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A catalog of chromosome numbers and genetic systems of scale insects (Homoptera: Coccinea) of the world

Ilya A. Gavrilov
Zoological Institute, Russian Academy of Sciences, Universitetskaya nab. 1, St. Petersburg 199034, Russia. E-mail: coccids@zin.ru

ABSTRACT

Chromosome numbers and genetic systems of 460 species belonging to 14 families of scale insects are listed. Illustrations are given for 16 species belonging to 8 families. The main features of the different genetic systems, variations in chromosome numbers, a unique phenomenon of "dizygotic soma", and karyotaxonomical approaches are briefly discussed.

KEY WORDS: scale insects, Coccoidea, Coccinea, chromosome numbers, genetic systems

INTRODUCTION

Scale insects (suborder Coccinea, or superfamily Coccoidea according to different authors) are one of the most specialized groups of hemipterous insects (Paraneoptera), comprising about 7500 species worldwide.

The Coccinea are exceptional among terrestrial animals in that the adult females in many families (e.g. Kermesidae, Asterolecaniidae, Aclerdidae, Diaspididae, Phoenicococcidae, Coccidae) lack legs (and wings) and are immovable. Many unique morphological, anatomical and cytological characters of scale insects are probably connected with this fact. The external appearance of many species is unique and unusual, and they resemble bark flakes, processes of plant tissues, twig buds etc. Bi-parental species are characterised by distinct sexual-dimorphism: the adult male is winged and short-lived, while the female is much bigger, wingless, larva-like and longer-lived. In parthenogenetic species the males are lacking or rare. The group is also characterized by many peculiar cytogenetic characters such as holocentric chromosomes, inverse meiosis, diverse sex-determining mechanisms and patterns of chromosome behavior in meiosis and mitosis, unique phenomena of "dizygotic soma" and heterochromatinization of the paternal set of chromosomes, male haploidy, hermaphroditism, facultative and obligate parthenogenesis (Hughes-Schrader, 1948; Brown, 1965; Buchner, 1965; Nur, 1980;

Normark, 2001; Kuznetsova and Gavrilov, 2005).

No modern comprehensive review exists of chromosome numbers and genetic systems of all the scale insects. The review by Hughes-Schrader (1948) discussed only 30 species and has become obsolete. Nur (1980) and Kuznetsova and Gavrilov (2005) have provided only general information on the suborder genetic systems with special emphasis on the mechanisms of heterochromatinization. Although numerous additional data on chromosome numbers have been reported recently, reviews for entire families (Diaspididae, Eriococcidae, and Pseudococcidae) are still sporadic (Brown, 1965, 1967; Nur et al., 1987). In this article I summarized all the available earlier and modern data in a single table (Table 2) that I believe will prove useful for future studies, especially for comparative and phylogenetic studies of scale insects and other related groups of insects. Additional recent information that could not be included in Table 2 will appear shortly in two new publications currently in press (Gavrilov and Kuznetsova, 2007; Gavrilov and Trapeznikova, 2007).

The classification of the suborder follows Danzig (1980). I do not discuss nomenclatural issues concerning the names "Homoptera" and "Hemiptera" and superfamilies in the Homoptera, but adopt the classical concepts of the order Homoptera, its suborders and superfamilies (Kerzhner and Danzig, 2001).

The approximate numbers of nominal species and genera in the Coccinea of the world fauna are given according to ScaleNet (www.sel.barc.usda.gov/scalenet/scalenet.htm), Miller and Kozár (2004), Ben-Dov (2005), Ben-Dov (2006), Ben-Dov and German (2003), and Miller and Gimpel (2000).

CHROMOSOME STRUCTURE AND NUMBERS

Scale insects as well as other hemipterous insects, such as other Homoptera (Aphidinea, Aleyrodinea, Psyllinea, Cicadinea), Heteroptera, Psocoptera, Thysanoptera, and Phthiraptera, possess holocentric (or holokinetic) chromosomes (Hughes-Schrader and Schrader, 1961). Holocentric chromosomes are also present in Dermaptera and Odonata, and with minor exceptions also in Lepidoptera and Trichoptera. Recently, holocentric chromosomes have also been discovered in Zoraptera (Kuznetsova et al., 2002). Scale insects were one of the first groups of insects in which this type of chromosome was discovered and studied (e.g., Hughes-Schrader and Ris, 1941; Hughes-Schrader, 1942, 1948; Hughes-Schrader and Schrader, 1961). Generally, there are four main differences between holocentric and monocentric chromosomes: (1) monocentric chromosomes have a primary constriction (centromere), while in holocentric chromosomes such a centromere is not morphologically or physiologically distinguished and kinetic activity is distributed along the entire chromosome (Hughes-Schrader and Schrader, 1961); (2) monocentric chromosomes have a J-like or V-like form in anaphase, because their arms protrude from the mitotic spindle and move to the pole after the centromere, while holocentric chromosomes move to the pole with their long axis parallel to the anaphase plate; (3) holocentric chromosomes are more tolerant to irradiation (Hughes-Schrader and Ris, 1941; Brown and Nelson-Rees, 1961; Chandra, 1962) because their fragments have their own kinetic activity and are not eliminated, in contrast to fragments of monocentric chromosomes; and (4) holocentric bivalents have a small number of chiasmata (one or two) (Nokkala et al., 2004, 2006), whereas monocentric bivalents can form from one to eight chiasmata (White, 1973).

It was originally postulated that organisms with holocentric chromosomes must have more variable chromosomal numbers than groups with monocentric chromosomes (Kuznetsova, 1979). However, recent work in both groups of organisms has shown that chromosome numbers can vary tremendously or be constant (Cook, 2000; De Prins and Saitoh, 2003; Maryanska-Nadachowska, 2002; Kerzhner et al., 2004; Nachman and Searle, 1995). Scale insects and other organisms with holocentric chromosomes probably have a special mechanism that prevents an increase in chromosome number, and only in some species are spontaneous chromosome fragments transmitted to subsequent generations, playing an important role in evolution (Brown, 1960; Nur et al., 1987).

To date chromosome numbers have been reported for 460 species of scale insects belonging to 14 families (Tables 1–2, Figs. 1–18), thus comprising about 6% of all coccid species in the world fauna. The smallest number, 2n=4, is known in species of the tribe Iceryini (Margarodidae) and in the genus *Apiomorpha* (Eriococcidae) (Hughes-Schrader, 1925, 1930, 1948, 1963); the greatest number, 2n≈192, is known in *Apiomorpha macqueeni* Froggatt (Cook, 2000). For several families only partial data are available. The small tropical families, Carayonemidae and Beesoniidae, have not been studied cytogenetically.

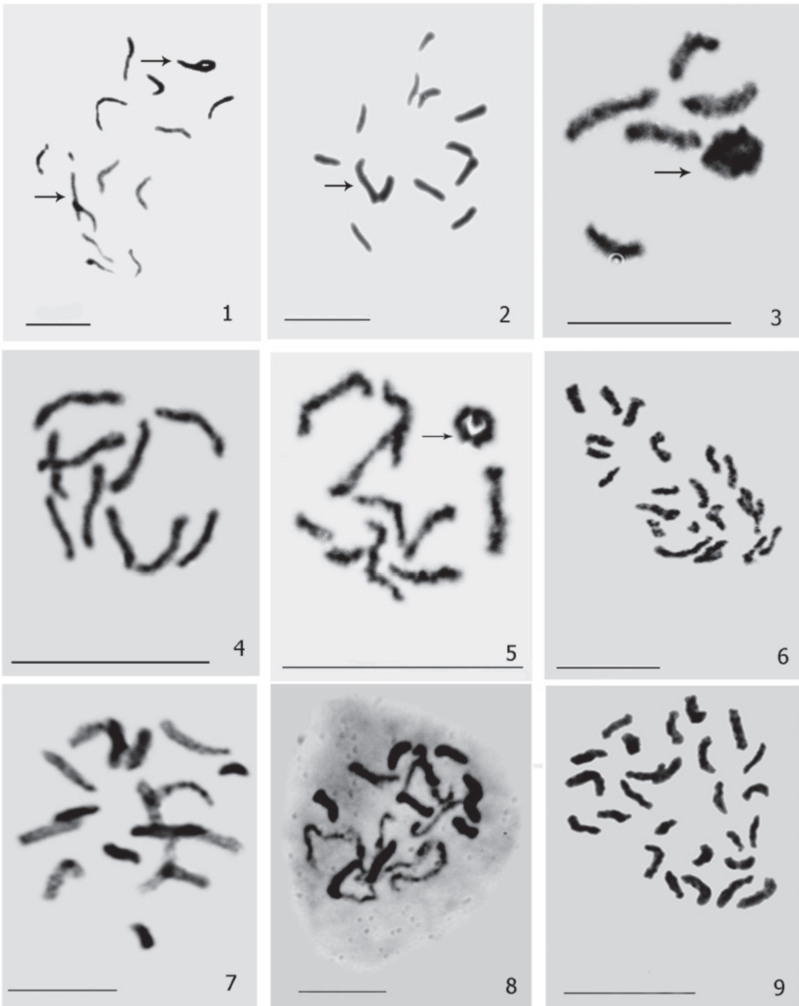
Unique intrageneric variation in chromosome number occurs in the endemic Australian genus *Apiomorpha* (Eriococcidae); 43 chromosome numbers, varying from 2n=4 to 2n=192 (Table 1), have been discovered in about 40 species of this genus (Cook, 2000, 2001). In some soft scales (Coccidae), such as *Physokermes hemicryphus* (Dalman) and *Saissetia coffeae* (Walker), triploid and tetraploid forms are known (Nur, 1979).

Accessory chromosomal elements were found in several species of mealybugs (Pseudococcidae) (Nur et al., 1987; Gavrilov, 2004a), in one species of the Margarodidae (Hughes-Schrader, 1942), in two species of soft scales (Coccidae) (Gavrilov, 2005) and in some armored scales (Diaspididae) (Brown, 1960). However, only in *Pseudococcus viburni* (Signoret) (Pseudococcidae) have these accessories (B-chromosomes) been investigated in detail (Nur, 1962, 1966a, 1966b, etc.; Nechaeva et al., 2004).

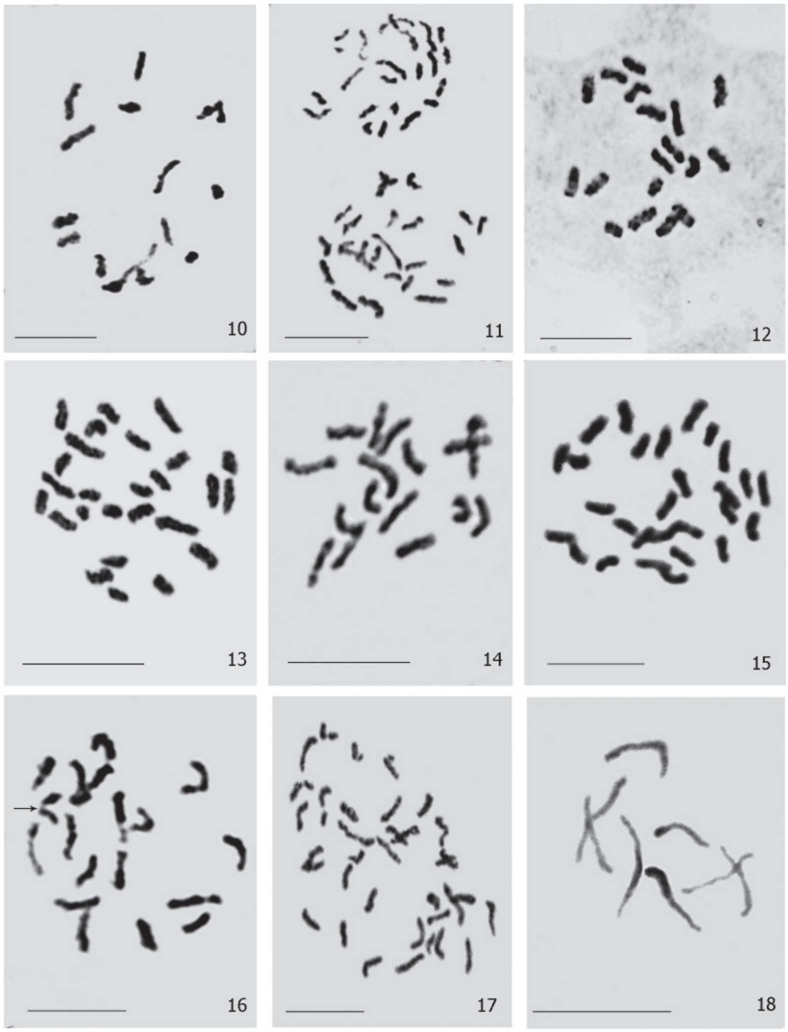
In one species, *Matsucoccus gallicolus* Morrison (Margarodidae), multiple sex chromosomes, 12X in female and 6X in male, are known (Hughes-Schrader, 1948). The number of sex chromosomes in this species is the highest known in the Insecta (Kuznetsova and Gavrilov, 2005).

Table 1
Variation of diploid chromosome numbers in 16 families of scale insects.

Family	Number of nominal taxa		Number of studied taxa		Range of variability	Modal numbers
	Genera	Species	Genera	Species		
Ortheziidae	17	190	3	3	14–18	-
Carayonemidae	4	4	-	-	-	-
Margarodidae	77	442	20	33	4–40	4, 6
Phenacoleachiidae	1	2	1	1	8	-
Pseudococcidae s.l. (including Putoidae)	272	2000	44	114	8–64	10
Eriococcidae	68	560	18	95	4–192	18
Kermesidae	10	90	1	1	26	-
Dactylopiidae	1	10	1	7	10–16	10
Asterolecaniidae s.l. (including Cerococcidae and Lecanodiaspididae)	37	550	4	5	6–24	-
Aclerdidae	3	50	1	1	18	-
Coccidae	163	1130	24	47	10–36	16, 18
Kerriidae	9	97	2	4	18–20	-
Beesoniidae	6	11	-	-	-	-
Conchaspididae	4	30	1	1	12	-
Phoenicococcidae s.l. (including Halimococcidae)	6	22	5	7	10–18	10
Diaspididae	380	2370	68	141	6–18	8
Total	**1058**	**7558**	**193**	**460**	**4–192**	**4, 8, 10, 18**



Figs. 1–9. Karyotypes of some scale insects from different families. 1–2. Margarodidae: *Porphyrophora polonica* (Linnaeus). 1. Female, 2n=14. 2. Male, 2n=13, X-chromosomes are pointed by arrows. 3–6. Pseudococcidae. 3. *Fonscolombia butorinae* Danzig and Gavrilov, 2n=10, paternal chromosome set (arrow) is heterochomatinized. 4. *Mirococcopsis subterranea* (Newstead), 2n=10. 5. *Phenacoccopsis phenacoccoides* Kiritshenko, 2n=10+Bs, accessory chromosomes are pointed by arrow. 6. *Antonina evelynae* Gavrilov, cell of bacteriome, 4n=24. 7–8. Eriococcidae: *Acanthococcus agropyri* (Borchsenius), 2n=16, paternal chromosomes are heterochromatinized. 9. Kermesidae: *Kermes quercus* (Linnaeus), 2n=26, Bar=10 µm.



Figs. 10−18. Karyotypes of some scale insects from different families. 10. Dactylopiidae: *Dactylopius coccus* Costa, 2n=16. 11. Asterolecaniidae: *Asterodiaspis quercicola* (Bouché), 2n=24. 12−17. Coccidae. 12. *Acanthopulvinaria orientalis* (Nasonov), 2n=18. 13. *Chloropulvinaria aurantii* (Cockerell), 2n=26. 14. *Pulvinaria peregrina* (Borchsenius), 2n=16. 15. *Rhizopulvinaria variabilis* Borchsenius, 2n=28. 16. *Sphaerolecanium prunastri* (Fonscolombe), 2n=18+Bs, accessory chromosomes are pointed by arrow. 17. *Ceroplastes japonicus* Green, 2n=36. 18. Diaspididae: *Diaspidiotus gigas* (Thiem and Gernek), 2n=8, Bar=10 µm.

GENETIC SYSTEMS

Coccoids possess unique genetic systems (Schrader, 1923a, 1929a; Brown, 1958–1969; Hughes-Schrader, 1948; Nur, 1962–1990; Haig; 1993, Normark, 2003; Kuznetsova and Gavrilov, 2005). The most comprehensive reviews were published by Nur (1980) and Kuznetsova and Gavrilov (2005), who considered 10 genetic systems ("chromosome systems" in Nur's terminology) in coccids: *XX–X0, n–2n (Haplo-diploidy), Hermaphroditism, 2n–2n, Lecanoid, Comstockiella, Diaspidid, Diploid Arrhenotoky, Deuterotoky,* and *Thelytoky.*

The *XX–X0* system is the most ancient in the suborder Coccinea and is usually considered as the ancestral system for all hemipterous insects (Blackman, 1995). Only primitive groups of scale insects display this system: Margarodidae (Figs 1, 2), Ortheziidae, and the genus *Puto* (Pseudococcidae). In species possessing this system, the sex of the progeny is determined during spermatogenesis. Spermatozoa with X-chromosomes produce females and spermatozoa without X-chromosomes produce males. For example, females of *Porphyrophora polonica* (Linnaeus) (Margarodidae) have 2n=12+2X and males have 2n=12 +1X (Figs 1, 2) (Gavrilov, 2004a). In the same family, *Matsucoccus gallicola* Morrison has multiple sex chromosomes (2n=28+12X in females and 2n=28+6X in males), which probably evolved as a result of fragmentation of one initial X-chromosome (Hughes-Schrader, 1948). Meiosis in the *XX–X0* system was studied in several species of the Margarodidae (Hughes-Schrader, 1931, 1942, 1955) and in the genus *Puto* (Pseudococcidae) (Hughes-Schrader, 1944; Brown and Cleveland, 1968). In both females and males meiosis comprises two divisions; in prophase I bivalents with one, rarely with two, terminal and interstitial chiasmata are formed. In the studied species meiosis is inverse, with first equational and second reductional divisions. It is noteworthy that in some margarodids with the *XX–X0* system meiotic chromosomes "are apparently enclosed in separate vesicles rather than in a single nuclear membrane" (White, 1973) and, as a result, from 3–7% (e.g. in *Nautococcus, Llaveia, Llaveiella*) to 100% (in *Protortonia*) of the primary spermatocytes show asynapsis of autosomal pairs (Schrader, 1931; Hughes-Schrader, 1931, 1941, 1948, 1955). Moreover, in *Protortonia* in the second meiotic division all chromosomes form a chain stretched between the two poles of the cell (Schrader, 1931), which is similar to the well-known example of chain formation in plants of the genus *Oenothera* (Onagraceae) and some other plants.

Hermaphroditism and *Haplo-diploidy* are known only in species of the tribe Iceryini (Margarodidae). *Hermaphroditism* is an example of bisexual reproduction. This system is very rare in Insecta in which it occasionally occurs as an abnormality, often connected with gynandromorphism. Only in some species of humpbacked flies (Phoridae: Termitoxeniinae) and scale insects of the genus *Icerya* is hermaphroditism constant (Hughes-Schrader, 1948, 1963; Hughes-Schrader and Monahan, 1966). In *Icerya* the hermaphrodites are diploid and, similar to females, normal in their morphology and mode of life. During embryogenesis the gonads of these insects do not undergo sexual differentiation. Later, in the crawlers, haploid nuclei appear in the gonads and form the central testicular part of a hermaphroditic gland. The haploid nuclei appear as a result of degeneration and elimination of one set of chromosomes. The peripheral ovarian part of the gland is diploid and formed a little later. Fertilization takes place either in the ovarian part or in the cavity of the ovo-testis. Fertilized eggs always develop into female-like hermaphrodites, which usually reproduce by self-fertilization. However, the hermaphrodites may also copulate with accidental haploid males, which sometimes develop from unfertilized eggs (Hughes-Schrader, 1948). *Haplo-diploidy* of scale insects is a result of haploid arrhenotoky, as in other insects. Fertilized eggs produce diploid females and unfertilized eggs produce haploid males (Hughes-Schrader, 1948).

To date, species with heteromorphous sex chromosomes (genetic system *XX/XY*) have not been found among scale insects. On the other hand, in some species, such as *Newsteadia* sp., *Praelongorthezia praelonga* (Douglas), *Lachnodius eucalypti* (Maskell), and *Stictococcus* sp., both females and males have the same number of chromosomes, but without distinct sex chromosomes or peculiar heterochromatinization of the paternal set (as in the unique coccid systems, *Lecanoid*, *Comstockiella*, and *Diaspidid*, discussed below). This has been described in the families Ortheziidae, Eriococcidae, and Stictococcidae and named *2n–2n* system. The Australian felt scale *Lachnodius eucalypti* (Maskell), having 2n=18 in both females and males (Brown, 1967, 1977; Nur, 1980), is especially noteworthy. In other studied species of the genus *Lachnodius* and in the family Eriococcidae as a whole, the *Comstockiella* system has been discovered, but in males of *L. eucalypti* heterochromatinization of the paternal set is absent. The *2n–2n* system probably evolved in scale insects more than once and from different ancestral systems: from the system with heterochromatinization in *L. eucalypti* and *Stictococcus* sp. and from the *XX–X0* system in *Praelongorthezia praelonga* (Nur, 1980).

Meiosis in *L. eucalypti* comprises one reductional division only (Brown and Chandra, 1977), whereas in *P. praelonga* it comprises two divisions without an inverted meiotic sequence (Brown, 1958).

The species with *Lecanoid, Comstockiella,* and *Diaspidid* systems, as well as *Diploid Arrhenotoky* and *Deuterotoky*, feature heterochromatinization of the paternal set of chromosomes in males (Fig. 19). Embryonic paternal genome elimination (PGE) is known in some groups of insects (see reviews of White, 1973 and Normark, 2003), but in each of these groups PGE has specific characters and forms unique genetic systems. The coccid systems *Lecanoid, Comstockiella*, and *Diaspidid* are purely bisexual, while *Diploid Arrhenotoky* and *Deuterotoky* are complicated by parthenogenesis.

In the *Lecanoid* system, the heterochromatic chromosome set exists during all stages of the male life cycle. During meiosis in the male, the chromosomes do not pair and separate equationally during the first division. During the second division, two metaphase plates are formed, and the heterochromatic and euchromatic chromosomes then segregate to the opposite poles (Hughes-Schrader, 1948; Nur, 1980). As a result of meiosis, quadrinucleate spermatids are formed, but only the nuclei of maternal origin produce sperm (Fig. 19).

In the *Comstockiella* system, the heterochromatic set is partly (as separate chromosomes) eliminated prior to spermatogenesis and different cells of the same tissue may differ in chromosome number. According to the number of eliminated chromosomes,

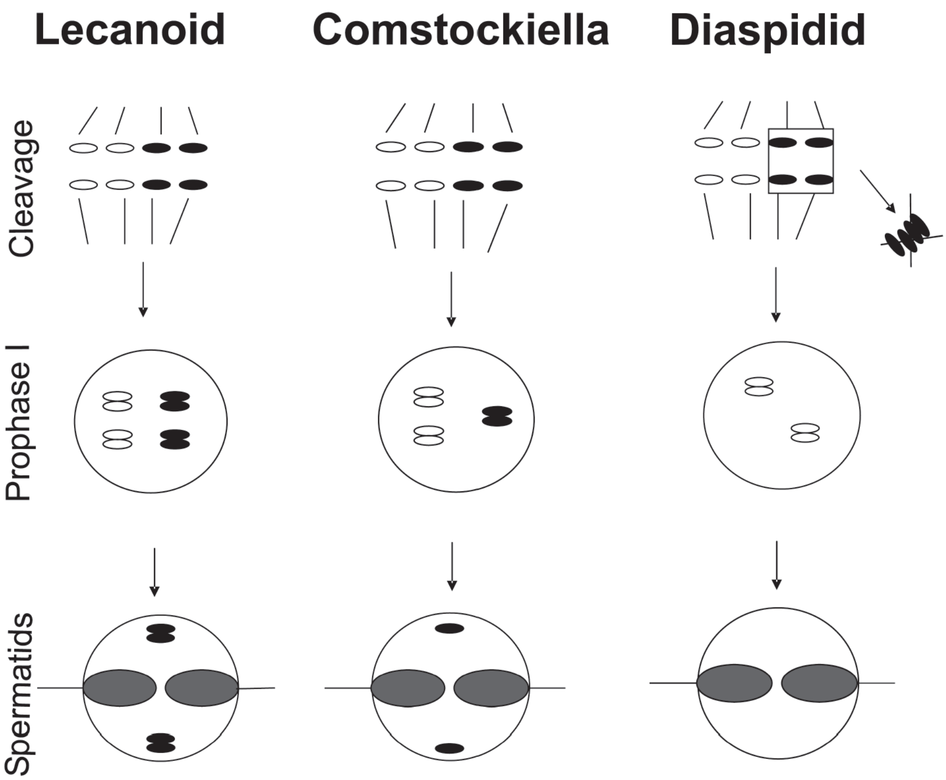


Fig. 19. Schematic presentation of chromosome cycles in *Lecanoid*, *Comstockiella*, and *Diaspidid* genetic systems. Heterochomatic chromosomes of paternal origin are shown in black.

several variants of the *Comstockiella* system are known: CL^{I} – *Comstockiella-Lecanoid* intermediates, C^{varH} – *Comstockiella* with one pair of paternal chromosomes, retained in different cysts, C^{C} – complete *Comstockiella*. The course of spermatogenesis varies among the different taxa, depending on the number of non-eliminated heterochromatic chromosomes. If all these chromosomes are destroyed, the second division is absent (Brown, 1965, 1967; Nur, 1980).

In the *Diaspidid* system, the heterochromatic set has been completely lost, and adult males are haploids. Hence, spermatogenesis consists of a single equational division (Brown, 1965, 1967; Nur, 1980, 1982).

It is difficult to identify the genetic system in parthenogenetic species. According to Nur (1980), the *Lecanoid, Comstockiella,* and *Diaspidid* systems are sexual with obligatory fertilization. This contention is based on a study of chromosome behavior in male embriogenesis and spermatogenesis. If the males are absent, the genetic system is considered as parthenogenesis (thelytoky). On the other hand, there may be few obligatory thelytokous species of scale insects, that never produce males in any population or geographical region, and that have lost the spermatheca. A great many species, often reported as thelytokous (e.g., Nur's (1990b) review), in reality combine thelytokous reproduction with amphimixis, producing males amphimictically or parthenogenetically (*Diploid Arrhenotoky* and *Deuterotoky*), and these males also have paternal heterochromatinization. Some species variously manifest thelytokous and bisexual lineages in different geographical regions or on different host plants (Nur, 1990b).

It is often very difficult or impossible to recognize the exact genetic systems noted by authors. In Table 2, therefore, I cite genetic systems according to the original descriptions, unifying the data only. In many cases, however, the genetic system was not discussed in the original description or only partly reported. Thus, for example, if a cited author reports "bisexual reproduction" without additional comments, I mark the system of this species in the table as "**S**", bisexual; if "heterochromatinization" is mentioned without comments, I marked it as "**H**", etc.

I do not review here the numerous studies on molecular cytogenetics of two "model species", *Pseudococcus viburni* (Signoret) and *Planococcus citri* (Risso), because various questions, such as their mechanisms of facultative heterochromatinization, genomic imprinting, and DNA methylation, are not within the scope of the present article. Information on these topics can be found in reviews by Nur (1990a) and Bongiorni and Prantera (2003).

KARYOSYSTEMATICS

Although there are many publications on scale insect cytogenetics, their data have rarely been used in practical taxonomy of coccoids. The most important achievement in the macrotaxonomy of the group is the general recognition that different families of scale insects are characterized by particular genetic systems (Fig. 20), and that macroevolution of the suborder Coccinea is accompanied by an evolution of genetic systems (Hughes-Schrader, 1948; Brown and McKenzie, 1962; Nur, 1980; Danzig, 1980; Kuznetsova and Gavrilov, 2005). Thus, the ancient, primitive families Ortheziidae, Margarodidae, and Phenacoleachiidae display the *XX–X0* system that is common to all hemipteroid insects. The next stage in the phylogeny of the suborder is represented by the family Pseudococcidae s.l., in which, in addition to *XX–X0*, the new, Lecanoid system, appeared. In the family Eriococcidae development of the *Comstockiella* system took place and, moreover, in some species the meiotic divisions can either be the *Lecanoid* or *Comstockiella* type in different cysts (Brown, 1967; Nur, 1980). Different genera of the highly specialized families, Coccidae, Asterolecaniidae, Dactylopiidae, and Phoenicococcidae, have either a *Lecanoid* or a *Comstockiella* system, or complex forms of parthenogenesis on the basis of the two above-mentioned systems. The most specialized family, Diaspididae, has a third, diaspidoid variant of heterochromatinization,

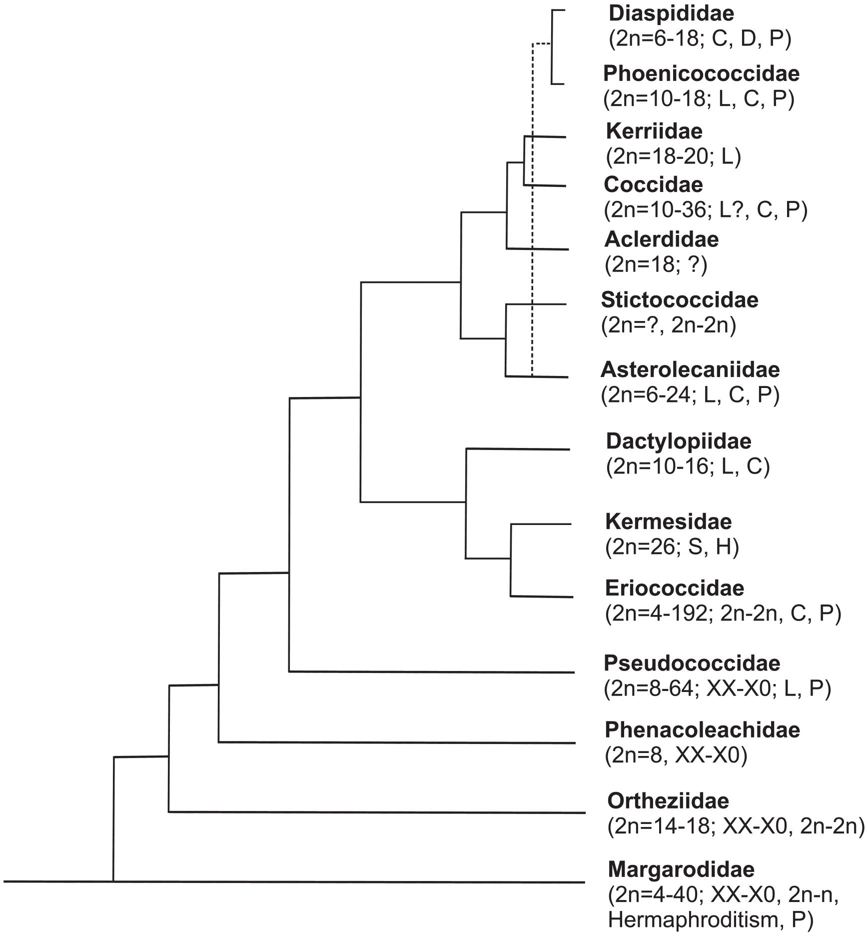


Fig. 20. Family phylogeny of Coccinea according to Danzig (1980), supplemented by cytogenetic data (abbreviations as in Table 2).

with total elimination of paternal chromosomes in early embriogenesis. The Diaspididae thus represent the top of the evolutionary line, from normally-functioning paternal chromosomes to their total elimination.

In microsystematics, the cytogenetic data are used only in taxa with a sufficient number of cytogenetically studied species. For example, attempts to reach kariotaxonomical conclusions have been made for margarodids of the tribe Iceryini (Hughes-Schrader and Tremblay, 1966), for some genera of armored scales (Diaspididae) (Brown, 1965), for the large and difficult genus *Apiomorpha* (Eriococcidae) (Cook, 2000, 2001), and for the genera *Trionymus* (Pseudococcidae), *Eriococcus, Gossyparia*, and *Acanthococcus* (Eriococcidae) (Gavrilov, 2004a; Gavrilov and Kuznetsova, 2005).

Of special interest is the frequently discussed question of the taxonomic position of the genus *Puto* Signoret (Hughes-Schrader, 1948; Brown and Cleveland, 1968; Nur, 1980; Danzig, 1980; Cook, Gullan and Trueman, 2002, and other authors), which has the ancient genetic system, XX–X0, in contrast to other studied mealybugs. Beardsley (1969) and some other authors contend that this genus (as well as several other very similar genera) should be placed in the special family, Putoidae. However, to date only four species of *Puto* have been studied cytogenetically (see Table 2) or by methods of DNA extraction (Downie and Gullan, 2004), but in their female morphology all species of *Puto* and similar genera are typical mealybugs (Pseudococcidae) (Danzig, 1980; Miller and Miller, 1993).

“DIZYGOTIC SOMA” AND POLYPLOID BACTERIOMES

The embriology and ontogenesis of Coccinea are beyond the scope of this article. However, I briefly discuss one aspect that is related to the main subject. Some scale insects are characterized by a specific individual development that is similar to development following double fertilization in angiosperms. In species of the families Pseudococcidae and Diaspididae, each embryo develops from two different cells. One of these is a normal diploid zygote that gives rise to the majority of tissues. The other cell is a polyploid secondary zygote that results from the fusion of a cleavage nucleus with the first or second polar bodies. The secondary zygote gives rise to the polyploid bacteriome or mycetome (Fig. 21). Each cell of the bacteriome or mycetome thus includes one haploid set of paternal chromosomes and several maternal sets (Schrader, 1923b; Hughes-Schrader, 1948; Brown, 1965; Normark, 2001). This unique phenomenon has been studied mainly in diaspidids, which display 5-ploid, 7-ploid or even 14-ploid bacteriomes (Brown, 1965; Normark, 2004). It is not known whether other coccid families also have “dizigotic soma” or other mechanisms of bacteriome-formation similar to some soft scales (Tremblay, 1961) or to the genus *Puto* (Pseudococcidae s.l.) (Brown and Cleveland, 1968). There is probably a connection between endosymbiotic bacteria and genetic systems, because these bacteria may have some deleterious effect on males, with male haploidy being one of the results of this effect (Normark, 2004).

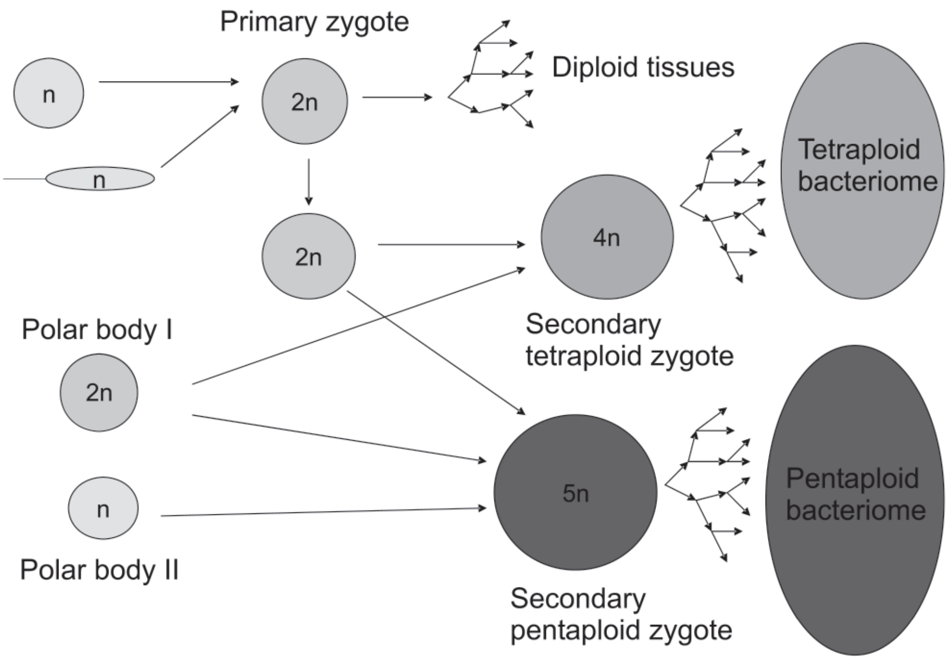


Fig. 21. Schematic presentation of the formation of dizygotic soma in scale insects conforming with Schrader's (1923) theory.

CATALOG OF CHROMOSOME NUMBERS AND GENETIC SYSTEMS

The following table (Table 2), which constitutes the major part of this article, presents a catalog of the chromosome numbers and genetic systems of 460 species of scale insects. Explanations to this table are as follows: **Bs** – B-chromosomes; **C** – Comstockiella; **C^{C}** – complete Comstockiella; **CL^{I}** – Comstockiella-Lecanoid intermediates; **C^{varH}** – Comstockiella with one pair of paternal chromosomes avoided elimination; **D** – Diaspidid; **H** – heterochromatinization of a haploid set of chromosomes; **Herm** – hermaphroditism; **L** – Lecanoid; **P(a)** – parthenogenesis, ameiotic; **P(m)** – parthenogenesis, meiotic; **P(o)** – parthenogenesis, obligatory, i.e. males have never been found; **S** – bisexual reproduction; **XX-X0** – genetic system with one sex chromosome in male karyotype; **2n** – diploid number of chromosomes; **2n-n** – diplo-haploidy; **2n-2n** – diplo-diploidy.

In systems **XX-X0** and **2n-n** the female and male chromosomal numbers are given in Table 2 in fractional form; in other systems 2n is the same in both sexes**.** The family name is followed (in parentheses) by the approximate number of species and the number of cytogenetically studied species (separated by a slash). A question-mark in square brackets after a cited reference indicates that the data are not clear or are doubtful.

Table 2
Chromosome numbers and genetic systems in 460 species of scale insects (Homoptera: Coccinea) of the world.

Taxon	**2n**	**Genetic system**	**Reference**
		Fam. Ortheziidae (190/3)	
Newsteadia sp.	14/13	XX–X0	Nur, 1980 [?]
Orthezia urticae (Linnaeus)	18?	?	Gavrilov, 2004a [Voronezh, Russia]
Praelongorthezia praelonga (Douglas)	16	2n–2n	Brown, 1958 (as *Orthezia*) [Trinidad]
		Fam. Carayonemidae (4/0)	
		Fam. Margarodidae (442/33)	
Aspidoproctus maximus Lounsbury	6/5	XX–X0	Hughes-Schrader, 1955 [Kenya]
Auloicerya acaciae Morrison et Morrison	4/2	2n–n	Hughes-Schrader, unpublished [Australia], according to White, 1973
Callipappus rubiginosus (Maskell)	14/13	XX–X0	Hughes-Schrader, unpublished [Australia], according to White, 1973
Crypticerya rosae (Riley et Howard)	4/2	2n–n	Hughes-Schrader, 1930 [Honduras]
Crypticerya sp.	4/2	2n–n	Parida and Moharana, 1982 [India]
Drosicha sp.	8	?	Moharana, 1990 [India]
Echinicerya anomala Morrison	4/2	2n–n	Hughes-Schrader, 1930 [Guatemala]
Gigantococcus maximus (Newstead)	4/2	2n–n	Hughes-Schrader, 1963 (as *Icerya maxima*) [Pretoria, South Africa]
Gueriniella serratulae (Fabricius)	6	P(o)	Hughes-Schrader and Tremblay, 1966 [Italy]
Hemaspidoproctus sp.	16	?	Moharana, 1990 [India]
Icerya aegyptiaca (Douglas)	4/2	2n–n	Hughes-Schrader, 1963 [Pretoria, South Africa]
	4	P(thelitoky)	Parida and Moharana, 1982 [India]

I. bimaculata De Lotto	4	Herm	Hughes-Schrader, 1963 [Pretoria, South Africa]
I. brasiliensis Hempel	4/2	2n–n	Hughes-Schrader and Monahan, 1966 (as *I. zeteki*) [Panama]
I. formicarum Newstead	4	?	Moharana, 1990 [India]
I. littoralis Cockerell	4/2	2n–n	Hughes-Schrader, 1930 [Guatemala]
I. montserratensis Riley et Howard	4/2	2n–n	Hughes-Schrader, 1930 [Honduras]
I. purchasi Maskell	4/2	2n–n + Herm	Hughes-Schrader, 1925 [California, USA] Schrader and Hughes-Schrader, 1926 [?]
I. seychellarum (Westwood)	4	?	Moharana, 1990 [India]
I. similis Morrison	4/2	2n–n	Hughes-Schrader, 1948 [?]
I. tremae Vayssière	4/2	2n–n	Hughes-Schrader, 1963 [Pretoria, South Africa]
Icerya sp.	8	?	Moharana, 1990 [India]
Kuwania oligostigma De Lotto	16	S	Hughes-Schrader, 1963. [Pretoria, South Africa.]
Llaveia axin (Llave)	6/5	XX–X0	Hughes-Schrader, 1931 (as *L. bouvari*) [Guatemala]
L. oaxacoensis Morrison	6/5	XX–X0	Hughes-Schrader, 1948 [?]
Llaviella taenechina Morrison	6/5	XX–X0	Hughes-Schrader, 1940 [Mexico]
Marchalina hellenica (Gennadius)	18	P(o)	Hovasse, 1930 [France]
Matsucoccus gallicolus Morrison	40/34	12X–6X	Hughes-Schrader, 1948 [?]
Nautococcus schraderae Vayssière	6/5+Bs	XX–X0	Hughes-Schrader, 1942 [Panama]
Porphyrophora hamelii Brandt	14/13	XX–X0	Matevossyan, 1977 [Armenia]

P. polonica (Linnaeus)	14/13	XX–X0	Gavrilov, 2004a [Voronezh, Russia]
Protortonia primitiva (Townsend)	6/5	XX–X0	Schrader, 1931 [Guatemala]
Steatococcus tuberculatus Morrison	4/2	2n–n	Hughes-Schrader and Ris, 1941 [Mexico]
Steingelia gorodetskia Nasonov	10/9	XX–X0	Nur, 1980 [Poland]
Fam. Phenacoleachiidae (2/1)			
Phenacoleachia zealandica (Maskell)	8/7	XX–X0	Brown and Cleveland, 1968 [New Zealand]
Fam. Pseudococcidae s.l. (including Putoidae) (2000/114)			
Antonina crawi Cockerell	12	S	Nur et al., 1987 [Hawaii, USA]
A. evelynae Gavrilov	12	?L	Gavrilov, 2004a [Sochi, Russia]
A. graminis (Maskell)	16 16	P(a) ?	Nur et al., 1987 [Jamaica] Parida and Moharana, 1982 [India]
A. pretiosa Ferris	24+ Bs	S	Nur et al., 1987 [California, USA]
Atrococcus paludinus (Green)	10	L	Gavrilov, 2004a [St. Petersburg, Russia]
Balanococcus singularis (Schmutterer)	10	H	Gavrilov and Trapeznikova, this report [Voronezh, Russia]
Cataenococcus olivaceus (Cockerell)	38? 64?	L S	Nur et al., 1987 [Texas, USA] Nur et al., 1987 [Mexico]
Chaetococcus bambusae (Maskell)	10	P(m)	Nur et al., 1987 [Jamaica]
Chlorococcus straussiae (Ehrhorn)	38?	? S	McKenzie, 1967 [California, USA] Nur et al., 1987 [Hawaii, USA]

Chorizococcus pusillus (De Lotto)	10	S	Nur et al., 1987 [Uganda]
Ch. rostellum (Lobdell)	10	?	McKenzie, 1967 [California, USA]
		S	Nur et al., 1987 [Hawaii, USA]
Clavicoccus tribulus Ferris	14	?	McKenzie, 1967 [California, USA]
		S	Nur et al., 1987 [Hawaii, USA]
Coccidohystrix insolita (Green)	12	L	Parida and Moharana, 1982 [India]
	10	S	Nur et al., 1987 [Thailand]
Coccidohystrix sp.	12	?	Moharana, 1990 [India]
Coccura suwakoensis (Kuwana et Toyoda)	10	S	Nur et al., 1987 [Japan]
Dysmicoccus boninsis (Kuwana)	12	S	Nur et al., 1987 [Hawaii, USA]
D. brevipes (Cockerell)	10	L	Parida and Moharana, 1982 [India]. Nur et al., 1987 [Ivory Coast]
		P(a)	McKenzie, 1967 [California, USA]. Nur et al., 1987 [Hawaii, USA; Jamaica; Uganda]
D. multivorus (Kiritshenko)	10	L	Gavrilov, 2004a [Voronezh, Russia]
D. neobrevipes Beardsley	10	S	Nur et al., 1987 [Jamaica]
D. wistariae (Green)	10	S	Nur et al., 1987 (as *D. cuspidatae*) [New York, USA]
Erium pygmaeum (De Lotto)	10	S	Nur et al., 1987 (as *Trionymus*) [Uganda]
Fonscolombia butorinae Danzig et Gavrilov	10	L	Danzig and Gavrilov, 2005 [Voronezh, Russia]

F. tomlinii (Newstead)	10	L	Danzig and Gavrilov, 2005 [Voronezh, Russia]
Ferrisia virgata (Cockerell)	10	L P	Parida and Moharana,1982 [India] Nur et al., 1987 [Mexico; Florida, USA] Nur et al., 1987 [Texas, USA]
Formicococcus ireneus (De Lotto)	10	S	Nur et al., 1987 (as *Planococcoides*) [Uganda]
F. robustus (Ezzat et McConnell)	10	L	Parida and Moharana, 1982 (as *Indococcus pipalae*) [India]
Heterococcus nudus (Green)	10	L	Gavrilov, 2004a [Voronezh, Russia]
Laminicoccus pandani (Cockerell)	10	S	Nur et al., 1987 [Fiji; Hawaii, USA]
L. vitiensis (Green et Laing)	10	S	Nur et al., 1987 [Fiji]
Maconellicoccus hirsutus (Green)	10	L	Parida and Moharana, 1982 [India] Nur et al., 1987 [New Guinea]
M. ugandae (Laing)	10	S	Nur et al., 1987 [Kenya]
Melanococcus viridis (Green)	16	S	Nur et al., 1987 (as *Mutabilicoccus*) [Australia]
Mirococcopsis subterranea (Newstead)	10	P (thelytoky)	Gavrilov, this report [Voronezh, Russia]
Mirococcus inermis (Hall)	10	?L	Gavrilov, this report [Astrakhan, Russia]
? *Miscanthicoccus* sp.	8	?	Moharana, 1990 [India]
Nairobia bifrons De Lotto	14	S	Nur et al., 1987 [Kenya]
Nesococcus pipturi Ehrhorn	12	S	Nur et al., 1987 [Hawaii, USA]
Nesopedronia acanthocauda (Beardsley)	18	S	Nur et al., 1987 [Hawaii, USA]
N. cibotii (Beardsley)	14	S	Brown, 1961 (as *Pedronia*) [Hawaii, USA]

N. dura (Beardsley)	10	S	Nur et al., 1987 [Hawaii, USA]
N. hawaiiensis (Ferris)	10	S	Nur et al., 1987 [Hawaii, USA]
Nipaecoccus aurilanatus (Maskell)	10	S	Nur et al., 1987 [New Guinea]
N. graminis (Maskell)	10	S	Nur et al., 1987 [Kenya]
N. nipae (Maskell)	10	L	Schrader, 1923a (as *Pseudococcus*) [USA] Nur et al., 1987 [Jamaica; Hawaii, USA]
	12	S	Nur et al., 1987 [Australia]
N. viridis (Newstead)	10	S	Nur et al., 1987 [Hawaii, USA]
	10	L	Parida and Moharana, 1982 [India]
Palmicultor browni Williams	8	S	Nur et al., 1987 [Fiji]
P. palmarum (Ehrhorn)	10	S	Nur et al., 1987 [Hawaii, USA]
Paracoccus bruguierae (De Lotto)	10	S	Nur et al., 1987 [Tanzania]
P. burnerae (Brain)	10	S	Nur et al., 1987 [Kenya]
P. diversus (De Lotto)	10	S	Nur et al., 1987 (as *Spilococcus*) [Uganda]
Paraputo anomala (Newstead)	14	?	Nur et al., 1987 [Kenya]
P. leveri (Green)	10	S	Nur et al., 1987 [New Guinea]
Pedronia strobilanthis Green	8	S	Nur et al., 1987 [Sri Lanka]
Phenacoccus acericola King	12	L	Hughes-Schrader, 1935 [Massachusetts, USA]
Ph. aceris (Signoret)	10	?	Drozdovskiy, 1966 [Moscow, Russia]
	10+Bs	L	Gavrilov and Kuznetsova, 2005 [Voronezh, Russia]

Ph. defectus Ferris	10	S	Nur et al., 1987 [Idaho, USA]
Ph. dicoriae McKenzie	10	S	Nur et al., 1987 [California, USA]
Ph. gossypii Townsend et Cockerell	12	L	Hughes-Schrader, 1948 [New York, USA]
	10	L	Nur et al., 1987 [California, Texas, Georgia, USA]
Ph. graminicola McKenzie	10	S	Nur et al., 1987 [Australia]
Ph. helianthi (Cockerell)	10	L	Nur et al., 1987 [Texas, USA]
Ph. infernalis McKenzie	10	S	Nur et al., 1987 [Arizona, USA]
Ph. phenacoccoides (Kiritshenko)	10+Bs	L	Gavrilov, 2004a [Voronezh, Russia]
Ph. pumilus Kiritshenko	10	L	Gavrilov, 2005 [Astrakhan, Russia]
Ph. solani Ferris	10	P(m)	Nur et al., 1987 [Hawaii, California, USA]
Ph. solenopsis Tinsley	10	S	Nur et al., 1987 [California, USA]
Phenacoccus sp.	10	P(m)	Nur et al., 1987 [Florida, USA]
Planococcoides crassus (De Lotto)	10	S	Nur et al., 1987 (as *Planococcus*) [Kenya]
Planococcus citri (Risso)	10	L	Schrader, 1923a (as *Pseudococcus*) [New York, California, USA]. Tremblay et al., 1977 (as *Pseudococcus*) [Italy]
P. lilacinus (Cockerell)	10	S	Nur et al., 1987 [Sri Lanka]
	10	?	Moharana, 1990 [India]
P. minor (Maskell)	16	?	Moharana, 1990 (as *P. pacificus*) [India]
P. vovae (Nasonov)	10	L	Gavrilov, this report [Adana, Turkey]

Planococcus sp.	10	?	Moharana, 1990 [India]
Porococcus tinctorius Cockerell	18	S	Nur et al., 1987 [Mexico]
Pseudococcus antricolens Ferris	10	S	Nur et al., 1987 [Hawaii, USA]
P. calceolariae (Maskell)	10	S L	Tremblay et al., 1977 [Italy] Nur et al., 1987 [California, USA; England]
P. comstocki (Kuwana)	10	S	Nur et al., 1987 [California, USA]
P. floriger Ferris	10	S	Nur et al., 1987 [Hawaii, USA]
P. kikuyuensis James	10	S	Nur et al., 1987 [Kenya]
P. longispinus (Targioni Tozzetti)	8	S ?	Brown, 1961 (as *P. adonidum*) [?]. Tremblay et al., 1977 [Italy]. Nur et al., 1987 [Peru; California, USA] Moharana, 1990 [India]
P. lycopodii Beardsley	10	S	Nur et al., 1987 [Hawaii, USA]
P. maritimus Ehrhorn	10	S	Nur et al., 1987 [California, USA]
P. montanus Ehrhorn	18	S	Nur et al., 1987 [Hawaii, USA]
P. nudus Ferris	10	S	Nur et al., 1987 [Hawaii, USA]
P. occidius De Lotto	10	S	Nur et al., 1987 [?, Africa]
P. pipturicolus Beardsley	10	S	Nur et al., 1987 [Hawaii, USA]
P. swezeyi Ehrhorn	10	S	Nur et al., 1987 [Hawaii, USA]
P. viburni (Signoret)	10 10+Bs 10 10+Bs	L L S L	Schrader, 1923a (as *P. maritimus*) [USA]. Nur, 1962, 1969 (as *P. obscurus*) [California, USA]. Tremblay et al., 1977 (as *P. obscurus*) [Italy]. Nechaeva et al., 2004 [St. Petersburg, Russia]

Pseudococcus sp.	10	?	Moharana, 1990 [India]
Pseudoripersia turgipes (Maskell)	10	S	Nur et al., 1987 [Australia]
Pseudotrionymus multiductus (Beardsley)	18	P?	Nur et al., 1987 [Hawaii, USA]
P. refertus (Ferris)	18	S	Nur et al., 1987 [Hawaii, USA]
Puto albicans McKenzie	20/19	XX−X0	Brown and Cleveland, 1968 [California, USA]
P. arctostaphyli Ferris	20/19	XX−X0	Brown and Cleveland, 1968 [California, USA]
P. pacificus McKenzie	16/15	XX−X0	Brown and Cleveland, 1968 [California, USA]
P. yuccae (Coquillett)	20/19	XX−X0	Brown and Cleveland, 1968 [California, USA]
Puto sp.	14/13	XX−X0	Hughes-Schrader, 1944 [Mexico]
Rastrococcus iceryoides (Green)	10	L+C	Parida and Moharana, 1982 [India]
R. sp.? *spinosus* (Robinson)	10	?	Parida and Moharana, 1982 [India]
Rastrococcus sp.	10	?	Moharana, 1990 [India]
Rhizoecus dianthi Green	12	S	Nur et al., 1987 [California, USA]
Rh. falcifer Kunckel d'Herculais	12	S	McKenzie, 1967 [California, USA]
Rh. mayanus (Hambleton)	10	S	Nur et al., 1987 [Jamaica]
Rh. mexicanus (Hambleton)	8	L	Gavrilov, 2004b [St. Petersburg, Russia (under glass)]
Saccharicoccus sacchari (Cockerell)	10	S	McKenzie, 1967 [California, USA]. Nur et al., 1987 [Hawaii, USA]

Spilococcus mamillariae (Bouché)	20	L	Manichote and Middlekauff, 1967 (as *S. cactearum*) [California, USA]
		P (thelytoky)	Gavrilov, this report [St. Peterburg, Russia (under glass)]
S. sequoiae (Coleman)	24	S	Nur et al., 1987 [California, USA]
Trionymus aberrans Goux	16	L	Gavrilov, this report [Voronezh, Russia]
T. caricis McConnell	8	S	Nur et al., 1987 [Tenessee, USA]
T. insularis Ehrhorn	10	P	Nur et al., 1987 [Hawaii, USA]
T. longipilosus De Lotto	10	S	Nur et al., 1987 [Zanzibar]
T. perrisii (Signoret)	16	L	Gavrilov, 2004a [Voronezh, Russia]
Trionymus sp.	10	P(m)	Nur et al., 1987 [Hawaii, USA]
Vryburgia amaryllidis (Bouché)	10	S	Nur et al., 1987 (as *Chorizococcus lounsburyi*) [Hawaii, USA]
V. transvaalensis (Brain)	10	P	Nur et al., 1987 [Kenya]
Fam. Eriococcidae (560/95)			
Acanthococcus agropyri (Borchsenius)	16	C	Gavrilov, 2004a [Voronezh, Russia]
A. insignis (Newstead)	16	C	Gavrilov, 2004a [Voronezh, Russia]
Apiomorpha attenuata (Froggatt)	ca. 56	CL[1] ?	Cook, 2000 [Australia]
A. baeuerleni (Froggatt)	4 6	CL[1] ?	Cook, 2000 [Australia]
A. calycina (Tepper)	92	CL[1] ?	Cook, 2000 [Australia]
A. conica (Froggatt)	18 22	CL[1] ?	Cook, 2000 [Australia]
A. densispinosa Gullan	4	CL[1] ?	Cook, 2000 [Australia]

A. sp. prope *densispinosa* Gullan	4	CL[I] ?	Cook, 2000 [Australia]
A. dipsaciformis (Froggatt)	18	CL[I] ?	Cook, 2000 [Australia]
A. duplex (Schrader)	24 28	CL[I] ?	Cook, 2000 [Australia]
A. excupula Fuller	18	CL[I] ?	Cook, 2000 [Australia]
A. frenchi Froggatt	16 12 22	CL[I] ?	Cook, 2000 [Australia]
A. gullanae Cook	72–74	P(o)	Cook, 2003 [Australia]
A. helmsii Fuller	98	CL[I] ?	Cook, 2000 [Australia]
A. hilli Froggatt	ca. 42	CL[I] ?	Cook, 2000 [Australia]
A. intermedia Gullan	12	CL[I] ?	Cook, 2000 [Australia]
A. sp. prope *intermedia* Gullan. 1.	4	CL[I] ?	Cook, 2000 [Australia]
A. sp. prope *intermedia* Gullan. 2.	34	CL[I] ?	Cook, 2000 [Australia]
A. karschi Rübsaamen	ca. 62 108 ca. 122	CL[I] ?	Cook, 2000 [Australia]
A. longiloba Brimblecombe	ca. 178	CL[I] ?	Cook, 2000 [Australia]
A. macqueeni Froggatt	ca. 192	CL[I] ?	Cook, 2000 [Australia]
A. maliformis Fuller	18	CL[I] ?	Cook, 2000 [Australia]
A. malleeacola Gullan	8 46 56	CL[I] ?	Cook, 2000 [Australia]
A. minor (Froggatt)	42 10 84	CL[I] ?	Cook, 2000 [Australia]
A. munita malleensis Gullan	6 20 22 24 26	CL[I] ?	Cook, 2001 [Australia]

A. munita munita (Schrader)	54 >100	CL[I] ?	Cook, 2000, 2001 [Australia]
A. munita tereticornuta Gullan	6 8 20 22 24	CL[I] ?	Cook, 2000, 2001 [Australia]
A. ovicola (Schrader)	62	CL[I] ?	Cook, 2000 [Australia]
A. ovicoloides (Tepper)	38 ca. 76	CL[I] ?	Cook, 2000 [Australia]
A. pedunculata (Fuller)	38	CL[I] ?	Cook, 2000 [Australia]
A. pharetrata (Schrader)	48? 46 48 10 26	CL[I] CL[I] ?	Brown, 1967 [Australia] Cook, 2000 [Australia]
A. pileata (Schrader)	4 6 34	CL[I] ?	Cook, 2000 [Australia]
A. regularis (Tepper)	108	CL[I] ?	Cook, 2000 [Australia]
A. rosaeforma (Froggatt)	14	CL[I] ?	Cook, 2000 [Australia]
A. sessilis (Froggatt)	4	CL[I] ?	Cook, 2000 [Australia]
A. sloanei (Froggatt)	ca. 92 ca. 136 ca. 164	CL[I] ?	Cook, 2000 [Australia]
A. spinifer Froggatt	ca. 132 144 152 164	CL[I] ?	Cook, 2000 [Australia]
A. strombylosa (Tepper)	32 50	CL[I] ?	Cook, 2000 [Australia]
A. sp. prope *strombylosa* (Tepper)	14	CL[I] ?	Cook, 2000 [Australia]
A. subconica (Tepper)	ca. 62 66 72	CL[I] ?	Cook, 2000 [Australia]
A. tepperi Gullan	64	CL[I] ?	Cook, 2000 [Australia]

A. urnalis (Tepper)	ca. 96 ca. 146	CL[I] ?	Cook, 2000 [Australia]
A. sp. prope *urnalis* (Tepper)	4	CL[I] ?	Cook, 2000 [Australia]
A. variabilis (Froggatt)	80	CL[I] ?	Cook, 2000 [Australia]
A. withersi Froggatt	40	CL[I] ?	Cook, 2000 [Australia]
Apiomorpha sp. 1	10	CL[I] ?	Cook, 2000 [Australia]
Apiomorpha sp. 2	10	CL[I] ?	Cook, 2000 [Australia]
Apiomorpha sp. 3	72	CL[I] ?	Cook, 2000 [Australia]
Apiomorpha sp. 4	108	CL[I] ?	Cook, 2000 [Australia]
Ascelis praemollis Schrader	16	?	Cook, 2000 [Australia]
A. schraderi Froggatt	18	C^{C}	Brown, 1967 [Australia]
Capulinia jaboticabae Ihering	18	C^{varH}+?CL[I]	Brown, 1967 [Brazil]
C. orbiculata Hoy	18	H	Brown, 1967 [New Zealand]
Casuarinaloma leaii (Fuller)	12	CL[I]	Brown, 1967 [Australia]
Cylindrococcus casuarinae Maskell	6	?	Cook, 2000 [Australia]
C. spiniferus Maskell	18	H	Brown, 1967 [Australia] Cook, 2000 [Australia]
Eriococcus abditus Hoy	16	CL[I]	Brown, 1967 [New Zealand]
E. ?araucariae Maskell	18	?L	Brown, 1967 [New Guinea]
E. araucariae Maskell	18	?	Brown, 1967 [Australia]
E. cavellii (Maskell)	18	H	Brown, 1967 [New Zealand]
E. coriaceus Maskell	18	C	Brown, 1967 [New Zealand]
E. detectus Hoy	18	H	Brown, 1967 [New Zealand]
E. ?ericae Signoret	14	H	Brown, 1967 [France]
E. prope *hakeae* Fuller	18	?	Cook, 2000 [Australia]
E. lecanioides (Green)	18	H	Brown, 1967 [Australia]
E. leptospermi Maskell	18	C	Brown, 1967 [New Zealand]

E. prope *leptospermi* Maskell	18	?	Cook, 2000 [Australia]
E. minus Hoy	16	H	Brown, 1967 [New Zealand]
E. rata Hoy	14	H	Brown, 1967 [New Zealand]
E. rhodomyrti Green	16	H	Brown, 1967 [Ceylon]
E. williamsi Danzig	14?	C	Gavrilov, 2004 [Sochi, Russia]
Eriococcus sp. 1	18	H	Brown, 1967 [Australia]
Eriococcus sp. 2	18	?	Brown, 1967 [Australia]
Eriococcus sp. 3	18	?	Brown, 1967 [Australia]
Eriococcus sp. 4	18	H	Brown, 1967 [New Caledonia]
Gossyparia spuria Modeer	28	C	Schrader, 1929a [Pennsylvania, New York, USA]. Nur, 1967 [USA] Gavrilov, 2004a [Voronezh, Russia]
Lachnodius eucalypti (Maskell)	18	2n–2n	Brown, 1977 [Australia]
L. lectularius Maskell	18	?	Cook, 2000 [Australia]
Lachnodius sp. 1	18	?	Cook, 2000 [Australia]
Lachnodius sp. 2	18	?	Cook, 2000 [Australia]
Lachnodius sp. 3	18	?	Cook, 2000 [Australia]
Madarococcus totarae (Maskell)	14	C^C	Brown, 1967 [New Zealand]
M. viridulus Hoy	18	H	Brown, 1967 [New Zealand]
?*Madarococcus* sp. 1	18	H	Brown, 1967 [Australia]
Madarococcus sp. 2	18	?	Cook, 2000 [Tasmania, Australia]
Opisthoscelis convexa Froggatt	18	?	Brown, 1967 [Australia] Cook, 2000 [Australia]
O. maculata Froggatt	18	?	Cook, 2000 [Australia]
O. subrotunda Schrader	18	?	Cook, 2000 [Australia]
Opisthoscelis sp.	18	H	Brown, 1967 [Australia]

Ourococcus cobbi Fuller	14	H	Brown, 1967 [Australia]
Ovaticoccus sp.	16	?	Brown, 1967 [California, USA]
Phacelococcus subcorticalis Gullan et Strong	18	?	Cook, 2000 [Australia]
Phloeococcus loriceus Hoy	18	CL^{I}	Brown, 1967 [New Zealand]
Scutare lanuginosa Hoy	24	CL^{I}	Brown, 1967 [New Zealand]
Sisyrococcus intermedius (Maskell)	18	C^{varH} or CL^{I}	Brown, 1967 [New Zealand]
"Sphaerococcus" socialis Maskell	18	?	Cook, 2000 [Australia]
Fam. Kermesidae (90/1)			
Kermes quercus (Linnaeus)	26	S, H	Gavrilov, 2004a [Voronezh, Russia]
Fam. Dactylopiidae (10/7)			
Dactylopius coccus Costa	16	C	Aquino et al. 1994 [Mexico] Gavrilov, this report [Madeira, Portugal]
D. ceylonicus (Green)	10	L ?	Nur, 1982 (as *D. indicus*) [Jamaica]. Moharana, 1990 (as *D. indicus*) [India]
D. confusus (Cockerell)	10	C	Aquino et al., 1994 [Mexico]
D. opuntiae (Cockerell)	10	C ?	Nur, 1982 [Texas, USA]. Moharana, 1990 [India]
Dactylopius sp.1	10	L	Hughes-Schrader, 1948 [Mexico]
Dactylopius sp. 2	10	C	Aquino et al., 1994 [Mexico]
Dactylopius sp. 3	10	C	Aquino et al., 1994 [Mexico]
Fam. Asterolecaniidae s.l. (including Cerococcidae and Lecanodiaspididae) (550/5)			
Anomalococcus indicus Ayyar	14	?	Parida and Moharana, 1982 [India]
Asterodiaspis quercicola (Bouché)	24	P(o)	Gavrilov and Kuznetsova, 2005 [Voronezh, Russia]

Cerococcus indicus (Maskell)	14	?	Moharana, 1990 [India]
C. quercus Comstock	18	L	Brown, 1959 [California, USA]
Mycetococcus ehrhorni (Cockerell)	6	C	Brown, McKenzie, 1962 [?]
Fam. Stictococcidae (16/1)			
Stictococcus sp.	?	2n–2n	Brown, 1977 [?]
Сем. Aclerdidae (50/1)			
Aclerda sp.	18	?	Moharana, 1990 [India]
Сем. Coccidae (1130/47)			
Acanthopulvinaria orientalis (Nasonov)	18	S, H	Gavrilov, this report [Astrachan, Russia]
Eriopeltis lichtensteini Signoret	14	S, H	Gavrilov, 2004a [St. Petersburg, Russia]
E. stammeri Schmutterer	14	S, H	Gavrilov, this report [Leningrad Region, Russia]
Eucalymnatus euterones (Signoret)	16	P(o)	Nur, 1972 [California, USA]
Eulecanium ciliatum (Douglas)	18	?	Drozdovskiy, 1966 [Moscow, Russia]
E. douglasi (Šulc)	18	?	Drozdovskiy, 1966 [Moscow, Russia]
? *E. tiliae* (Linnaeus)	18	S	Thomsen, 1929 (as *Lecanium coryli*) [Denmark]
Ceroplastodes sp.	18	?	Moharana, 1990 [India]
Ceroplastes actiniformes (Green)	32	?	Moharana, 1990 [India]
C. floridensis Comstock	36	?	Moharana, 1990 [India]
C. japonicus Green	36	S, H	Gavrilov and Kuznetsova, 2005 [Sochi, Russia]
C. pseudoceriferus (Green)	36	?	Moharana, 1990 [India]
C. rubens Maskell	36	?	Moharana, 1990 [India]

Ceroplastes sp. ?*ceriferus* (Fabricius)	36	?	Moharana, 1990 [India]
Ceroplastes sp.	36	?	Moharana, 1990 [India]
Chloropulvinaria aurantii (Cockerell)	26	?L	Gavrilov and Kuznetsova, 2005 [Sochi, Russia]
Ch. floccifera (Westwood)	16	?	Gavrilov, this report [Crimea, Ukraine]
Ch. polygonata (Cockerell)	18	?	Moharana, 1990 [India]
Ch. psidii Maskell	14	?	Moharana, 1990 [India]
Coccus hesperidum Linnaeus	14	P (deuterotoky)	Thomsen, 1927, 1929 (as *Lecanium*) [Denmark (under glass)].
	14	P(o)	Nur, 1979 [Texas, California and under glass, USA].
	14	?	Moharana, 1990 [India]
C. longulus (Douglas)	18	?	Moharana, 1990 [India]
Coccus sp.	18	?	Moharana, 1990 [India]
Drepanococcus cajani (Maskell)	18	?	Moharana, 1990 (as *Ceroplastodes*) [India]
Lichtensia viburni Signoret	18	S, H	Gavrilov, this report [Crimea, Ukraine]
Luzulaspis dactylis Green	18	H	Gavrilov, 2004a [St. Petersburg, Russia]
Neolecanium cornuparvum (Thro)	34	C	Nur, 1980 [?]
Neopulvinaria innumerabilis (Rathvon)	?	H, P (deuterotoky)	Nur, 1980 (as *Pulvinaria*) [?]
Parasaissetia sp.	20	?	Moharana, 1990 [India]
Parthenolecanium cerasifex (Fitch)	16	P (deuterotoky)	Phillips, 1965 (as *Lecanium*) [Ontario, Canada] Nur, 1980 (as *Lecanium*) [Ontario, Canada]
P. corni (Bouché)	16	?	Thomsen, 1929 (as *Lecanium*) [Denmark]
	16+Bs?	?C	Gavrilov, Kuznetsova, 2005 [Voronezh, Russia]

P. putmani (Phillips)	16	P (Deuteron-toky)	Phillips, 1965 (as *Lecanium*) [Ontario, Canada] Nur, 1980 (as *Lecanium*) [Ontario, Canada]
Physokermes hemicryphus (Dalman)	18 (2n) 27 (3n)	P(o) P(o)	Nur, 1979 [Beltsville, USA]
Protopulvinaria pyriformis (Cockerell)	16	P (thelytoky)	Gavrilov, this report [France]
Pseudopulvinaria sp.	18	?	Moharana, 1990 [India]
Pulvinaria hydrangeae Steinweden	16	H, P (deutero-toky)	Nur, 1963 [California, USA]
P. peregrina (Borchsenius)	16	P(o)	Gavrilov, this report [Sochi, Russia]
P. ribesiae Signoret	18	S S, H	Drozdovskiy, 1966 [Moscow, Russia] Gavrilov, 2004a (as *P. vitis* [St.Petersburg, Russia]
P. vitis (Linnaeus)	16	?	Drozdovskiy, 1966 [Moscow, Russia]
Pulvinaria sp.	16	?	Moharana, 1990 [India]
P. sp. prope *polygonata* Cockerell	18	?	Moharana, 1990 [India]
Pulvinariella mesembryanthemi (Vallot)	?	P (Deuterotoky)	Pesson, 1941 (as *Pulvinaria*) [France]
Rhizopulvinaria variabilis Borchsenius	28	P(o)	Gavrilov, this report [Astrakhan, Russia]
Saissetia coffeae (Walker)	16 16 16	P P(o) ?	Thomsen, 1927, 1929 (as *Lecanium hemisphaericum*) [Denmark, under glass]. Nur, 1979 [Rochester, USA, under glass]. Moharana, 1990 [India]
S. miranda Cockerell et Parrott.	16	?	Moharana, 1990 [India]
Saissetia sp.	16	?	Moharana, 1990 [India]

Sphaerolecanium prunastri (Fonscolombe)	18 18+Bs?	? ?C	Tremblay, 1961 [Italy]. Gavrilov and Kuznetsova, 2005 [Voronezh, Russia]
Vinsonia sp. ?*stellifera* (Westwood)	10	?	Moharana, 1990 [India]
Fam. Kerriidae (97/4)			
Kerria lacca (Kerr)	18	L	Dikshith, 1964 [India]
Kerria sp.	18	?	Moharana, 1990 [India]
K. sp. ?lacca (Kerr)	18	?	Moharana, 1990 [India]
Tachardiella sp.	20	L	Brown, 1959 [Arizona, USA]
Fam. Beesoniidae (9/0)			
Fam. Conchaspididae (30/1)			
Conchaspis lepagei Hempel	12	L	Brown, 1959 [São Paulo, Brazil]
Fam. Phoenicococcidae (including Halimococcidae) (22/7)			
Colobopyga browni Beardsley	10	C	Brown, 1965 [Hawaii, USA]
C. pritchardiae (Stickney)	10	C^{varH}	Brown, 1965 [Hawaii, USA]
Halimococcus borassi Green	10	C	Brown, 1965 [Ceylon]
Phoenicococcus marlatti Cockerell	18	C^{varH}	Brown, 1965 [California, USA]
Platycoccus tylocephalus Stickney	10	L	Brown, 1965 [Hawaii, USA]
Thysanococcus calami Stickney	10	P	Brown, 1965 [Jamaica]
Th. pandani Stickney	10	S, H	Brown, 1965 [Bogor, Indonesia]
Fam. Diaspididae (2370/141)			
Abgrallaspis cyanophylli (Signoret)	8	D	Brown, 1965 (as *Hemiberlesia*) [Sicily, Italy]
A. flavida De Lotto	8	D	Brown, 1965 (as *Hemiberlesia*) [Kenya]
Acutaspis paulista (Hempel)	8	D	Brown, 1965 (as *Melanaspis*) [São Paulo, Brazil]

A. perseae (Comstock)	8	D	Brown, 1965 [São Paulo, Brazil]
Africaspis chionaspiformis (Newstead)	8	D	Brown, 1965 [Kenya]
A. fici (Newstead)	12	D	Brown, 1965 [Kenya]
Ancepaspis edentata (Ferris)	8	C CL^{I}	Brown, 1965 [Arizona, USA]
A. tridentata (Ferris)	6	C^{varH}	Brown, 1963 [Mexico]
Aonidia lauri (Bouché)	8	C	Brown, 1963 [France. Greece]
A. shastae (Coleman)	8	D	Brown, 1965 [Arizona, USA]
Aonidiella aurantii (Maskell)	8	D D	Brown, 1965 [California, USA] Parida and Moharana, 1982 [India]
A. citrina (Coquillett)	8	D	Brown, 1965 [California, USA]
A. orientalis (Newstead)	8	D	Parida and Moharana, 1982 [India]
A. simplex Grandpré et Charmoy	8	D	Brown, 1965 (as *A. andersoni*) [Kenya]
Aonidiella sp.	8	?	Moharana, 1990 [India]
Aonidomytilus concolor (Cockerell)	12	D	Brown, 1965 [Mexico]
A. variabilis Ferris	10	D	Brown, 1965 [California, USA]
Aspidaspis arctostaphyli (Cockerell et Robbins)	8	D	Brown, 1965 [California, USA]
A. densiflorae (Bremner)	8	D	Brown, 1965 [California, USA]
Aspidiella hartii (Cockerell)	8	D	Brown, 1965 [Trinidad]
A. sacchari (Cockerell)	8	D	Brown, 1965 [Trinidad]
Aspidiotus cryptomeriae Kuwana	8	D	Brown, 1960b [Japan]

A. destructor Signoret	8	D	Brown, 1965 [Trinidad. Jamaica]
A. hedericola Leonardi	8	D	Brown, 1965 [Italy]
A. nerii Bouché	8	P D, P ?	Schrader, 1929b (as *A. hederae*) [?Pennsylvania, USA]; Brown, 1965 (as *A. hederae*) [California, USA; São Paulo, Brazil; Italy; Israel]. Moharana, 1990 [India]
A. simulans De Lotto	8	D	Brown and De Lotto, 1959 [Kenya] Brown, 1960a [Kenya] Brown, 1965 [Kenya]
Aulacaspis rosae (Bouché)	8	D	Brown, 1965 [Mauritius; France]
A. spinosa (Maskell)	8	D	Brown, 1965 [Japan]
A. tubercularis Newstead	8	D	Brown, 1965 (partly as *A. cinnamomi*) [Sãn Paulo, Brazil; Mauritius]
Aulacaspis sp.	8	?	Moharana, 1990 [India]
Carulaspis minima (Signoret)	8	D	Brown, 1965 [Mexico]
Chionaspis ortholobis Comstock	8	D	Brown, 1965 [Arizona, USA]
Ch. pinifoliae (Fitch)	8	D and P	Brown, 1965 (as *Phenacaspis*) [California, Arizona, Idaho, USA]
Ch. platani (Cooley)	8	D	Brown, 1965 (as *Phenacaspis*) [Mexico]
Ch. salicis (Linnaeus)	8	?D	Gavrilov, 2004 [St. Petersburg, Russia]
Chrysomphalus aonidum (Linnaeus)	8	D	Brown, 1965 (as *Ch. ficus*) [Trinidad; Mexico]
Ch. bifasciculatus Ferris	8	D	Brown, 1965 [California, USA]

Ch. dictyospermi (Morgan)	8	P	Brown, 1965 [Mexico]
Ch. pinnulifer (Maskell)	8	P	Brown, 1965 [Kenya]
Clavaspis coursetiae (Marlatt)	8	D	Brown, 1965 [Arizona, USA]
C. texana Ferris	8	D	Brown, 1965 [Mexico]
Clavaspis sp.	8	?	Moharana, 1990 [India]
Comstockiella sabalis (Comstock)	10	C	Brown, 1957 [Bermuda] Brown, 1963 [Bermuda]
Cooleyaspis praelonga (Newstead)	18	D	Brown, 1965 [Kenya]
Costalimaspis eugeniae Lepage	12	C and L	Brown, 1965 [São Paulo, Brazil]
Crassaspis multipora (Ferris)	8	D	Brown, 1965 [Mexico]
Diaspidiotus aesculi (Johnson)	8	D	Brown, 1960a [Arizona, USA] Brown, 1965 [Arizona, USA.]
D. ancylus (Putnam)	8	D	Brown, 1965 (as *Hemiberlesia howardi*) [Mexico]
D. gigas Thiem et Gernek	8	D	Gavrilov, 2004a [Voronezh, Russia]
D. lenticularis (Lindinger)	8	D	Brown, 1965 [Australia]
D. ostreaeformis (Curtis)	8	D	Brown, 1965 (as *Quadraspidiotus*) [Italy]
D. perniciosus (Comstock)	8	D?	*Lindner, 1954 [?], according to Brown, 1965 (as *Quadraspidiotus*)
D. zonatus (Frauenfeld)	8	D	Brown, 1965 [France]
Diaspis boisduvalii Signoret	8	D	Brown, 1965 [Pericicaba, Brazil; Jamaica]
D. bromeliae (Kerner)	8	D	Brown, 1965 (as *Quadraspidiotus*) [Trinidad]

D. echinocacti (Bouché)	16	D	Brown, 1965 [California, Arizona, Hawaii, USA].
		D	Parida and Moharana, 1982 [India]
Duplachionaspis sicula (Lupo)	8	D	Brown, 1965 [Sicily, Italy]
Dynaspidiotus apacheca (Ferris)	8	D	Brown, 1965 (as *Nuculaspis*) [Guatemala]
D. californicus (Coleman)	8	D	Brown, 1965 (as *Nuculaspis*) [California, USA]
D. pseudomeyeri (Kuwana)	8	D	Brown, 1960b (as *Tsugaspidiotus*) [Japan]
D. tsugae (Marlatt)	8	S	Brown, 1965 [Japan]
Epidiaspis leperii (Signoret)	8	S	Brown, 1965 [Sicily, Italy]
E. persimilis (Cockerell)	8	D	Brown, 1965 (as *E. phoradendri*) [Mexico]
Fiorinia fioriniae (Targioni Tozzetti)	8	P	Brown, 1965 [São Paulo, Brazil]
F. japonica Kuwana	8	D	Brown, 1965 [Japan]
Froggattiella penicillata (Green)	8	C^{varH}	Brown, 1963, 1965 (as *Odonaspis*) [Fiji]
Furcaspis biformis (Cockerell)	6	C	Brown, 1965 [Jamaica]
Greenaspis decurvata (Green)	8	D	Parida and Moharana, 1982 [India]
Gymnaspis aechmeae Newstead	10	H	Brown, 1965 [Rio de Janeiro, Brazil]
Helaspis mexicana McKenzie	12	D	Brown, 1965 [Mexico]
Hemiberlesia cupressi (Cockerell)	8	P	Brown, 1965 [Guatemala]
H. lataniae (Signoret)	8	D, P	Brown, 1965 [California, Hawaii, USA; Mexico; Uganda; Jamaica]
		D	Parida and Moharana, 1982 [India]

H. palmae Cockerell	8	P	Brown, 1965 [São Paulo, Brazil]
		?	Moharana, 1990 [India]
H. quercicola Ferris	8	D	Brown, 1965 [Arizona, USA]
H. rapax (Comstock)	8	P	Brown, 1965 [California, USA; Mexico; Guatemala; Italy]
Howardia biclavis (Comstock)	10	P	Brown, 1961 [?]; 1965 [Bermuda, Great Britain; Hawaii, USA; Jamaica]
Ischnaspis longirostris (Signoret)	8	P	Brown, 1965 [Mexico; Trinidad; Jamaica, Uganda]
Kuwanaspis bambusicola (Cockerell)	10	P	Brown, 1965 [Santos, Brazil]
K. pseudoleucaspis (Kuwana)	8	P	Brown, 1965 [France]
Ledaspis reticulata (Malenotti)	8	D	Brown, 1965 [Kenya]
L. tenuiloba De Lotto	18	D	Brown, 1965 [Kenya]
Lepidosaphes conchyformis (Gmelin)	8	D	Brown, 1965 [France]
L. tokionis (Kuwana)	12	D	Brown, 1965 [Mauritius]
L. ulmi (Linnaeus)	8	D	Brown, 1965 [France; Trinidad (as *L. beckii*)]
	12	?	Drozdovskiy, 1966. [Moscow, Russia]
Leucaspis loewi Colvée	11	P(a?)	Brown, 1965 [France]
L. pusilla Löw	8	H	Brown, 1965 [Italy]
Lindingaspis ferrisi McKenzie	8	D	Parida and Moharana, 1982 [India]
L. opima (Silvestri)	8	D	Brown, 1965 [Kenya]
L. rossi (Maskell)	8	D	Brown, 1965 [Australia; Peru]
Melanaspis glomerata (Green)	8	D	Parida and Moharana, 1982 [India]

M. inopinata (Leonardi)	8	S	Brown, 1965 [Italy]
M. lilacina (Cockerell)	8	D	Brown, 1965 [Arizona, USA]
Morganella longispina (Morgan)	8	D	Brown, 1965 [Bermuda]
Mycetaspis juventinae Lepage et Giannotti	8	D	Brown, 1965 [São Paulo, Brazil]
M. personata (Comstock)	8	D	Brown, 1965 [Mexico]
Neomorgania eucalypti (Maskell)	8	H	Brown, 1965 [Australia]
Neoselenaspidus kenyae Mamet	8	P	Brown, 1965 [Kenya]
N. silvaticus (Lindinger)	8	P	Brown, 1965 [Kenya]
Nicholiella bumeliae Ferris	8	C and L	Brown, 1963 [New Mexico, USA]
Nikkoaspis shiranensis Kuwana	8	D	Brown, 1965 [Japan]
Odonaspis ruthae Kotinsky	8	P	Brown, 1965 [California, Hawaii, USA]
O. saccharicaulis (Zehntner)	8	D	Parida and Moharana, 1982 [India]
Opuntiaspis philococcus (Cockerell)	8	D	Brown, 1965. [Mexico.]
Parlatoria crotonis Douglas	8	C and L	Brown, 1965 [Jamaica]
P. oleae (Colvée)	8	C	Brown, 1963, 1965 [California, USA]
P. proteus (Curtis)	8	C and L, P(m)	Brown, 1965 [Rio de Janeiro, Brazil]
P. ziziphi (Lucas)	8	C and L	Brown, 1965 [France]
Pinnaspis aspidistrae (Signoret)	8	D	Brown, 1965 [Sicily, Italy]
P. buxi (Bouché)	8	P	Brown, 1965 [Rio de Janeiro, Brazil]
P. strachani (Cooley)	8	D	Brown, 1965 [Mexico; Jamaica; Brazil; Peru]

Poliaspoides formosana (Takahashi)	8	P(m)	Brown, 1965 [Mauritius; Kenya]
Protodiaspis agrifoliae Essig	8	D	Brown, 1965 [Mexico]
P. chichi McKenzie et Nelson-Rees	8	D	Brown, 1965 [Guatemala]
P. didymus McKenzie et Nelson-Rees	8	S	Brown, 1965 [Arizona, USA]
P. infidelis Ferris	6	D	Brown, 1965 [Guatemala]
P. signata Ferris	8	D	Brown, 1965 [Mexico]
Pseudaonidia baikeae (Newstead)	8	H	Brown, 1958 [Kenya]
P. trilobitiformis (Green)	8	C, L	Brown, 1965 [Viçosa, Brazil; Mauritius]
Pseudaulacaspis pentagona (Targioni Tozzetti)	16	D	Brown, 1965 [S. Africa; Jamaica; Sãn Paulo, Brazil]
Pseudaulacaspis sp.	16	?	Moharana, 1990 [India]
Pseudischnaspis bowreyi (Cockerell)	8	D	Brown, 1965 [Jamaica]
Pseudoparlatoria browni McKenzie	8	D	Brown, 1965 [Mexico]
P. ostreata Cockerell	10	D	Brown, 1965 [Jamaica; Viçosa, Brazil]
P. parlatorioides (Comstock)	10	D	Brown, 1965 [São Paulo, Brazil]
Radionaspis indica (Marlatt)	8	C and L?	Brown, 1965 [Jamaica]
Rhizaspidiotus dearnessi (Cockerell)	8	D	Brown, 1965 [Mexico]
Rolaspis anacantha De Lotto	18	D	Brown, 1965 [Kenya]
Selenaspidus articulatus (Morgan)	8	D	Brown, 1965 [Trinidad; Jamaica; Peru]
S. incisus Lindinger	8	P	Brown, 1960a [Kenya]

Separaspis capensis (Walker)	8	D	Brown, 1965 (as *Furcaspis*) [Pretoria, South Africa]
Situlaspis yuccae (Cockerell)	10	D	Brown, 1965 [Arizona, USA]
Spinaspidiotus fissidens (Lindinger)	8	D	Brown, 1965 [Kenya]
Targionia bigeloviae (Cockerell)	8	P	Brown, 1965 [Mexico]
T. nigra Signoret	8	D	Brown, 1965 [France]
T. vitis Signoret	8	D	Brown, 1965 [Italy]
T. yuccarum (Cockerell)	8	?	Brown, 1965 [Arizona, USA]
Trischnaspis bipindensis (Lindinger)	8	P	Brown, 1965 (as *Ischnaspis*) [Kenya]
Unachionaspis bambusae (Cockerell)	8	D	Brown, 1965 [Japan]
Unaspis citri (Comstock)	8	D	Brown, 1965 [Trinidad]
U. euonymi (Comstock)	8	D	Brown, 1965 [Italy]
Xerophilaspis prosopidis (Cockerell)	8	D	Brown, 1965 [Mexico]
Xanthophthalma concinnum Cockerell et Parrott	16	P	Brown, 1965 [Mexico]

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