

The Coleopterists Society

Chromosome Numbers in Indian Weevils (Coleoptera: Curculionoidea)

Author(s): T. K. Gill, Manju Gulati, H. R. Pajni

Source: *The Coleopterists Bulletin*, Vol. 44, No. 4 (Dec., 1990), pp. 437-441

Published by: [The Coleopterists Society](#)

Stable URL: <http://www.jstor.org/stable/4008652>

Accessed: 08/09/2010 12:46

Your use of the JSTOR archive indicates your acceptance of JSTOR's Terms and Conditions of Use, available at <http://www.jstor.org/page/info/about/policies/terms.jsp>. JSTOR's Terms and Conditions of Use provides, in part, that unless you have obtained prior permission, you may not download an entire issue of a journal or multiple copies of articles, and you may use content in the JSTOR archive only for your personal, non-commercial use.

Please contact the publisher regarding any further use of this work. Publisher contact information may be obtained at <http://www.jstor.org/action/showPublisher?publisherCode=cole>.

Each copy of any part of a JSTOR transmission must contain the same copyright notice that appears on the screen or printed page of such transmission.

JSTOR is a not-for-profit service that helps scholars, researchers, and students discover, use, and build upon a wide range of content in a trusted digital archive. We use information technology and tools to increase productivity and facilitate new forms of scholarship. For more information about JSTOR, please contact support@jstor.org.



The Coleopterists Society is collaborating with JSTOR to digitize, preserve and extend access to *The Coleopterists Bulletin*.

<http://www.jstor.org>

CHROMOSOME NUMBERS IN INDIAN WEEVILS (COLEOPTERA: CURCULIONOIDEA)

T. K. GILL, MANJU GULATI, AND H. R. PAJNI

Department of Zoology, Panjab University,
Chandigarh-160014, India

ABSTRACT

The chromosome number and sex-chromosome mechanism are listed for 53 species in the families Curculionidae, Attelabidae and Apionidae. Chromosome number is constant in short-snouted species of Curculionidae while long-snouted species show a great deal of variation with their haploid number ranging from 10 to 28. In all the species in which the sex configurations were discernible, the male meiotic cells exhibited a parachute shaped X_y configuration. Almost all the investigated species are new cytogenetically.

This list deals with the chromosomes of 53 species in 37 genera in the families Curculionidae, Attelabidae and Apionidae. In all, 105 species in 44 genera of Indian Curculionoidea are known cytogenetically (Manna and Smith 1959; Dasgupta 1963; Dasgupta and Basile 1966; Yadav 1972, 1973; Saha 1973; Gill 1974; Pal 1979; Dua and Kacker 1980; Sharma *et al.* 1980; Singla 1986).

MATERIALS AND METHODS

In general, 5 or 6 live adult males of each species were collected by means of a net during the day time or hand picked at night from under the street lights except for a few species, *viz.*, *Cionus championi* Mshl. and *Curculio* sp. nov., of which only 2 or 3 individuals could be collected. An acetic acid dissociation technique with certain modifications (Crozier 1968) was used for making karyological preparations. The testes were pretreated with 0.9% sodium citrate and fixed in Carnoy's fixative (3 parts of methanol: 1 part of acetic acid). The slides were then made by dissociating the material in 60% acetic acid and staining it in carbol fuchsin. These were then dehydrated in butanol and mounted in euparal. All the specimens were identified and retained by Dr. H. R. Pajni.

DISCUSSION

Out of the listed species, 51 species in 17 genera have been reported here cytogenetically for the first time. Two species, *viz.*, *Mecyslobus (Mecyslobus) westermanni* and *Myllocerus viridanus* have been reinvestigated from different localities as mentioned in Table 1.

All of the 28 species of short-snouted weevils (Otiorrhynchinae, Brachyderinae, Eremninae and Sitoninae) reveal a constant diploid number of 22. The remaining 25 species from long-snouted subfamilies of family Curculionidae usually show a higher diploid number ranging from 20 to 56. The diploid number varies from 22 to 32 in Baridinae, 24 to 32 in Curculioninae, 32 in Alcidodinae and 36 to 46 in Cleoninae with the highest of 56 in Cryptorrhynchinae. Of the earlier reported species, the diploid chromosome number is

Table 1. Chromosome number and sex-chromosome mechanism in Curculionoidea.

Species	Chromosome number		S.-c. mech. ¹	Locality	Source
	2n	n			
FAMILY CURCULIONIDAE					
Subfamily Otiorrhynchinae					
<i>Myllocerus dentifer</i> Fab.	22	11 (I, II) ²	Xy _p ³	Chandigarh	<i>Zea mays</i>
<i>M. subfasciatus</i> Guer.	22	11 (I, II)	Xy _p	Chandigarh	Grass
<i>M. viridanus</i> Fab.	22	11 (I, II)	Xy _p	South India	<i>Dodonea viscosa</i>
<i>M. dorsatus</i> Fab.	22	11 (I, II)	Xy _p	South India	Grass
<i>M. conspersus</i> Mshl.	22	11 (I, II)	Xy _p	South India	Grass
<i>M. kashmirensis</i> Mshl.	22	11 (I, II)	Xy _p	South India	Grass
<i>M. discolor canescans</i> Mshl.	—	11 (I, II)	Xy _p	South India	Grass
<i>Ptochus oyulum</i> Fst.	22	11 (I, II)	Xy _p	South India	Grass
Subfamily Brachyderinae					
<i>Leptomias angustatus</i> Redt.	22	11 (I, II)	Xy _p	Dehra Dun	Wild plant
<i>L. waltersi</i> Aslam	22	11 (I, II)	Xy _p	Shillong	<i>Pulum baramain</i>
<i>Lepropus chrysochlorus</i> Wied.	22	11 (I, II)	Xy _p	Chandigarh	<i>Ziziphus zuzubae</i>
<i>Esamus sciurus</i> (Oliv.)	22	11 (I, II)	Xy _p	Chandigarh	<i>Zea mays</i>
<i>E. albomarginatus</i> (Gyll.)	22	11 (I, II)	Xy _p	Chandigarh	<i>Zea mays</i>
<i>E. circumdatus</i> (Wied.)	22	11 (I, II)	Xy _p	Chandigarh	<i>Pennisetum typhordes</i>
<i>E. plurisetosus</i> sp.	—	11 (I, II)	Xy _p	Chandigarh	<i>Pennisetum typhordes</i>
<i>Indomecus lectus</i> Mshl.	22	11 (I, II)	Xy _p	Chandigarh	<i>Zea mays</i>
<i>Hypomeces squamosus</i> Fab.	22	11 (I, II)	Xy _p	Chandigarh	<i>Ziziphus zuzubae</i>
<i>Tanymecus hispidus</i> Mshl.	22	11 (I, II)	—	Chandigarh	<i>Trifolium alexandrinum</i>
Subfamily Eremninae					
<i>Platymycterus moestus</i> Mshl.	22	11 (I, II)	Xy _p	Chandigarh	<i>Crotalaria juncea</i>
<i>P. sjostedti</i> Mshl.	22	11 (I, II)	Xy _p	Chandigarh, South India	<i>Dalbergia sisso</i>
<i>Parascaphus</i> sp.	—	11 (I, II)	Xy _p	Chandigarh	Grass
<i>Cyrtepistomus bardus</i> Mshl.	22	11 (I, II)	Xy _p	Shillong	Wild plant
<i>Deiradolcus</i> sp.	22	11 (I, II)	Xy _p	Chandigarh	<i>Dalbergia sisso</i>

Table 1. Continued.

Species	Chromosome number		S.-c. mech. ¹	Locality	Source
	2n	n			
<i>Deiradolcus pubescens</i> sp.	—	11 (I, II)	Xy _p	Chandigarh	<i>Dalbergia sisso</i>
<i>Pseudophytoscaphus</i> sp.	22	11 (I, II)	Xy _p	Chandigarh	<i>Dandrocalamus</i>
<i>Cyphicerinus tectonae</i> Mshl.	22	11 (I, II)	Xy _p	Coimbatore	Wild plant
<i>Transptochus</i> sp.	22	11 (I, II)	Xy _p	Ooti	Grass
Subfamily Sitoninae					
<i>Sitona crinitus</i> Hbst.	22	11 (I, II)	Xy _p	Chandigarh	<i>Lens esculenta</i>
Subfamily Hyperinae					
<i>Hypera postica</i> (Gyll.)	22	11 (I, II)	Xy _p	Chandigarh	<i>Trifolium alexandrinum</i>
<i>H. medicaginis</i> (Mshl.)	22	11 (I, II)	Xy _p	Chandigarh	<i>Trifolium alexandrinum</i>
Subfamily Baridinae					
<i>Apotomorhinus cribratus</i> Sch.	26	13 (I, II)	Xy _p	Chandigarh	<i>Eugenia jambolana</i>
<i>Athesapeuta</i> sp. I	—	16 (I)	—	Chandigarh	Aquatic plant
<i>Athesapeuta</i> sp. II	—	16 (I)	—	Chandigarh	Aquatic plant
<i>Barioscaphus cordiae</i> (Mshl.)	—	11 (I, II)	Xy _p	Chandigarh	<i>Cordia myxa</i>
Subfamily Curculioninae					
<i>Curculio longirostris</i> P. & S.	26	13 (I, II)	Xy _p	Chandigarh	<i>Hibiscus</i> sp.
<i>Curculio ficusi</i> P. & S.	26	13 (I, II)	—	Chandigarh	<i>Ficus infectoria</i>
<i>Curculio</i> sp. nov.	—	16 (I, II)	—	Shillong	Grass
<i>Indocurculio minutus</i> sp.	—	12 (I, II)	Xy _p	Chandigarh	<i>Ficus infectoria</i>
Subfamily Cleoninae					
<i>Larinus saussureae</i> Mshl.	—	18 (I, II)	Xy _p	Chandigarh	<i>Amaranthus penniculata</i>
<i>Atactogaster</i> sp.	—	23 (I, II)	Xy _p	Dehra Dun	Tube light
<i>Pycnodactylus hypocritia</i> (Chevr.)	—	19 (I)	—	Chandigarh	Grass
Subfamily Alcidodinae					
<i>Mecyslobus (M.) westermanni</i> (Boh.)	—	16 (I, II)	Xy _p	Dehra Dun	Wild plant
Subfamily Cryptorrhynchinae					
<i>Dystropicus dorsalis</i>	56	28 (I)	Xy _p	Dehra Dun	Tube light

Table 1. Continued.

Species	Chromosome number		S.-c. mech. ¹	Locality	Source
	2n	n			
		Subfamily Desmidophorinae			
<i>Desmidophorus</i> sp.	22	11 (I)	Xy _p	Chandigarh	Wild plant
		Subfamily Anthonominae			
<i>Acalloplastus</i> sp.	—	12 (I)	Xy _p	Chandigarh	<i>Abutilon indicum</i>
		Subfamily Zygopinae			
<i>Anobleptus</i> sp.	24	12 (I)	—	Chandigarh	<i>Saccharum</i> sp.
<i>Metialma scenica</i> Pasc.	—	16 (I, II)	Xy _p	Chandigarh	Wild plant
		Subfamily Cioninae			
<i>Cionus championi</i> Mshl.	—	20 (I)	Xy _p	Dehra Dun	Wild plant
		Subfamily Ceuthorrhynchinae			
<i>Rhinoncus (Amalorhinoncus) pagnus</i> Gyll.	20	10 (I, II)	Xy _p	Chandigarh	Wild plant
		FAMILY ATTELABIDAE			
		Subfamily Rhynchitinae			
<i>Byctiscus (Aspidobyctiscus)</i> <i>launipennis</i> sp.	—	11 (I, II)	—	Dehra Dun	Wild plant
<i>Deporaus (Arodepus) marginatus</i> Pasc.	—	11 (I, II)	Xy _p	Chandigarh	
		Subfamily Apoderinae			
<i>Centrocorynus (Paracentrocorynus)</i> <i>aemulus</i> Faust.	—	14 (I)	Xy _p	Dehra Dun	Wild plant
		FAMILY APIONIDAE			
		Subfamily Apioninae			
<i>Aplemonus tuberculata</i> sp.	—	13 (I, II)	Xy _p	Dehra Dun	Wild plant

¹ Sex-chromosome mechanism.² I—metaphase I; II—metaphase II.³ Xy_p—X and y chromosomes at metaphase I are held together in a parachute configuration.

found to vary between 14 in *Gelus californicus* (Ennis 1972) and 54 in *Baris* sp. (Takenouchi 1958) with most of the species having an Xy_p type of sex-chromosome mechanism. It is also seen that the number of chromosomes differs among species and genera of long-snouted subfamilies, but all the species within the genera *Hypera* (Hyperinae, $2n = 22$) and *Athesapeuta* (Baridinae, $n = 16$) have the same chromosome numbers (Table 1).

ACKNOWLEDGMENT

The research was financed by a grant made by the United States Department of Agriculture, Science and Education Administration, authorized by Public Law 480, for the project on the morphotaxonomy and cytotaxonomy of Indian Curculionidae along with ecology of the pest species.

LITERATURE CITED

- CROZIER, R. H. 1968. An acetic acid dissociation, air drying technique for insect chromosomes with aceto-lactic orcein staining. *Stain Tech.* 43(6).
- DASGUPTA, J. 1963. The cytology of *Cybister limbatus*, *Gymnopleurus koengii*, *Aulacophora intermedia* and *Alcides* sp. (Insecta: Coleoptera). *Proc. Zool. Soc.* 16:123-134.
- , AND G. BASILE. 1966. The cytology of *Myloccerus viridanus* F. (Coleoptera: Curculionidae). *Curr. Sci.* 35:290-292.
- DUA, P. S., AND R. K. KACKER. 1980. Chromosome numbers in Indian Coleoptera. *Rec. Zool. Surv. India* 76:259-285.
- ENNIS, T. J. 1972. Low chromosome number and post reductional XO in *Gelus californicus* (Col: Curculionidae). *Can. J. Genet. Cytol.* 17:75-80.
- GILL, T. K. 1974. Studies on the chromosomes of some of the Indian Curculionidae. Ph.D. Thesis, Panj. Univ., Chd., India.
- MANNA, G. K., AND S. G. SMITH. 1959. Chromosome polymorphism and inter-relationship among bark weevils of the genus *Pissodes*. *Nucleus* 2:179-208.
- PAL, V. 1979. Karyological studies on some curculionid beetles (superfamily Curculionoidea) from India. Ph.D. Thesis, Panj. Univ., Chd., India.
- SAHA, A. K. 1973. Chromosomal studies of the Indian coleopterans. *Cytologia* 38:363-373.
- SHARMA, G. P., T. K. GILL, AND V. PAL. 1980. Chromosomes in curculionid beetles (Coleoptera: Curculionidae). *Coleopt. Bull.* 34:361-367.
- SINGLA, P. 1986. On the karyotypic variability of some Indian Curculionidae (Coleoptera). Ph.D. Thesis, Panj. Univ., Chd., India.
- TAKENOUCI, Y. 1958. Further survey of chromosomes in curculionid weevils (Coleoptera). *Zool. Mag.* 67:27.
- YADAV, J. S. 1972. Chromosome studies on Indian Curculionidae (Coleoptera). *Nucleus* 15:57-64.
- . 1973. Chromosome studies and sex-determining mechanism in fourteen species of Coleoptera. *Curr. Sci.* 42:514.

(Received 7 May 1989; revised 16 October 1989; accepted 19 October 1989)

LITERATURE NOTICES

- BALKE, M. 1990. Die Gattung *Rhantus* Dejean. IV. Taxonomie und Faunistik verschiedener paläarktischer und nearktischer Spezies (Coleoptera: Dytiscidae). *Mitt. Schweiz. Ent. Ges.* 63:195-208.
- FRANZ, H., ET I. LÖBL. 1990. *Eutheimorphus paradoxus* gen. n., sp. n., un Scydmaenidae (Coleoptera) intéressant de Bornéo. *Mitt. Schweiz. Ent. Ges.* 63:169-172.