro	Gill 1982b
Tanymecus longulus Fhs.	22	$10+Xy_p$	.	Sharma *et al.* 1980
Tanymecus palliatus (F.)	22	$10+Xy_p$	meta, X-submeta	Rożek *et al.* 1994
Tanymecus sciurus Ol.	22	$10+Xy_p$	meta	Gill 1982b
Tanymecus sciurus Ol.	22,23	$10+Xy_p$, $10+Xyy_p$	.	Sharma *et al.* 1980
Amystax fasciatus Roel.	22,16	$10+Xy_p$,$7+Xy_p$, $10+Xyy_p$	.	Takenouchi 1981a
Scepticus insularis Roel.	33 parth.		.	Takenouchi 1980a
Scepticus griseus Roel.	22	$10+Xy_p$	.	Takenouchi 1980b
Sympiezomias cribricollis Kôno	22	$10+Xy_p$	meta, submeta	Takenouchi 1980b
Sympiezomias cribricollis Kôno	22	$10+Xy_p$	.	Takenouchi 1981a
Ereminae				
Astycus sp.	22	$10+Xy_p+1B$	meta, submeta	Dey 1989
Platymycterus himalayanus Mshl.	.	$10+Xy_p$	.	Sharma *et al.* 1980
Platymycterus moestus Mshl.	.	$10+Xy_p$	.	Sharma *et al.* 1980
Platymycterus sp.	.	$10+Xy_p$	.	Sharma *et al.* 1980
Thlipsomerus glebosus Mshl.	22	$10+Xy_p$	.	Sharma *et al.* 1980
Parascaphus sp.	20	$9+Xy_p$	.	Sharma *et al.* 1980
Phytoscaphus sp.	20	$9+Xy_p$	.	Sharma *et al.* 1980
Phytoscaphus inductus (Boh.)	22	$10+Xy_p+1B$	.	Dey 1989
Coriegetus chandigarhensis	22	$10+Xy_p$	meta	Gill 1982a
Amblyrrhinus sp.	22	$10+Xy_p$	.	Sharma *et al.* 1980
Amblyrrhinus poricollis Boh.	22	$10+Xy_p$	.	Sharma *et al.* 1980
Amblyrrhinus poricollis Boh.	22	$10+Xy_p$	meta, submeta	Gill 1982a
Amblyrrhinus subrecticollis Mshl.	.	$10+Xy_p$	.	Sharma *et al.* 1980
Amblyrrhinus suberecticollis Mshl.	22	$10+Xy_p$	.	Gill 1982a
Cyrtepistomus gucindus Mshl.	22	$10+Xy_p$	meta, submeta, acro	Gill 1982a
Callirhopalus bifasciatus Roel.	44 parth.		.	Takenouchi 1980a
Cleoninae				
Larinodontes obtusus Gyll.	40	$19+Xy_p$	.	Lachowska *et al.* 1998
Lixus cardui (Ol.)	44	$21+Xy_p$	.	Holecová *et al.* 1995
Gasteroclisus binodulus (Boh.)	.	$17+Xy_p$	.	Takenouchi 1981a
Gasteroclisus binodulus (Boh.)	.	$18+Xy_p$	.	Sharma *et al.* 1980
Gasteroclisus aethiops Hbst.	36	$17+Xy_p$	.	Sharma *et al.* 1980
Hypolixus truncatulus F.	22	$10+Xy_p$	.	Sharma *et al.* 1980
Xanthochelus sp.	22	$10+Xy_p$	.	Sharma *et al.* 1980
Hylobiinae				
Heiliopodus scaber	.	$13+X_p$neoXneoYy$_p$	.	Virkki 1984
Heiliopodus scabripennis (Klug)	30	$14+$neo$X_p$neoXneoYy$_p$	.	Postiglioni *et al.* 1987
Heilipodus erythropus (Klug)	30	$14+Xy_p$	.	Postiglioni *et al.* 1987
Heilipus tremolerasi	.	$14+Xy_p$	.	Virkki 1984
Heilipus tremolerasi	.	$13+$neo$X_p$neoYy$_p$	.	Virkki 1984
Liparus glabrirostris Küst	32	.	meta, submeta, subtelo, telo	Lachowska unpubl.
Adexius scrobipennis Gyll.	36	$17+Xy_p$	.	Holecová *et al.* 1995

Table 1 continued

Hypera medicaginis Mshl.	22	$10+Xy_p$	all meta	Gill & Gulati 1989a
Hypera medicaginis Mshl.	.	$10+Xy_p$	.	Sharma *et al.* 1980
Hypera postica (Gyll.)	22	$10+Xy_p$	meta, acro, X-meta	Gill & Gulati 1989a
Hypera postica (Gyll.)	22	$10+Xy_p$	meta, submeta, acro, X-submeta	Hsiao & Hsiao 1984
Hypera punctata (F.)	20	9+neo-Xy	meta, submeta, X-meta	Hsiao & Hsiao 1984
Hypera elongata (Payk)	.	$10+Xy_p$	.	Petryszak 1981
Pachytychius sp.	32	$15+Xy_p$	.	Sharma *et al.* 1980
Niphades sp.	.	$15+Xy_p$	.	Sharma *et al.* 1980
Pagiophloeus sp.	.	$13+Xy_p$	.	Sharma *et al.* 1980
Paramecopus farinosus Wied.	32	$15+Xy_p$	.	Sharma *et al.* 1980
Curculioninae				
Oxydema sp.	.	$14+Xy_p$	.	Takenouchi 1981a
Dicranthus elegans (F.)	22	10+XY	meta, submeta, acro, X-meta	Kodada *et al.* 1992
Dicranthus majzlani Kodada, Holecova, Behne	22	10+XY	meta, submeta, subtelo, acro, X-submeta	Kodada *et al.* 1992
Echinocnemus sp.	16	$7+Xy_p$	.	Sharma *et al.* 1980
Echinocnemus squameus Billberg	.	$10+Xy_p$	.	Takenouchi 1981a
Anthonomus grandis Boh.	.	20+X1X2Y	.	Wise *et al.* 1982
Anthonomus grandis Boh.	42	$20+Xy_p+1\text{-}2B$	.	North *et al.* 1981
Curculio roelofsi Heller	.	$12+Xy_p$	.	Takenouchi 1980b
Curculio sp.	.	$11\text{-}13+Xy_p$	.	Sharma *et al.* 1980
Curculio nucum (L.)	.	$12+Xy_p$	.	Petryszak 1981
Caenocryptorrhynchus frontalis Morimoto	.	$16+Xy_p$	.	Takenouchi 1981a
Colobodes matsumurai Kôno	.	Xy_p	.	Takenouchi 1980b
Cryptorhynchus sp.	22-53	.	.	Sharma *et al.* 1980
Rhyssomatus marginatus Farhaeus	.	$10+Xy_p$	.	Vidal 1984
Euthyrhinus yakushimanus Nakane	.	7+Neo-XY	.	Takenouchi 1981a
Mechistocerus fumosus Mshl.	.	$17+Xy_p$	.	Sharma et al. 1980
Mechistocerus sp.	22	$10+Xy_p$,15+ Xy_p,19+Xy_p	meta, submeta	Takenouchi 1980b
Mechistocerus sp. Nov.	.	$15+Xy_p$,10+ Xy_p,19+Xy_p	.	Takenouchi 1981a
Orochlesis takaosanus Kôno	.	$19+Xy_p$	.	Takenouchi 1981a
Rhadinomerus annulipes (Roel.)	.	$16+Xy_p$	.	Takenouchi 1980b
Rhadinomerus annulipes (Roel.)	.	$17+Xy_p$	.	Takenouchi 1981a
Simulatacalles simulator (Roel.)	.	$11+Xy_p$	.	Takenouchi 1981a
Syrotelus septentrionalis (Roel.)	16	.	.	Takenouchi 1980b
Syrotelus umbrosus (Roel.)	.	$7+Xy_p$	.	Takenouchi 1981a
Baris arthemisiae (Herbst)	38	$18+Xy_p$	.	Holecová *et al.*, in press
Baris sp.	22,18	$10+Xy_p$,$8+Xy_p$	.	Sharma *et al.* 1980
Didothis melancholica Roel.	28	$13+Xy_p$	meta, submeta, y-meta	Takenouchi 1981a
Didothis sp.	34	$16+Xy_p$	.	Sharma *et al.* 1980
Zacladus geranii (Payk.)	28	$13+Xy_p$	.	Lachowska unpubl.
Nedyus quadrimaculatus (L.)	28	$13+Xy_p$	.	Holecová *et al.* 1995
Rhinoncus sp.	20	$9+Xy_p$	.	Sharma *et al.* 1980
Alcidodes affaber Fst.	32	$15+Xy_p$	.	Sharma *et al.* 1980

Table 1 continued

Alcidodes sp.	.	$15+Xy_p$	.	Sharma *et al.* 1980
Alcides sp.	34	$16+Xyy_p$	.	Dey 1986
Mecyslobus flavosignatus Roel.	.	$16+Xy_p$	.	Takenouchi 1980b
Gymnetron tetrum (F.)	32	$15+Xy_p$	meta, submeta	Lachowska unpubl.
Gymnetron smreczyński Fremuth.	32	$15+Xy_p$	.	Lachowska unpubl.
Cionus tuberculosus (Scop.)	.	$21+Xy_p$	.	Lachowska unpubl.
Cionus hortulanus (Geoffr.)	.	$18+Xy_p$	.	Lachowska unpubl.
Cionus longicollis-montanus Wingelm.	.	$19+Xy_p$	.	Lachowska unpubl.
Cionus ganglbaueri Wingelm.	.	$18+Xy_p$	meta, submeta, subtelo	Lachowska unpubl.
Cionus olivieri Rosensch.	.	$20+Xy_p$	meta, submeta, subtelo	Lachowska unpubl.
Cionus nigritarsis Reitt.	.	$18+Xy_p$	.	Lachowska unpubl.
Acicnemis nigra Nakane	.	$10+Xy_p$	.	Takenouchi 1980b
Rhynchaenus stigma (Germ.)	28	$13+Xy_p$	meta, submeta	Takenouchi 1981a
Zygopinae				
Heilipus wiedemanni Boh.	.	$10+Xy_p$	.	Takenouchi 1980b
Anobleptus sp.	22	10+Xy	meta, submeta, acro, X-submeta	Gill & Gulati 1989b
Lobotrachelus sp.	28	$13+Xy_p$	.	Sharma *et al.* 1980
Mecopomorphus griseus Hustache	.	$11+Xy_p$	.	Takenouchi 1981a
Metialma scenica Pascoe	32	$15+Xy_p$	meta, submeta, acro	Gill & Gulati 1989b
Metialma sp.	.	$16+Xy_p$	.	Takenouchi 1980b
Metialma sp.	.	$15+Xy_p$	.	Sharma *et al.* 1980

Chromosome forms: meta – metacentric, submeta – submetacentric, subtelo – subtelocentric, acro – acrocentric.

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