

F. KOZÁR

**Zoogeographical analysis and status of knowledge
of the Eriococcidae (Hemiptera), with a World list of species**

Riassunto - *Analisi zoogeografica e stato delle conoscenze delle Eriococcidae (Hemiptera) con l'elenco delle specie note nel mondo*

In accordo con i dati attuali la famiglia degli Eriococcidi comprende 628 specie (il Database ScaleNet ne comprende solo 572 al 24 febbraio 2009) appartenenti a 97 generi.

La descrizione di nuovi generi e specie di Eriococcidae è stata incrementata dal 1758 fino ad oggi. La famiglia conta il più alto numero di generi e specie nella Regione Palearctica, seguita dalle regioni Neotropicale, Australiana, Nuova Zelanda e del Pacifico ed infine dalla regione Nearctica.

Si osserva la molto ridotta segnalazione nelle regioni Etiope, Orientale e Austro-Orientale.

Il numero di specie endemiche è particolarmente alto nella Regione Palearctica, Australiana, della Nuova Zelanda e del Pacifico.

Nelle regioni Palearctica e Nearctica la fauna degli Eriococcidi è ricca su piante erbacee dicotiledoni e Graminacee. Sebbene le specie galligene su Myrtaceae, in particolare su *Eucalyptus*, siano estremamente numerose in Australia, le Fagaceae albergano un grande numero di specie in Nuova Zelanda e Australia.

Il diagramma di Venn mostra che tutte le regioni zoogeografiche presentano una fauna specifica di Eriococcidi nettamente separata sia a livello di genere che di specie. Noi troviamo i più stretti collegamenti tra regioni Orientale e Palearctica che hanno in comune 5 generi e 20 specie.

Vi sono alcuni deboli collegamenti tra le regioni Nearctica e Palearctica piuttosto che tra la Nearctica e la Neotropica. Le regioni Orientale e Austro-Orientale sono connesse dalle specie dei generi *Gossypariella* e *Sangiococcus*. La regione Australiana è connessa con le regioni della Nuova Zelanda e del Pacifico dalle specie del genere *Madarococcus*.

Le affinità morfologiche tra *Pseudomontanococcus* della regione Austro-Orientale e *Montanococcus* della Nuova Zelanda evidenziano un nuovo possibile collegamento tra queste regioni.

La Nuova Zelanda ha alcuni collegamenti pure con la regione Neotropicale.

Alcuni generi presentano una distribuzione inconsueta; *Cryptococcus* è presente nelle regioni Palearctica e Nearctica e in Nuova Zelanda, ma con più specie nella regione Palearctica.

Il caso di *Kuwanina* è simile: vi sono specie in Australia, Nuova Zelanda e regione Palearctica.

Ambedue i generi potrebbero essere un antico complesso di un gruppo della famiglia Acanthococcidae.

La particolare ricchezza in specie delle regioni Australia e Nuova Zelanda concorda con il punto di vista di Hoy (1962) che suggerisce che le radici di questa famiglia e del gruppo di famiglie possono aver avuto origine sotto la copertura di ghiaccio dell'Antartide.

La comune evoluzione di questa famiglia parte da qui e solo successivamente si è diffusa nelle regioni temperate.

Hoy (1962) è dell'opinione che gli Eriococcidi abbiano avuto origine nelle regioni temperate nel Gondwana e i nuovi dati confermano questa opinione. Il clima arido e le piante xerofile giustificano la ricchezza di generi e di specie di questa famiglia. Al momento attuale i generi e le specie sono stati costituiti essenzialmente dall'estinzione e dalla vicarianza e meno dalla dispersione.

Abstract - According to the present survey the family of Eriococcidae contains 628 species (the ScaleNet database contains only 572 species on 24 February, 2009) of 97 genera. The description of new genera and species of Eriococcidae have been increasing steadily since 1758 till present. The family has highest numbers of genera and species in the Palaearctic Region, followed by the Neotropical, Australian, New Zealand and Pacific regions, and finally by the Nearctic region. The very poor representation in the Ethiopian, Austro-Oriental and Oriental regions is remarkable. The number of endemic species is especially high in the Palaearctic, Australian, New Zealand and Pacific regions. In the Palaearctic and Nearctic regions the eriococcid fauna on herbaceous and grass is rich. Although the gall forming species on Myrtaceae especially on *Eucalyptus* are extremely numerous in Australia, the Fagaceae harbour a lot of species in New Zealand and Australia. The Venn diagram shows that all zoogeographic regions have clearly separated specific eriococcid faunas at both generic and species levels. We found the strongest connection between the Oriental and the Palaearctic regions which have in common 5 genera and 20 species. There is some weak connection between the Nearctic and Palaearctic as well as the Nearctic and Neotropic regions. The Oriental and Austro-Oriental regions are connected by species of *Gossypariella* and *Sangicoccus*. The Australian Region is connected with the New Zealand and Pacific regions by the *Madarococcus* species. The morphological similarity of *Pseudomontanococcus* from the Austro-Oriental region and *Montanococcus* from New Zealand present a new possible connection between these regions. New Zealand has some connection with the Neotropical Region, too. Some genera show unusual distribution, *Cryptococcus* is present in the Palaearctic, and Nearctic regions, and in New Zealand, with more species in the Palaearctic region. The case of *Kuwanina* shows a similar picture: it has species in Australia, New Zealand and in Palaearctic regions. Both genera may present an old stock of the Acanthococcidae family group. The particular species richness of the Australian and New Zealand regions is in accordance of Hoy's (1962) view suggesting that the roots of this family and family group may lead under the ice cover of Antarctica. The main evolution of this family occurred there and only subsequently spread to the more temperate regions. Hoy (1962) believed that Eriococcidae originated in the temperate areas of the Gondwana continent and the new data support this opinion.

The arid climate and sclerophyllous plants explain the generic and species richness of this family. The present day generic and species composition is formed basically by extinction and vicariance, and less by dispersion.

Key words: scale insects, felt scales, Acanthococcidae, Eriococcidae, Cryptococcidae, species list, distribution, zoogeography.

The family Eriococcidae (Felt scales) is the fourth richest, and presumable one of the oldest family of Coccoidea (Koteja, 1985; Foldi, 1997; Hoy, 1962, 1963; Miller and Gimpel, 2000; Miller and Kosztarab, 1979), however, comparing with the other scale insect families, our taxonomic knowledge on this family is far from complete. Zoogeography of this family was studied in detail by Borchsenius (1949), Hoy (1962), Williams (1984), Kozár and Drozdják (1987) and partly by Gullan et al (2006). The phylogenetic paper of Ouvrard and Kozár (2009) also contains some zoogeographic information based on the ScaleNet database. Studying the world-wide zoogeography of the family, the generic and species richness of the South Hemisphere indicates that the family has southern origin (Eastop, 1978, 1979; Hoy, 1962; Williams, 1984).

The family Eriococcidae has been treated differently by the authors: Ben-Dov et al. (1997), Borchsenius (1948, 1949), Danzig (1962, 1975, 1980), Dziedzicka & Koteja (1971), Ferris (1957), Foldi & Kozár (2007), Hodgson (2001), Hoy (1962, 1963), Kosztarab & Kozár (1988), Koteja (1974a, b), Koteja & Zak-Ogaza (1981), Kozár & Walter (1985), Köhler (1998), Miller (1991), Miller & Gimpel (1996), Miller & Miller (1992, 1993), Ouvrard and Kozár (2009), Signoret (1875), Tang & Hao (1995), Tereznikova (1981), Williams (1985), Williams & Watson (1990), etc. A lot of information has been found in the on-line database ScaleNet, which contains very important data (taxonomy, distribution, biology, etc) for the species of this family (Ben-Dov et al. 2006).

Miller & Gimpel (2000) in the World Catalogue treated 551 species in 67 genera belonging to the family of Eriococcidae, and Ben-Dov et al. (2006, last updated in 24 February 2009) mentioned in the ScaleNet database 572 species. Among them, the genus *Eriococcus sensu lato*, contains 346 species and is unnaturally large. It is especially striking for the well-studied Palaearctic Region where 155 species from 175 were sunken and covered under the so-called generic name “*Eriococcus*”.

The Eriococcidae fauna is not well explored in the World, the description of new species shows a continuous increase (Miller & Gimpel 2000). Such a trend has already been shown by Kozár & Drozdják (1987) for the Palaearctic Region. However in the last years there is a very intensive progress in the study of the Eriococcidae all over the World (Erkilic et al., 2009; Foldi and Kozár, 2007; Gullan and Strong, 1997; Hardy and Gullan, 2007a, b; Hardy et al, 2008; Henderson, 2006, 2007a, b; Hodgson, 1994; Hodgson and Miller, 2002; Hodgson and Trencheva, 2008; Kaydan and Kozár, 2008; Kondo et al, 2006, Kozár and Konczné Benedicty, 2008; Kozár et al, 2007, 2008, 2009; Matile-Ferrero 1988; Williams 2007; Williams and Martin, 2003, and others. These new data make it possible to prepare a new zoogeographic analysis and a World list of species reflecting mostly the view of the generic structure used by Palaearctic authors.

In this study Eriococcidae is treated here in sense of Koteja (1974 a, b) and Tang and Hao (1995). On the other hand, according to Williams (1985), Miller & Gimpel (2000); and Ben-Dov et al (2006) the monotypic genus *Pseudochermes* belongs to the family Eriococcidae. Koteja (1974a, b) included it in the Acanthococcidae family group in the Cryptococcidae Kosztarab, 1967 family, but Danzig (1980) did not accept this concept, and synonymized the Cryptococcidae with Eriococcidae. Kosztarab and Kozár (1988), and Köhler (1998) followed Koteja's system. Tang and Hao (1995) took an intermediate position establishing an Eriococcidae *sensu lato* family, and included in it, as a subfamily, Cryptococcinae, which contains the genera *Cryptococcus* and *Pseudochermes*.

All of above mentioned data, complications and increasing number of new publications shows that we need to summarise the new results and clarify the nomenclature from time to time. The aim of the present paper is to present a current zoogeographic analysis, and a new generic and species list.

MATERIAL AND METHODS

The present analysis is based on the World Catalogue of Miller and Gimpel (2000), the scale insect data base ScaleNet (Ben-Dov, et al, 2006), the Palaearctic Catalogue of Köhler (1998), and the work of Ouvrard and Kozár (2009), with addition of publications issued during the last years as mentioned in the introduction. Concerning the zoogeographic regions we followed the system used by Kozár and Ben-Dov (1997).

RESULTS

General statistics.

According to the present survey the family Eriococcidae contains 628 species in 97 genera. The World list of genera and species is given in Table 1. The presented Acanthococcus genus *sensu lato* includes 122 species from different regions of the World, which probable should be separated in smaller genera, as it was already mentioned by Goux (1949, 1989), Koteja (1988), Koteja and Zak-Ogaza (1981), Miller and Gimpel (2000), and Ouvrard and Kozár (2009). About 173 species are tentatively left in an "Eriococcus" *sensu lato* group, which does not correspond with the description of the Eriococcus Targioni-Tozzetti, 1868 genus *sensu stricto*, conserved by The International Commission on Zoological Nomenclature (Miller and Williams, 1976). Most of these species were described from the Australian, Nearctic, New Zealand and Pacific zoogeographic regions, and they need further study to find the right generic place for them.

The trend of describing new genera of Eriococcidae since 1758 is shown in Fig. 1. A and steady increase can be observed in the cumulative numbers after the year 1861. In the last 60 years 4-18 new genera were described every 10 years, and especially high number (18) appears in 2001-2009. The new genus descriptions concerned different parts of the World, such as Neotropic, Australian, Austrooriental, New Zealand and Pacific, and Palaearctic zoogeographic regions. These data show that this trend will be continued

Table 1. World generic and species list of Eriococcidae with distribution of the species

Genus	Species	Palae-arctic	Nearctic	Neotropic	Ethiopian-Madagassian	Oriental	Aust-ralian	Austro-Oriental	New-Zealand and Pacific
Acalyptococcus	eugeniae Lambdin and Kosztarab, 1977	●				●			
Acalyptococcus?	deformis (Wang, 1974)	●				●			
Acanthococcus	abeliceae (Kuwana, 1927a)	●							
Acanthococcus	acericola (Tang and Hao, 1995)	●							
Acanthococcus	aceris aceris (Signoret, 1875)	●							
Acanthococcus	aceris kurdicus (Bodenheimer, 1943)	●							
Acanthococcus	acutus acutus (Goux, 1938)	●							
Acanthococcus?	adzharicus Hadzibeyli, 1960b	●							
Acanthococcus	altaicus Matesova, 1967	●							
Acanthococcus	ammophilus ammophilus (Balachowsky, 1933a)	●							
Acanthococcus	amomidis (Gómez Menor Ortega, 1935)	●							
Acanthococcus	arboisi (Goux, 1991)	●							
Acanthococcus	armeniacus (Tang & Hao, 1995)	●							
Acanthococcus	artemisiarum Matesova, 1976	●							
Acanthococcus	arthrophyti Borchsenius, 1949	●							
Acanthococcus	artiguesi (Goux, 1991)	●							
Acanthococcus	sp.n. (from Austria)	●							
Acanthococcus	azaleae (Comstock, 1881)	●	●						
Acanthococcus	azumae (Kanda, 1933)	●							
Acanthococcus	baldonensis Rasina, 1966	●							
Acanthococcus	betulaefoliae (Tang & Hao, 1995)	●							
Acanthococcus	bezzii (Leonardi, 1907b)	●							
Acanthococcus	borchsenii Danzig, 1975a	●							
Acanthococcus	brevenniae (Goux, 1993)	●							
Acanthococcus	brucius (Goux, 1995)	●							
Acanthococcus	cantium (Williams, 1985)	●							
Acanthococcus	castanopus (Tang and Hao, 1995)	●				●			
Acanthococcus	caudatus (Tang and Hao, 1995)	●							
Acanthococcus?	centaureae Savescu, 1985	●							
(Kaweckia??)									
Acanthococcus	chabohiba (Kuwana & Nitobe, 1918)	●							
Acanthococcus	christoferus (Foldi and Kozár, 2007)			●					
Acanthococcus?	cistacearum (Goux, 1936a)	●							
Acanthococcus	corniculatus (Ferris, 1950)	●				●			

Continua

Continua

Acanthococcus	costaricensis (Cockerell and Robinson, 1915)			●				
Acanthococcus	coronillae Tereznikova, 1977	●						
Acanthococcus	costatus Danzig, 1975a	●						
Acanthococcus	crassispinus Borchsenius, 1949	●						
Acanthococcus?	crispus (Boyer de Fonscolombe, 1834)	●						
Acanthococcus	desertus Matesova, 1957	●						
Acanthococcus	devoniensis (Green, 1896)		●					
Acanthococcus	(acutus) echinatus (Goux, 1938)	●						
Acanthococcus	ericae Signoret, 1875	●						
Acanthococcus	erinaceus (Kiritchenko 1940)	)	●					
Acanthococcus	festucarum (Lindinger, 1932)	●						
Acanthococcus	(Rhizococcus?)							
Acanthococcus	gassinus (Goux, 1992)	●						
Acanthococcus	glanduliferus (Balachowsky, 1933)	●						
Acanthococcus?	gnidii (Signoret, 1875)	●						
Acanthococcus	gracilispinus Borchsenius & Matesova, 1955	●						
Acanthococcus	(Gossypariella?)							
Acanthococcus	graminis (Maskell, 1897a)	●				●		
Acanthococcus	greeni (Newstead, 1898)	●						
Acanthococcus	guesinus (Goux, 1992)	●						
Acanthococcus	hassanicus Danzig, 1975a	●						
Acanthococcus	helichrysi (Goux, 1936b)	●						
Acanthococcus	henmii (Kuwana, 1931)	●				●		
Acanthococcus	(Asiacornococcus?)							
Acanthococcus	henryi (Balachowsky, 1930)	●						
Acanthococcus	heteroacanthos (Balachowsky, 1927)	●						
Acanthococcus	isacanthus Danzig, 1975a	●						
Acanthococcus	istresianus (Goux, 1989a)	●						
Acanthococcus	jorgenseni (Morrison, 1919)			●				
Acanthococcus	kaschgariae Danzig, 1972b	●						
Acanthococcus?	koelreuterius Wei & Wu 2004	●						
Acanthococcus	korotyaevi Danzig, 1982a	●						
Acanthococcus	lactucae Borchsenius, 1949	●						
Acanthococcus	lagerstroemiae (Kuwana, 1907)	●				●		
Acanthococcus	latialis (Leonardi 1907b)	●						
Acanthococcus	longisetosus (Foldi and Kozár, 2007)			●				
Acanthococcus	madeirensis (Balachowsky, 1939)	●						
Acanthococcus	marginalis Borchsenius, 1949	●						
Acanthococcus	maximus (Foldi and Kozár, 2007)			●				

Continua

Continua

Acanthococcus	melnikensis Hodgson and Trencheva, 2008	●							
Acanthococcus	micracanthus Danzig, 1975a		●						
Acanthococcus	microspinus Kozár and Konczné Benedicty, 2008			●					
Acanthococcus	minimus Tang in Tang & Li, 1988	●							
Acanthococcus	miscanthi (Takahashi, 1957)	●							
Acanthococcus	multispinosus Matesovae, 1976 (=matesovae Miller and Gimpel, 2000, reestablishment)	●							
Acanthococcus	mumtazi (Bodenheimer 1943)	●							
Acanthococcus	munroi Boratynski, 1962	●							
Acanthococcus	nematosphaerus (Hu, Xie & Yan, 1981)	●				●			
Acanthococcus	ningxianensis (Tang & Hao, 1995)	●							
Acanthococcus	notabilis Borchsenius, 1949	●							
Acanthococcus	onukii (Kuwana, 1902)	●				●			
Acanthococcus	orbiculus Matesova, 1960	●							
Acanthococcus	osbeckiae (Green, 1922)	●				●			
Acanthococcus	pamiricus Bazarov, 1968	●							
Acanthococcus	perplexus (Hempel, 1900a)			●					
Acanthococcus	populi Matesova, 1967	●							
Acanthococcus	pseudolongisetosus Konczné Benedicty and Kozár, 2008			●					
Acanthococcus	puymorensis (Goux, 1992)	●							
Acanthococcus	reynei Schmutterer, 1952	●							
Acanthococcus	ribesiae Borchsenius, 1960a	●							
Acanthococcus	roboris (Goux, 1931a)	●							
Acanthococcus	rosannae (Tranfaglia and Esposito, 1985)	●							
Acanthococcus	rugosus (Wang, 1982a) (=wangi Miller and Gimpel, 2000, reestablishment)	●				●			
Acanthococcus	saboteneus (Kuwana and Tanaka, 1922)	●							
Acanthococcus	sachalinensis (Siraiwa, 1939)	●							
Acanthococcus	salicis (Borchsenius, 1938)	●							
Acanthococcus	sasae Danzig, 1975a	●							
Acanthococcus	saxatilis (Kiritchenko, 1937a)	●							
Acanthococcus	saxidesertus Borchsenius, 1949	●							
Acanthococcus	shiraiwai (Kuwana and Muramatsu, 1931a)	●				●			
Acanthococcus	siakwanensis Borchsenius, 1960e	●				●			
Acanthococcus	sojae (Kuwana, 1917b)	●							
Acanthococcus	spiniferus Borchsenius, 1949	●							
Acanthococcus	spiraeae Borchsenius, 1949	●							
Acanthococcus	subterraneus Borchsenius, 1949	●							

Continua

Continua

Acanthococcus	targassonensis (Goux, 1993)	●							
Acanthococcus	tavignani (Goux, 1991)	●							
Acanthococcus	terrestris (Matesova, 1957)	●							
Acanthococcus	teucriicolus (Bodenheimer 1943)	●							
Acanthococcus	thymelaeae (Newstead, 1897a)	●							
Acanthococcus	thymi (Schränk, 1801)	●							
Acanthococcus	timidus (Hulden, 1985)	●							
Acanthococcus	tokaetae (Kuwana, 1932c)	●							
Acanthococcus	tounetae (Goux, 1995)	●							
Acanthococcus	transversus (Green, 1922)	●				●			
Acanthococcus	turanicus Matesova, 1967	●							
Acanthococcus	turkmenicus (Archangelskaya, 1930)	●							
Acanthococcus	ulmarius Danzig, 1975a	●							
Acanthococcus	uvaeursi (Linnaeus, 1761)	●							
Acanthococcus	variabilis (Goux, 1940)	●							
Acanthococcus	venezuelensis (Foldi and Kozár, 2007)			●					
Acanthococcus	veyrensis (Goux, 1991)	●							
Acanthococcus	ventrispinus Kozár and Konczné Benedicty, 2008			●					
Acanthococcus	willinkae Kozár and Konczné Benedicty, 2008			●					
Acanthococcus	zernae Tereznikova, 1977	●							
Aculeococcus	morrisoni Lepage, 1941			●					
Aculeococcus	yongpingensis Tang and Hao, 1995	●							
Affeldococcus	kathrinae Henderson, 2006								●
Alpinococcus	elongatus Henderson, 2006								●
Anophococcus	inermis (Green, 1915a)	●							
Anophococcus?	oligacanthus (Danzig, 1972b)	●							
Anophococcus	parvispinus (Goux, 1948) (=parvisetus Lindinger, 1957)	●							
Anophococcus	salsolae (Borchsenius, 1949)	●							
Apezococcus	idiastes Ferris, 1955			●					
Apiococcus	asperatus Hempel, 1900a				●				
Apiococcus	globosus Hempel, 1900a				●				
Apiococcus	gregarius Hempel, 1900a				●				
Apiococcus	singularis Hempel, 1900a				●				
Apiomorpha	amaroensis Brimblecombe, 1959a						●		
Apiomorpha	annulata Froggatt, 1930						●		
Apiomorpha	attenuata Froggatt, 1898						●		
Apiomorpha	baeuerleni Froggatt, 1893						●		

Continua

Continua

Apiomorpha?	beyeriae (Tepper, 1893)							●		
Apiomorpha	calycina (Tepper, 1893)							●		
Apiomorpha	conica (Froggatt, 1893)							●		
Apiomorpha	cucurbita Fuller, 1897b							●		
Apiomorpha	densispinosa Gullan 1984							●		
Apiomorpha	dipsaciformis (Froggatt, 1895)							●		
Apiomorpha	duplex (Schrader, 1863)							●		
Apiomorpha	excupula (Fuller, 1896)							●		
Apiomorpha	frenchi (Froggatt, 1921)							●		
Apiomorpha	gullanae Cook, 2003							●		
Apiomorpha	helmsii Fuller, 1897b							●		
Apiomorpha	hilli Froggatt, 1921a							●		
Apiomorpha	intermedia Gullan, 1894							●		
Apiomorpha	karschi Rübsaamen, 1894							●		
Apiomorpha	longiloba Brimblecombe, 1959a							●		
Apiomorpha	macqueeni Froggatt, 1929							●		
Apiomorpha	maliformis Fuller, 1897b							●		
Apiomorpha	malleacola Gullan, 1984							●		
Apiomorpha	minor (Froggatt, 1893)							●		
Apiomorpha	munita malleensis Gullan, 1984							●		
Apiomorpha	munita munita (Schrader, 1863)							●		
Apiomorpha	munita tereticornuta Gullan, 1984							●		
Apiomorpha	ovicola (Schrader, 1863)							●		
Apiomorpha	ovicoloides (Tepper, 1893)							●		
Apiomorpha	pedunculata (Fuller, 1896)							●		
Apiomorpha	pharetrata (Schrader, 1863)							●		
Apiomorpha	pileata (Schrader, 1863)							●		
Apiomorpha	pomaphora Gullan and Jones, 1989							●		
Apiomorpha	regularis (Tepper, 1893)							●		
Apiomorpha	rosaeforma (Froggatt, 1895)							●		
Apiomorpha	sessilis (Froggatt, 1895)							●		
Apiomorpha	sloanei (Froggatt, 1898)							●		
Apiomorpha	spinifer (Froggatt, 1930)							●		
Apiomorpha	strombylosa (Tepper, 1893)							●		
Apiomorpha	subconica (Tepper, 1893)							●		
Apiomorpha	tepperi Gullan, 1984							●		
Apiomorpha	urnalis (Tepper, 1893)							●		
Apiomorpha	variabilis (Froggatt, 1893)							●		

Continua

Continua

Apiomorpha	withersi (Froggatt, 1931)						●		
Ascelis	attenuata Froggatt, 1894						●		
Ascelis	melaleucae Fuller, 1897b						●		
Ascelis	praemollis Schrader, 1863						●		
Ascelis	schraderi Froggatt, 1894						●		
Asiacornococcus	exiguus (Maskell, 1897a)	●				●			
Asiacornococcus	japonicus (Kuwana, 1902)	●							
Asiacornococcus	khaki (Kuwana, 1931a)	●				●			
Atriplicia	gallicola Cockerell and Rohwer, 1909		●						
Balticococcus	oblicus Koteja, 1988c	●							
Balticococcus	spinosus Koteja, 1988c	●							
Borchsenioccus	duzgenesae Kaydan and Kozár 2008	●							
Briococcus	hippodamus Henderson, 2006								●
Callococcus	acaciae (Maskell, 1892)						●		
Callococcus	leptospermi (Maskell, 1893)						●		
Callococcus	newmanni (Froggatt, 1921)						●		
Callococcus	pulchellus (Maskell, 1896)						●		
Calycicoccus	merwei Brain, 1918				●				
Capulinia	crateraformis Hempel, 1900			●					
Capulinia	jaboticabae Ihering, 1898			●					
Capulinia	orbiculata Hoy, 1958						●		
Capulinia	sallei Signoret, 1875b			●					
Carpochloroides	mexicanus Ferris, 1957c		●						
Carpochloroides	viridis Cockerell, 1899			●					
Casuarinaloma	leaii (Fuller, 1897a)						●		
Chazeauana	gahniae Matile-Ferrero, 1988a								●
Chilechiton	lynnae Hodgson and Miller, 2002			●					
Chilecoccus	browni Miller and Gonzales, 1975			●					
Chilecoccus	spinosus Miller and Gonzales, 1975			●					
Cornoculus	cornutus Ferris, 1955a		●						
Comoculus	densus Miller, 1967		●						
Coxicoccus	foldi Kozár and Konczné Benedicty, 2008			●					
Cryptococcus	aceris Borchsenius, 1937	●							
Cryptococcus	fagisuga Lindinger, 1937	●	●						
Cryptococcus	integricornis Danzig, 1971a	●							
Cryptococcus	nudatus Brittin, 1915a								●
Cryptococcus	ulmi Tang and Hao, 1995	●							
Cryptococcus	williamsi Kosztarab and Hale, 1968		●						

Continua

Continua

Cylindrococcus	casuarinae Maskell, 1892						●		
Cylindrococcus	spiniferus Maskell, 1892						●		
Cystococcus	echiniformis Fuller, 1897b						●		
Cystococcus	pomiformis (Froggatt, 1893)						●		
Eremococcus	pirogallis (Maskell, 1894)						●		
Eremococcus	rugosus rugosus (Maskell, 1894)						●		
Eremococcus	rugosus elongatus (Maskell, 1897)						●		
Eremococcus	turbinata (Froggatt, 1921b)						●		
Eriobalachowskya	valenzuelae (Balachowsky, 1959a)		●						
Eriochiton	armatus (Brittin, 1915)								●
Eriochiton	brittini Hodgson and Henderson, 1996								●
Eriochiton	deboerae Hodgson and Henderson, 1996								●
Eriochiton	dracophylli Hodgson and Henderson, 1996								●
Eriochiton	dugdalei Hodgson and Henderson, 1996								●
Eriochiton	hoheriae Hodgson, 1994								●
Eriochiton	propespinosus Hodgson, 1994								●
Eriochiton	pseudohispidus Hodgson and Henderson, 1996								●
Eriochiton	spinosus Maskell, 1879								●
Eriococcus	buxi (Fonscolombe, 1834)	●							
Eriococcus	williamsi Danzig, 1987	●							
„Eriococcus”	abditus Hoy, 1962								●
„Eriococcus”	aconeae Henderson, 2006								●
„Eriococcus”	actius Miller and Miller, 1993		●						
„Eriococcus”	acutispinatus Hoy, 1962								●
„Eriococcus”	adenostomae Ehrhorn, 1898		●						
„Eriococcus”	agonis Fuller, 1897a						●		
„Eriococcus”	albatus Hoy, 1962								●
„Eriococcus”	angulatus Froggatt, 1916						●		
„Eriococcus”	apiomorphae Fuller, 1897a						●		
„Eriococcus”	arcanus Hoy, 1962								●
„Eriococcus”	arctostaphyli Ferris, 1955a		●						
„Eriococcus”	arenariae (Miller and Miller, 1993)		●						
„Eriococcus”	arenosus Cockerell, 1897w		●						
„Eriococcus”	asteliae Hoy, 1962								●
„Eriococcus”	aureus Cockerell, 1902t		●						
„Eriococcus”	australis Maskell, 1895b						●		
„Eriococcus”	bambusae Green, 1922					●			
„Eriococcus”	barri (Miller, 1991)		●						

Continua

Continua

„Eriococcus”	beilschmiediae Hoy, 1962								●
„Eriococcus”	beshearae Miller and Miller, 1993		●						
„Eriococcus”	bicolor (Froggatt, 1915)						●		
„Eriococcus”	boguschi McDaniel, 1964		●						
„Eriococcus”	brittini Hoy, 1962								●
„Eriococcus”	busariae Froggatt, 1916						●		
„Eriococcus”	campbelli Hoy, 1959						●		
„Eriococcus”	campinensis Hempel, 1937			●					
„Eriococcus”	carolinae Williams, 1969		●						
„Eriococcus”	casuarinae (Maskell, 1893b)						●		
„Eriococcus”	celmisiae (Maskell, 1984)								●
„Eriococcus”	chalazogamarum (Lindinger, 1933a)						●		
„Eriococcus”	chathamensis Hoy, 1962								●
„Eriococcus”	chilos (Miller and Miller, 1993)		●						
„Eriococcus”	coffae Hempel, 1919			●					
„Eriococcus”	confluens (Maskell, 1893b)						●		
„Eriococcus”	confusus Maskell, 1892						●		
„Eriococcus”	conspersus Maskell, 1893b						●		
„Eriococcus”	constrictus Froggatt, 1933						●		
„Eriococcus”	coprosmae Hoy, 1962								●
„Eriococcus”	coriaceus Maskell, 1893b						●		●
„Eriococcus”	crenilobatus Hoy, 1962								●
„Eriococcus”	crofti Froggatt, 1916						●		
„Eriococcus”	cryptus Cockerell, 1901h		●						
„Eriococcus”	cultellus Hoy, 1959						●		
„Eriococcus”	curassavicus Reyne, 1964			●					
„Eriococcus”	cypraeaeformis Fuller, 1897b						●		
„Eriococcus”	dacrydii Hoy, 1962								●
„Eriococcus”	danthoniae Maskell, 1891								●
„Eriococcus”	davidsoni Miller and Miller, 1993		●						
„Eriococcus”	dennoi (Miller and Miller, 1993)		●						
„Eriococcus”	diaboli Ferris, 1955a		●						
„Eriococcus”	diversispinus Leonardi, 1911a			●					
„Eriococcus”	dombeyae Gonzalez, 2008			●					
„Eriococcus”	droserae (Miller, Liu and Howell, 1992)		●						
„Eriococcus”	dubius (Cockerell, 1896)		●	●					
„Eriococcus”	elaecarpi Hoy, 1962								●
„Eriococcus”	elegans Fuller, 1897b						●		

Continua

Continua

„Eriococcus”	elytranthae Henderson, 2006								●
„Eriococcus”	emimensis Mamet, 1954				●				
„Eriococcus”	epacrotichus (Miller and Miller, 1992)		●						
„Eriococcus”	eriogoni Ehrhorn, 1911		●						
„Eriococcus”	etbaicus De Lotto, 1954a				●				
„Eriococcus” (Thekes?!)	eucalypti Maskell, 1892						●		
„Eriococcus”	euphorbiae Ferris, 1955a		●						
„Eriococcus”	fossilis Froggatt, 1933						●		
„Eriococcus”	fossor(Maskell, 1884)								●
„Eriococcus”	froebeae (Miller, 1991)		●						
„Eriococcus”	fuligitectus Hoy, 1962								●
„Eriococcus”	gaultheriae Hoy, 1962								●
„Eriococcus”	gerbergi McDaniel, 1959		●						
„Eriococcus”	gibbus Hoy, 1959						●		
„Eriococcus”	grandis grandis (Maskell, 1892)						●		
„Eriococcus”	grandis spinosior (Maskell, 1893b)						●		
„Eriococcus”	gurneyi Fuller, 1899						●		
„Eriococcus”	hakeae Fuller, 1897b						●		
„Eriococcus”	hebes Hoy, 1962								●
„Eriococcus”	howelli (Miller and Miller, 1993)		●						
„Eriococcus”	hoyi (Miller and Miller, 1993)		●						
„Eriococcus”	humatus Hoy, 1962								●
„Eriococcus”	imperfectus Fuller, 1897b						●		
„Eriococcus”	ironsidei Williams, 1973						●		
„Eriococcus”	irregularis Froggatt, 1921a						●		
„Eriococcus”	kamahi Hoy, 1958								●
„Eriococcus”	kijabensis James, 1934a				●				
„Eriococcus”	kowhai Hoy, 1962								●
„Eriococcus”	laevigatus Maskell, 1891						●		
„Eriococcus”	lanatus Hempel, 1932			●					
„Eriococcus”	larrae Parrott and Cockerell, 1899		●						
„Eriococcus”	lecanioides (Green, 1915d)						●		
„Eriococcus”	leptoporus (Miller and Miller, 1993)		●						
„Eriococcus”	leptospermi Maskell, 1891						●		
„Eriococcus”	lidgetti (Cockerell, 1899k)						●		
„Eriococcus”	mackenziei (Miller and Miller, 1992)		●						
„Eriococcus”	macrobactrus (Miller and Miller, 1992)		●						

Continua

Continua

„Eriococcus”	mancus (Maskell, 1897)						•		
„Eriococcus”	matai Hoy, 1962								•
„Eriococcus”	megaporus (Miller and Miller, 1993)	•							
„Eriococcus”	meridianus Hoy, 1962								•
„Eriococcus”	mesotrichus (Miller and Miller, 1993)	•							
„Eriococcus”	microtrichus (Miller and Miller, 1993)	•							
„Eriococcus”	millei Williams, 2007								•
„Eriococcus”	milleri Hoy, 1962						•		
„Eriococcus”	mimus Hoy, 1962								•
„Eriococcus”	missourii Hollinger, 1917a	•							
„Eriococcus”	monotrichus (Miller and Miller, 1993)	•							
„Eriococcus”	montanus Hoy, 1962								•
„Eriococcus”	montifagi Hoy, 1962								•
„Eriococcus”	multispinus (Maskell, 1879)								•
„Eriococcus”	myrsinae Hoy, 1962								•
„Eriococcus”	neomyrti Hoy, 1962								•
„Eriococcus”	nitidulus Hoy, 1962								•
„Eriococcus”	nudulus (Ferris, 1955a)	•							
„Eriococcus”	nuerae Green, 1922					•			
„Eriococcus”	oligotrichus (Miller and Miller, 1993)	•							
„Eriococcus”	ophius (Miller and Miller, 1993)	•							
„Eriococcus”	orariensis Hoy, 1954						•		
„Eriococcus”	pallidus Maskell, 1885a								•
„Eriococcus”	palmeri Cockerell, 1899j	•							
„Eriococcus”	palustris Dodds, 1923	•							
„Eriococcus”	papillosus Morrison, 1924a			•					
„Eriococcus”	parabilis Hoy, 1962								•
„Eriococcus”	parsonsiae Henderson, 2006								•
„Eriococcus”	parvulus Hoy, 1962								•
„Eriococcus”	paucispinus Ferris, 1921	•							
„Eriococcus”	philippinensis (Morrison, 1920)							•	
„Eriococcus”	phyllocladi Maskell, 1992								•
„Eriococcus”	picta Froggatt, 1916						•		
„Eriococcus”	pimeliae Hoy, 1962								•
„Eriococcus”	piptandeniae Hempel, 1937			•					
„Eriococcus”	pittospori Ferris, 1955a	•							
„Eriococcus”	pohutukawa Hoy, 1958								•
„Eriococcus”	popayanensis Balachowsky, 1959a			•					

Continua

Continua

„Eriococcus”	pumiliae Gonzalez, 2008				•				
„Eriococcus”	pustulatus (Maskell, 1893b)							•	
„Eriococcus”	quercus (Comstock, 1881a)		•						
„Eriococcus”	rata Hoy, 1958								
„Eriococcus”	rhodomyrti Green, 1922								•
„Eriococcus”	rugosus Froggatt, 1933						•		
„Eriococcus”	rusapiensis Hall, 1937							•	
„Eriococcus”	salaris Ferris, 1955a		•		•				
„Eriococcus”	serratilobis prominens Green, 1915d								
„Eriococcus”	serratilobis serratilobis Green, 1915d							•	
„Eriococcus”	setulosus Hoy, 1962							•	
„Eriococcus”	simplex dealbatus Maskell, 1897								•
„Eriococcus”	simplex simplex Maskell, 1897							•	
„Eriococcus”	smithi Lobdell, 1929		•					•	
„Eriococcus”	sophorae Green, 1929								
„Eriococcus”	sordidus (Green, 1904)								•
„Eriococcus”	spiniger Maskell, 1896b							•	
„Eriococcus”	stauroporus (Miller and Miller, 1992)		•					•	
„Eriococcus”	stellatus McDaniel, 1963		•						
„Eriococcus”	stenoclini Mamet, 1950					•			
„Eriococcus”	sutepensis Takahashi, 1942b						•		
„Eriococcus”	syncarpiae (Froggatt, 1915)							•	
„Eriococcus”	tenuis Green, 1922							•	
„Eriococcus”	tepperi Maskell, 1892						•		
„Eriococcus”	tesselatus Froggatt, 1916							•	
„Eriococcus”	texanus King, 1902f		•					•	
„Eriococcus”	tholothrix Miller and González, 1975				•				
„Eriococcus”	tillandsiae Ferris, 1921		•						
„Eriococcus”	tinsleyi Cockerell, 1898		•						
„Eriococcus”	tosotrichus (Miller and Miller, 1993)		•						
„Eriococcus”	tricarinatus Fuller, 1897b							•	
„Eriococcus”	tripartitus (Fuller, 1897b)							•	
„Eriococcus”	tucurinae Laing, 1929a				•			•	
„Eriococcus”	villosus Froggatt, 1916								
„Eriococcus”	washingtonensis (Miller and Miller, 1993)		•					•	
„Eriococcus”	whiteheadi (Miller, 1991)		•						
„Erium”	frenellae Froggatt, 1916							•	
Exallococcus	laureliae Miller and González, 1975				•				
Floracoccus	elevans (Maskell, 1895b)							•	

Continua

Continua

Fragorbis	fructus Hardy and Gullan, 2007						●		
Fragorbis	pseudopustulans Hardy and Gullan, 2007						●		
Fragorbis	pustulans Hardy and Gullan, 2007						●		
Fragorbis	stipites Hardy and Gullan, 2007						●		
Fragorbis	superficies Hardy and Gullan, 2007						●		
Gedaniccoccus	gracilis Koteja, 1988c	●							
Gossyparia	salicicola Borchsenius, 1949	●							
Gossyparia	spuria (Modeer, 1778)	●	●						
Gossypariella	crematogastrii Kozár and Konczné Benedicty, 2007	●				●			
Gossypariella	phyllanthi (Ferris, 1957)	●				●			
Gossypariella	siamensis (Takahashi, 1942)	●				●			
Gossypariella	sulawesi Kozár and Martin, 2007							●	
Greenisca	brachypodii Borchsenius and Danzig, 1966	●							
Greenisca	gouxi (Balachowsky, 1954a)	●							
Greenisca??	laingi Lecanopsis turcica (Coccidae)?	●							
Greenisca	placidus Green, 1921	●							
Greenoripersia	kaiseri Bodenheimer, 1921	●							
Neocanthococcus?									
Gregoporia	istriensis Kozár, 1983a	●							
Gregoporia	rosaceus (Balachowsky, 1932e)	●							
Hempelicoccus	brasiliensis (Cockerell, 1900)			●					
Hempelicoccus	leguminicola (Morrison, 1919)			●					
Hempelicoccus	mendozae (Morrison, 1919)			●					
Hempelicoccus	paranaensis (Foldi and Kozár, 2007)			●					
Hispaniococcus	agenjoi (Gómez-Menor Ortega, 1954)	●							
Hoheriococcus	fionae Henderson, 2006								●
Hoyicoccus	hendersonae Kozár and Williams, 2009							●	
Hypericococcus	hyperici (Ferris, 1955a)		●						
Icelococcus	charlini Miller and González, 1975			●					
Icelococcus	lithraeae Hodgson and Miller, 2002			●					
Icelococcus	nothofagi Miller and González, 1975			●					●
Intecticoccus	viridis Kondo, 2006			●					
Jutlandicoccus	pauper Koteja, 1988c	●							
Jutlandicoccus	perfectus Koteja, 1988c	●							
Kaweckia	alpina Pellizzari, 1999	●							
Kaweckia	erwini Kozár, 1996	●							
Kaweckia	glyceriae (Green, 1921)	●							
Kaweckia	hellenica Kozár, 1999	●							
Kaweckia?	orientalis Borchsenius, 1956b	●							

Continua

Continua

Keithia	luzzii Koteja, 1988b	●						
Kotejacoccus	turcicus Kaydan and Kozár, 2008	●						
Kuenowicoccus	pietrzeniukae Koteja, 1988b	●						
Kuwanina	kiwana Henderson, 2006							●
Kuwanina	obscurata (Maskell, 1896b)					●		
Kuwanina	parva (Maskell, 1897a)	●						
Lachnodi	eucalypti (Maskell, 1892)					●		
Lachnodi	hirsutus (Froggatt, 1921b)					●		
Lachnodi	hirtus Maskell, 1896b					●		
Lachnodi	lectularius Maskell, 1896b					●		
Macracanthopyga	verganiana Lizer y Trelles, 1955		●					
Madarococcus	argentifagi (Hoy, 1962)							●
Madarococcus	cavelli (Maskell, 1890)							●
Madarococcus	chilensis (Miller and González, 1975)		●					
Madarococcus	cruriamplus (Hoy, 1962)							●
Madarococcus	cunicularius (Hoy, 1962)							●
Madarococcus	cunninghamii Hardy and Gullan, 2008					●		
Madarococcus	detectus (Hoy, 1962)							●
Madarococcus	eurythrix (Miller and Gonzalez, 1975)		●					
Madarococcus	fagicorticis (Maskell, 1892)							●
Madarococcus	hispidus (Maskell, 1887)							●
Madarococcus	intermedius (Maskell, 1891)							●
Madarococcus	latilobatus (Hoy, 1962)							●
Madarococcus	maculatus (Maskell, 1890)							●
Madarococcus	maskelli (Hoy, 1962)							●
Madarococcus	meander Hardy and Gullan, 2008					●		
Madarococcus	megaventris Hardy and Gullan, 2008					●		
Madarococcus	montifagi (Hoy, 1962)							●
Madarococcus	moorei Hardy and Gullan, 2008					●		
Madarococcus	navarinoensis (Hoy, 1962)		●					
Madarococcus	nelsonensis (Hoy, 1962)							●
Madarococcus	nothofagi (Hoy, 1962)							●
Madarococcus	occultus Hardy and Gullan, 2008					●		
Madarococcus	osculus Hardy and Gullan, 2008					●		
Madarococcus	papillosus (Hoy, 1962)							●
Madarococcus	podocarpi (Hoy, 1962)							●
Madarococcus	pulchellus (Maskell, 1891)							●
Madarococcus	raithbyi (Maskell, 1890)							●
Madarococcus	rhadinothrix (Miller and Gonzalez, 1975)		●					

Continua

Continua

Madarococcus	rotundus (Hoy, 1962)								●
Madarococcus	rubrifagi (Hoy, 1962)								●
Madarococcus	viridulus Hoy, 1962								●
Megacoccus	tasmaniensis Kosztarab and Kennedy, 1971						●		
Melzeria	horni Green, 1930			●					
Montanococcus	graemei Henderson, 2006								●
Montanococcus	petrobis Henderson, 2006								●
Montanococcus	thriaticus Henderson, 2006								●
Neacanthococcus	tamaricola Borchsenius, 1948	●							
Neoeriochiton	clareae Hodgson, 1994								●
Neokaweckia	laeticoris (Tereznikova, 1965)	●							
Neokaweckia	rubrus (Matesova, 1960)	●							
Neotectococcus	lenticularis Hempel, 1937			●					
Neotrichococcus	filifer (Borchsenius, 1948)	●							
Noteococcus	hoheriae (Maskell, 1880)	●!							●
Olliffia	eucalypti Fuller, 1897						●		
Opisthoscelis	conica Fuller, 1897						●		
Opisthoscelis	convexa Froggatt, 1929						●		
Opisthoscelis	fibularis Froggatt, 1894						●		
Opisthoscelis	globosa Rübsaamen, 1894						●		
Opisthoscelis	maculata Froggatt, 1894						●		
Opisthoscelis	mammularis Froggatt, 1894						●		
Opisthoscelis	maskelli Froggatt, 1894						●		
Opisthoscelis	nigra Froggatt, 1898						●		
Opisthoscelis	pisiformis Froggatt, 1894						●		
Opisthoscelis	prosopidis Kieffer and Jorgensen, 1910			●					
Opisthoscelis	recurva Froggatt, 1929						●		
Opisthoscelis	rubsaameni Lindinger, 1943						●		
Opisthoscelis	serrata Froggatt, 1894						●		
Opisthoscelis	spinosa Froggatt, 1894						●		
Opisthoscelis	subrotunda Schrader, 1863						●		
Opisthoscelis	verrucula Froggatt, 1894						●		
Orafortis	luma Hardy, 2006			●					
Oregmopyga	erigoni Miller, 1967		●						
Oregmopyga	johnsoni Miller, 1967		●						
Oregmopyga	neglecta (Cockerell, 1895)		●						
Oregmopyga	parvispina (Chaffin, 1923)		●						
Oregmopyga	peninsularis (Ferris, 1921)		●						

Continua

Continua

Oregmomyga	sanguinea Miller, 1967		●						
Oregmomyga	strongyla Miller and Miller, 1993		●						
Oregmomyga	tippinsi Miller and Miller, 1993		●						
Oregmomyga	viscosa (Kondo, 2004)		●						
Ourococcus	casuarinae Fuller, 1897						●		
Ourococcus	cobbi Fuller, 1897						●		
Ourococcus	eucalypti Fuller, 1897						●		
Ovaticoccus	adoxus (Ferris, 1955)		●						
Ovaticoccus	agavium (Douglass, 1888)	●	●		●				
Ovaticoccus	amplicoxae Williams and Martin, 2003				●				
Ovaticoccus	californicus McKenzie, 1964		●						
Ovaticoccus	lahillei (Leonardi, 1911)				●				
Ovaticoccus	mackenziei Miller, 1967		●						
Ovaticoccus	nativus (Parrott, 1900)		●						
Ovaticoccus	parkerorum Miller, 1967		●						
Ovaticoccus	salviae Miller, 1967		●						
Ovaticoccus	senarius McKenzie 1964		●						
Ovaticoccus	variabilis Miller, 1967		●						
Pedroniopsis	beesoni Green, 1926					●			
Phacelococcus	brookesae Miller, 1970						●		
Phacelococcus	bursaria Hardy and Gullan, 2007						●		
Phacelococcus	cookae Gullan and Strong, 1997						●		
Phacelococcus	frenchi Gullan and Strong, 1997						●		
Phacelococcus	subcorticalis Gullan and Strong, 1997						●		
Phloeococcus	cordylinidis Hoy, 1962								●
Phloeococcus	loriceus Hoy, 1962								●
Proteriococcus	acutispinatus Borchsenius, 1960	●				●			
Proteriococcus	lauri Erkilic, 2009	●							
Pseudocapulinia	lanosa Hempel, 1932				●				
Pseudochermes	fraxini (Kaltenbach, 1860)	●							
Pseudochermes	williamsi Kozár and Konczné Benedicty, 2008	●							
Pseudomontano- coccus	martini Kozár and Konczné Benedicty, 2008							●	
Pseudomontano- coccus	baloghi Kozár and Konczné Benedicty, 2008							●	
Pseudotectococcus	anona Hempel, 1934				●				
Pseudotectococcus	rollinae Hodgson and Goncalves, 2004				●				
Rhizococcus	abaii (Danzig, 1990)	●							

Continua

Continua

Rhizococcus	agropyri Borchsenius, 1949	●							
Rhizococcus	cactearum (Leonardi, 1918)	●							
Rhizococcus	chaoticus (Goux, 1991)	●							
Rhizococcus	cingulatus (Kiritchenko, 1940)	●							
Rhizococcus	coccineus (Cockerell, 1894)	●	●	●	●		●		●
Rhizococcus	confusus Danzig, 1962 reestablishment, not danzigae (Miller and Gimpel, 1996)	●							
Rhizococcus	cynodontis (Kiritchenko, 1940)	●							
Rhizococcus	evelinae Kozár, 1983	●							
Rhizococcus	formicicola (Newstead, 1897)	●							
Rhizococcus	franceschini (Balachowsky, 1934)	●							
Rhizococcus	granulatus (Green, 1931)	●							
Rhizococcus	herbaceus Danzig, 1962	●							
Rhizococcus	iljiniae Danzig, 1972	●							
Rhizococcus	insignis (Newstead, 1891)	●							
Rhizococcus??	jumperi (Goux, 1936)	●							
Rhizococcus?	kemptoni (Parrott, 1900)		●	●					
Rhizococcus	kondarensis Borchsenius, 1949	●							
Rhizococcus	multispinatus Tang and Hao, 1995	●							
Rhizococcus	multispinosus Kuhlglatz, 1898	●							
Rhizococcus	oblongus Borchsenius, 1949	●							
Rhizococcus?	orientalis Danzig, 1975	●							
Rhizococcus	oxyacanthus (Danzig, 1975)	●							
Rhizococcus	Palustris Dziedzicka and Koteja, 1971 reestablishment, not podhalensis Dziedzicka and Koteja, 1985	●							
Rhizococcus	pseudinsignis (Green, 1921)	●							
Rhizococcus	sanguinairensis (Goux, 1993)	●							
Rhizococcus	socialis (Goux, 1931)	●							
Rhizococcus??	totarae Maskell, 1890								●
Rhizococcus	trispinatus (Wang, 1974)	●							
Rhizococcus	zygophylli (Archangelskaya, 1931)	●							
Rhopalotococcus	dugdalei Williams, 2007								●
Rhopalotococcus	metrosideri Williams, 2007								●
„Rippersia”	leptospermi Maskell, 1889						●		
Sangicoccus	morrisoni Kozár and Konczné Benedicty, 2009							●	
Sangicoccus	obtusispinus (Reyne, 1961)					●			
Sangicoccus	reynei Kozár and Konczné Benedicty, 2009							●	
Sangicoccus	truncatispinus (Reyne, 1961)							●	

Continua

Continua

Scutare	fimbriata Brittin, 1915								●
Scutare	lanuginosa Hoy, 1962								●
Scutare	pittospori Hoy, 1962								●
Sysirococcus	Intermedius (Maskell, 1891)								●
Sysirococcus	Papillosus Hoy, 1962								●
Sphaerococcopsis	inflatipes (Maskell, 1893)						●		
Sphaerococcopsis	platynotum Beardsley, 1974						●		
Sphaerococcopsis	simplicior (Maskell, 1896)						●		
Sphaerococcopsis	umbilicus Beardsley, 1974						●		
Sphaerococcus???	froggatti (Maskell, 1894)						●		
Sphaerococcus???	morrisoni elongatus (Fuller, 1899)						●		
Sphaerococcus???	morrisoni morrisoni (Fuller, 1897)						●		
Sphaerococcus???	socialis (Maskell, 1897)						●		
Sphaerococcus???	tepperi (Fuller, 1897)						●		
Sphaerococcus???	tomentosus (Fuller, 1899)						●		
Spiroporococcus	braggi (Cockerell and Robinson, 1915)	●							
Spiroporococcus	ruber (Parrott and Cockerell, 1899)	●							
Spiroporococcus	yuccae (Ferris, 1919)	●							
Stegococcus	flagellatus Henderson, 2006								●
Stegococcus	oleariae Hoy, 1962								●
Stibococcus	cerinus Miller and Gonzalez, 1975			●					
Subcorticoccus	beardsleyi Gullan, 1999						●		
Subcorticoccus	huonamnis Gullan, 1999						●		
Subcorticoccus	murrindindi Gullan, 1999						●		
Tectococcus	ovatus Hempel, 1900			●					
Tolypecoccus	latebrosus Hoy, 1962								●
Uhleria?	araucariae araucariae (Maskell, 1879)	●	●	●	●	●	●	●	●
Uhleria?	araucariae minor (Maskell, 1895)	●					●		
Uhleria?	araucariae nudus (Gomez-Menor Ortega, 1957)	●							
Uhleria?	szentivanyi (Kozár and Williams, 2009)							●	
Uhleria?	nr araucaria sp.n. Corsica,Port.It	●							
Xerococcus	fouquieriae Ferris, 1921		●						
Summary data									
No. of species	628	198	86	67	9	28	171	10	102
No. of „endemic” species	597	170	78	62	6	7	168	9	97
No. of genus	97	31	15	27	5	9	26	6	22
No. of „endemic” genus	78	17	7	16	1	1	18	2	16

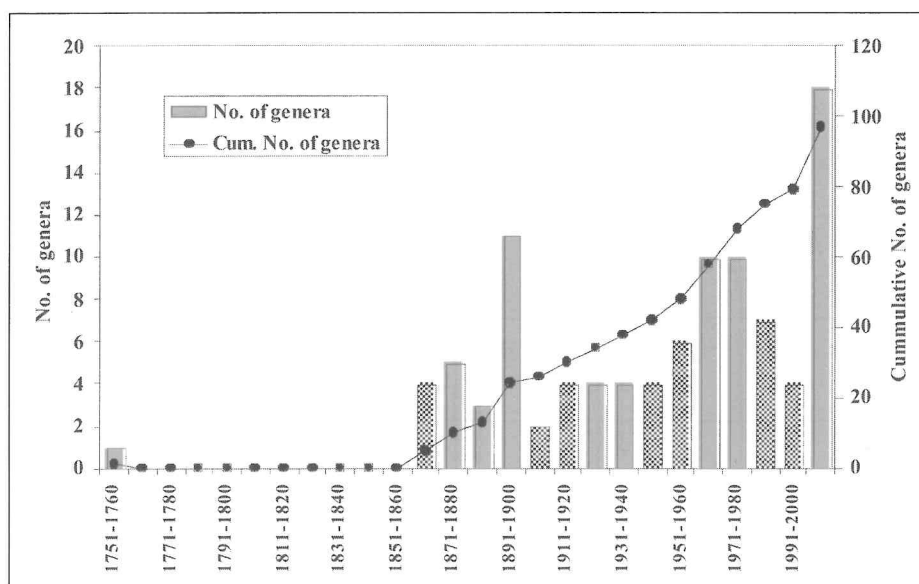


Fig. 1 - History of genus description in Eriococcidae of the World.

in the future. The accumulation of the new species described shows a similar picture: a steady increase from 1881 (Fig. 2). In the last 60 years 14-84 new species were described every 10 years since 1951, an especially high number of species (84) was described in 1951-1960, 1981-1990, and 57 during the last nine years. These data support the view of Miller and Gimpel (2000) that the descriptive phase of the eriococcid fauna is still in progress and many new species remain to be discovered.

In a comparison of the eriococcid statistics presented by Miller and Gimpel (2000) and present work (Table 2.), we can see that increase of number of genera and species and the difference of meaning of structure of genera, did not change too much in the general characters, there is only some small changes could be observed. There is a slight decrease in the average number of species per genus from 8.22 to 6.47, the number of genera with more than 10 species increased from 5 to 7. Although the number of monotypic genera increased from 32 to 41, the ratio of monotypic genera decreased from 47.76% to 42.27%, and by this the ratio is less than in Pseudococcidae (48%) and similar to Coccidae (41%). Most of the new monotypic genera were described from not well studied regions, partly from cryptic habitats, so probably several new species will be described from these genera, and the ratio of percentage will be low.

It is interesting to see the comparison on some statistics of different zoogeographic regions (Table 3, Fig. 3). In this analysis it seems that Eriococcidae has highest number of genera in the Palearctic Region, followed by the Neotropical, Australian, New Zealand and Pacific zoogeographical regions. Concerning the number of species, the situation is quite different; although most of species were found in the Palearctic, they are followed

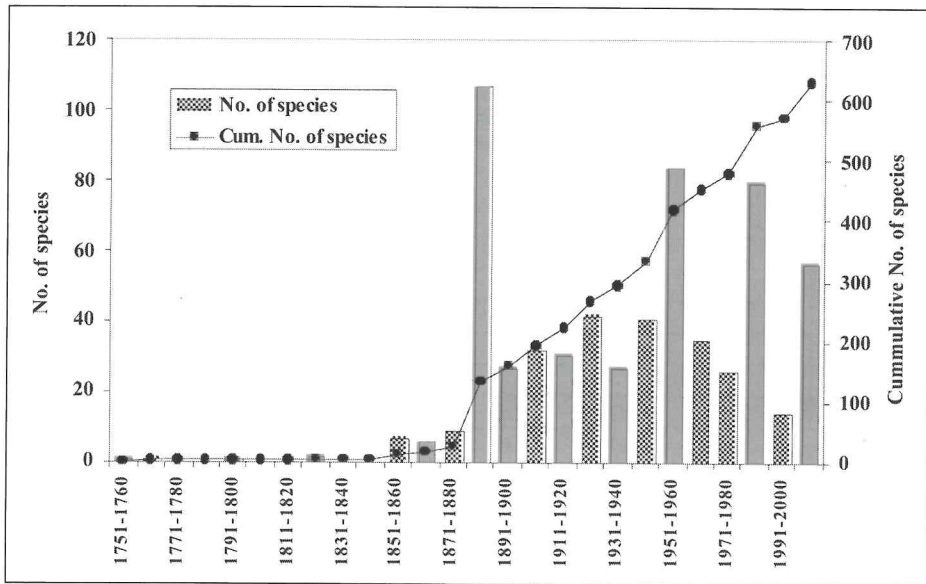


Fig. 2 - History of species description in Eriococcidae of the World.

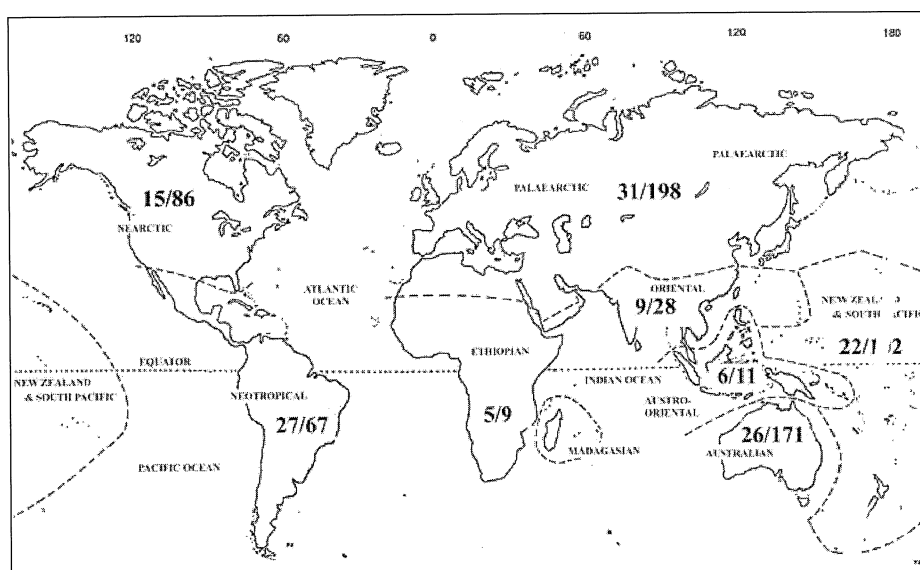
Table 2 - Some statistics overtime in the eriococcidae.

Authors	number of species	number of genera	average number of species in genera	genera with 10 or more species	monotypic genera
Fernald, 1903	171	20	8.50	4 (20%)	6 (33.33%)
Hoy, 1963	405	43	9.42	3 (6.98%)	22 (51.16%)
Miller and Gimpel, 2000	551	67	8.22	5 (7.46%)	32 (47.76%)
Kozár, present Work	628	97	6.47	7 (7.22%)	41 (42.27%)

by the Australian, New Zealand and Pacific regions, and smallest in the Nearctic region. The very poor eriococcid fauna of the Ethiopian, Austro-Oriental and Oriental regions is remarkable. The average number of species per genera in regions with high species richness is similar to the global average (6.47). The number of so called "endemic" genera (known only in one region) is about the same (16-18) in genus rich regions. The number of endemic species is especially high in the Palaearctic, Australian, and New Zealand and Pacific regions and average species number (6.1) is highest in Australian Region.

Table 3 - Some statistics of *eriococcidae* in zoogeographic regions.

Regions	Number of genera	Number of species	Average number of species in these genera	Number of genera endemic to region		Average number of species in these genera	Total number of "endemic" species
				genera	species in these genera		
Palearctic	31	198	6.39	17	32	1.88	170
Nearctic	15	86	5.73	7	20	2.86	78
Neotropical	27	67	2.48	16	22	1.38	62
Ethiopian	5	9	1.80	1	1	1.00	6
Oriental	9	28	3.11	1	1	1.00	7
Australian	26	171	6.58	18	109	6.10	168
New Zealand and Pacific							
	22	102	4.64	16	31	1.94	97
Austro-Oriental	6	10	1.67	2	4	2.00	9
Total	97	628	6.47	78	220	2.82	597

Fig. 3 - Number of genera and species of *Eriococcidae* known from each zoogeographic regions of the World.

Characteristics of the regions.

a. Palearctic. Here we report 31 genera and 198 species in this region (Table 3). This region, therefore, has a rich eriococcid fauna but this may be because it is well studied. However, several of new genera and species have been described in recent decades

within this area, indicating that the fauna remains incompletely known. On the one side the Palaearctic Region could be characterised by large numbers of species of *Acanthococcus* and *Rhizococcus* genera living on different woody, herbaceous and grass, on the other side by genera specialised to certain groups of plants such as *Kotejacoccus* living on *Quercus*, *Greenisca*, *Gregoporia*, *Kaweckia* living on grasses, *Hispaniococcus* on *Artemisia*, *Neoacanthococcus* on *Tamarix*, *Pseudochermes* on *Fraxinus* and other plants. These data suggest that Eriococcidae have evolved in a wide range of different environments. On the other hand the colder, more humid habitats are poor in eriococcid species. There are a lot of species living on grasses in the open steppes and others on bushes and on the roots of perennial herbs in the temperate and Mediterranean regions (Miller and Gimpel, 2000).

b. **Nearctic.** The felt scale fauna of this region appears to be medium rich, with 86 species in 15 genera (Table 3), this is one of the well studied region. The number of genera will increase if the numerous species listed now in the “*Eriococcus*” group will be transferred to other genera. The felt scale fauna could be characterised by high number of *Acanthococcus* species living on different plants, and by several small specialised genera, such as *Apezococcus* and *Cornoculus* on grasses, *Atriplicia* on *Atriplex*, *Hypericoccus* on *Hypericum*, *Oregmopyga*, *Ovaticoccus* on different herbaceous plants often on Compositae and grasses, *Spiroporococcus* on different herbaceous plants, *Xerococcus* on *Fouquieria*. The majority of species of Nearctic felt scales are found on trees, shrubs and grasses (Miller and Gimpel, 2000).

c. **Neotropic.** Twenty seven genera comprising 67 species are known from this region (Table 3). The numerous new descriptions indicate that here the felt scale insect fauna is not well explored. Several species listed now in the “*Eriococcus*” group should be redescribed and sorted out other genera. The fauna tends to be specialised having high number of apparently endemic genera containing only few species, such as *Apiococcus*, *Stibococcus* and *Tectococcus* on Myrtaceae, *Chilechiton*, *Chilecoccus*, and *Intecticoccus* on *Nothofagus*, *Exallococcus* on *Laurelia*, *Icelococcus* on *Lithraea*, *Macracanthopyga* and *Orafortis* on Myrtaceae, *Eriobalachowskya* on *Inga*, *Hempelicoccus* on Compositae, Leguminosae, *Pseudotectococcus* on *Anona*. The host plant range shows a close connection with Australian and New Zealand faunas, as it has been shown by several authors (Hoy, 1962; Gullan et al, 2006; Hodgson and Miller, 2002; Kondo and Hardy, 2006; Miller and Gonzalez, 1975). In several cases the host plant is unknown: *Aculeococcus*, *Coxicoccus*, *Melzeria*, *Neotectococcus* and *Pseudocapulinia* (Miller and Gimpel, 2000).

d. **Ethiopian.** The eriococcid fauna of this region is very poor, only five genera containing 9 species have been recorded (Table 3) (Miller and Gimpel, 2000). Only one gall-forming endemic genus *Calycicoccus* is known from South Africa on *Apodytes* (Icacinaeae), which shows some similarity to the Neotropical *Aculeococcus* (Gullan et al 2006; Miller and Gimpel, 2000). There are some cosmopolitan species and some endemic species, probably belonging to the genus *Acanthococcus* (Miller and Gimpel, 2000). It seems that the Ethiopian region was distantly separated from those parts of Gondwana land, where

the main radiation of eriococcids happened. Further study could discover much more species. Few data are available for Madagascar, too. Ben-Dov (1993) records here the Coccidae genus *Antandroya*, which resembles the Eriococcidae (Williams, 1984).

e. **Oriental.** The felt scale fauna of this region appears also poor, with 28 species in 9 genera (Table 3), and the fauna needs further exploration (Miller and Gimpel, 2000). Only one genus *Penderopsis* could be considered to be endemic for this region living on Dipterocarpaceae, however this genus may not belong to the Eriococcidae (Miller and Gimpel, 2000).

f. **Austro-Oriental.** This region is very poor in eriococcids (Kozár et al, 2007, 2008, 2009) having 10 species in 6 genera and it could be characterised by endemic genera such as *Hoyicoccus*, *Pseudomontanococcus*. Both genera live in the litter which originated in both cases from *Coprosma* (Rubiaceae) plants that are hosts of several eriococcid species in New Zealand (Hoy, 1962). Further study could let discover much more new genera and species.

g. **Australian.** There is no comprehensive new work on the Eriococcidae family as a whole, for this region, except works of Gullan (1984a, b) on gall forming and on some other groups. Recently, 171 species in 26 genera have been recorded from this region. The eriococcid fauna is very rich, special, more than half of the genera is considered as endemic, especially the gall forming fauna is very rich (Cook and Gullan, 2001, 2004; Gullan et al, 2005). Further studies surely will discover many genera and species, and will clarify the generic position of the numerous species tentatively included now in the "Eriococcus" group, as it can be seen in works of Cook, (2003), Cook et al, 2002; Gullan (1999), Gullan and Cook, 2001, 2007; Gullan and Strong (1997), Hardy et al (2008), Hardy and Gullan (2007a, b). The eriococcid fauna is especially rich and characteristic on Myrtaceae and Nothofagaceae. It could be well characterised by such great genera like *Apiomorpha* with all 43 species included, or *Opisthocelis* with 16 included species, living on *Eucalyptus*, also by smaller specialised genera such as *Ascelis*, *Casuariloma*, *Cylindrococcus*, *Cystococcus*, *Floracoccus*, *Fragorbis*, *Lachnodi*, *Megacoccus*, *Oliffia*, *Ourococcus*, *Phacelococcus*, *Sphaerococcopsis*, and *Subcorticis*.

h. **New Zealand and Pacific Region.** Based on present knowledge, the eriococcid scale fauna of this region appears to be very rich, with 22 genera and 102 species. The New Zealand eriococcids were very well elaborated by Hoy (1962). However current results of Henderson (2006, 2007 a, b) Hodgson and Henderson (1996, 2004) show that it is even richer. The great number of species currently included into the "Eriococcus" group should be studied in more detail to find the right generic designation as it was started by Hardy et al. (2008). The eriococcid fauna of the Pacific region seems very poor (Williams and Watson, 1990), however the new descriptions show that this region also has several, unexplored specific genera and species (Kozár et al., 2009; Williams and Martin, 2007). The eriococcid fauna is especially rich and characteristic on Myrtaceae and Nothofagaceae. The presence of some species belonging to the genera *Alpinococcus*, *Chauzeauana* and *Montanococcus* living on Cyperaceae plants, or genera living in litter, or among moss as *Affeldococcus*, *Bryococcus*, which are poor in the other re-

gions. The fauna could be well characterised by other small genera like, *Affeldococcus*, *Rhopalotococcus*, *Hoheriococcus*, *Noteococcus*, *Phloeococcus*, *Scutarae*, *Stegococcus*, *Tolypecoccus*, *Sysirococcus*. In New Zealand seems most important is the *Eriochiton* genus belonging to a special tribe Eriochitonini, containing all 9 included species, or the 22 species of *Madarococcus* genus from the included 31.

Connections between regions.

The Venn diagram shows that all zoogeographic regions have clearly separated faunas at both generic and species levels (Figs 4, 5). The strongest connection appears between the Oriental and Palaearctic regions with 5 common genera and 20 common species. Most of the common species were found among wood living species of the genera *Acanthococcus* and *Gossypariella*. The distribution of the small common South-East Asian genera are not clearly known at present. There is some connection between the Nearctic and Palaearctic regions, like *Cryptococcus* on *Fagus*, *Acanthococcus* on *Azalea*, *Gossyparia* on *Ulmus*. The connection between the Nearctic and Neotropic regions is also weak, there are only two common genera and three common species: *Acanthococcus dubius* and *Rhizococcus* (?) *kemptoni*. The Oriental and Austro-Oriental regions are connected by species of *Gossypariella*, and *Sangicoccus*. The Australian and Austro-Oriental regions are connected only with the cosmopolitan species *Uhleria* (?) *araucariae*. The Australian Region is connected with the New Zealand and Pacific regions by the genus *Madarococcus* and by some introduced species. The New Zealand and Pacific regions

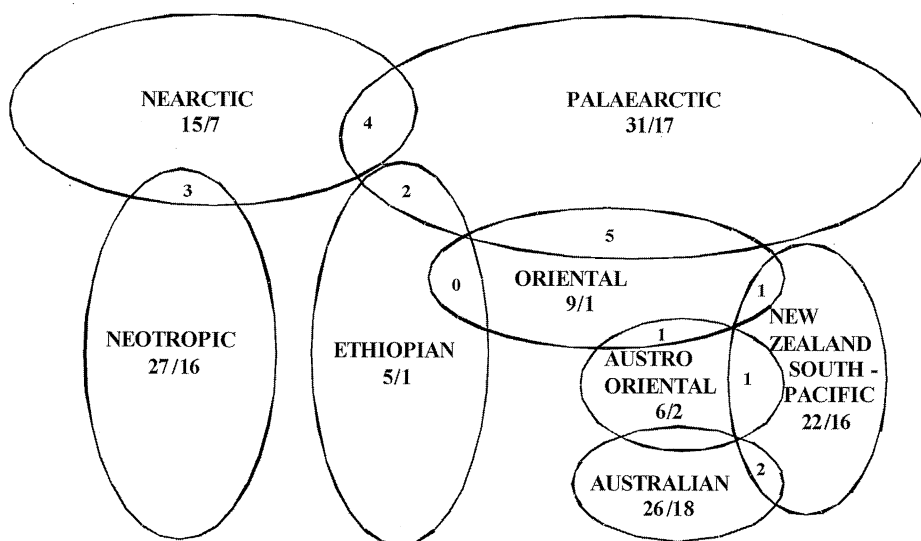


Fig. 4 - Venn diagram of number of total and "endemic" genera of Eriococcidae in different zoogeographic regions of the World.

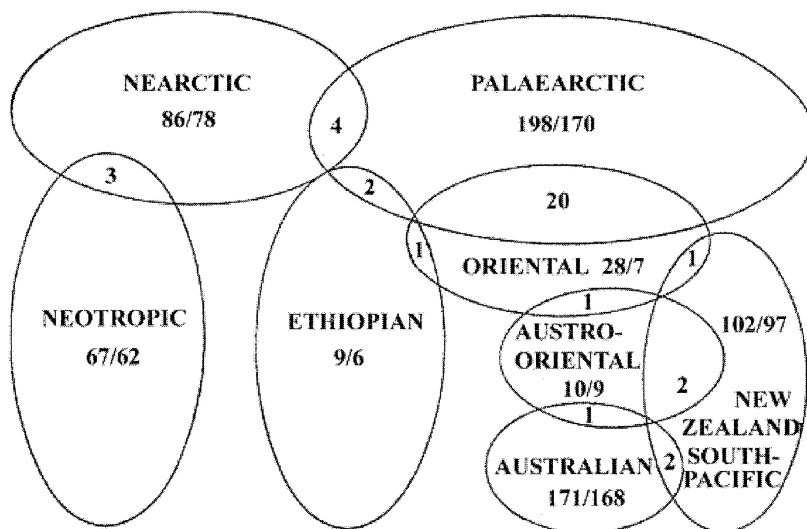


Fig. 5 - Venn diagram of the number of total and “endemic” species of Eriococcidae in different zoogeographic regions of the World.

are connected with the Austro-Oriental and Oriental regions by the introduced *Uhleria* (?) *araucariae*, only. The morphological similarity of *Pseudomontanococcus* from the Austro-Oriental region and *Montanococcus* from New Zealand could present a new possible connection between these regions. New Zealand has some connection with the Neotropical Region sharing such genera as *Icelococcus* and *Madarococcus*.

In comparison to other scale insect families relatively few cosmopolitan species are known in the family Eriococcidae, may be because of the restricted host plant range. Such species are *Ovaticoccus agavium* on *Agave*, *Rhizococcus coccineus* on Cactaceae, *Uhleria* (?) *araucariae* on *Araucaria* distributed by humans with their host plants, used as ornamentals all over the World.

Some genera show unusual distribution according to our present knowledge. The genus *Cryptococcus* occurs in the Palaearctic (with more species in the Palaearctic region), Nearctic regions and in New Zealand (Gwiazdowski et al, 2006; Wu, 2000). A similar picture can be seen in case of *Kuwanina*, which has members in Australia, New Zealand and in the Palaearctic regions (Wu, and Wei, 2003). Both genera may represent an old stock of the Acanthococcidae family group.

There are some large cosmopolitan genera like *Acanthococcus*, *Rhizococcus*, both of which probably have centres of origin in the Palaearctic and Nearctic regions. The large genus *Madarococcus* has centre of origin in the South, connecting Australian, New Zealand and Neotropical regions.

DISCUSSION

The particular species richness of the Eriococcidae in the Australian and New Zealand regions is in accordance with Hoy's (1962) view suggesting that the roots of this family or family group may lead under the ice cover of Antarctica. The main evolution of this family occurred there and it spread only subsequently to the more temperate regions. However, Miller and Gonzales (1975) suggested that the Coccidae had a common origin with Eriococcidae, however the Coccidae is more restricted to tropical climate (Kozár and Ben-Dov, 1997). Hoy (1962) believed that Eriococcidae originated in the temperate areas of the Gondwana continent and new data support this opinion. The distribution data of Eriococcidae species shows, as well as in most of the families of Coccoidea, that the mediterranean parts of the World (except South Africa), with arid climate and sclerophyllous plants are the richest in genera and species (Kozár, 1990b; Kozár and Kindelman, 1987).

The new connections, presented here, change a little bit connections of regions showed by Hoy (1962) in Fig. 79. The New Zealand and Pacific region is not a blind separate region, it is connected by some genera and species with the Australian and Neotropical regions, and form a route of dispersion of eriococcids toward the Oriental and Palaearctic regions, too.

The Venn diagrams of the family Eriococcidae show a very high local genus and species formation (and biome conservatism, sensu Crisp et al, 2009), and very weak connections and colonisation rate among biogeographic regions of World, similarly to the other studied families or regions, as Ortheziidae by Kozár (2004), Rhizoecinae by Kozár and Konczné Benedicty (2007), Coccidae by Kozár and Ben-Dov (1997), Diaspididae by Kozár (1990a), or the work on all families in the Palaearctic region by Kozár (1995), Kozár and Drozdják (1987). The wide separate distribution supports the opinion of Koteja (1985), that a lot of families and genera connecting the regions disappeared in the paleontological time and now we see a new picture (the top of iceberg) of the evolution of the groups, with two main old centres of speciation, one on the Gondwana and a second on Laurasia, while probable Gondwana was first, and now it is not easy to find the common roots.

Several new genera and species (*Affeldococcus*, *Bryococcus*, *Hoyicoccus*, and *Pseudomontanococcus*) were found in the Eriococcidae living in litter, among moss or lichens. This can support the view of Koteja (1985), Bourgoin (1997) and others that the ancestors of hemipterans were ground-dwelling, as it was found in several Ortheziidae groups by Kozár (2004), or for Rhizoecinae groups by Kozár and Konczné Benedicty (2007).

As a conclusion generic and species composition is formed basically by extinction and vicariance and in smaller part by dispersion. Similar relationships were found by Burckhardt and Ouvrard (2006) in Psyllidae. However specimens of ancestors with four wings in female and male stages, and ancestors with two wings in female stages are waiting to be discovered. The present day zoogeographic studies are based on the remnants of the supposedly older genera, which are represented by a small number of species and genera with restricted present distribution areas.

ACKNOWLEDGEMENTS

The author wish to thank the European Synthesys Programmes (GB-TAF-1318, FR-TAF-1319, ES-TAF-2590) and the OTKA (Hungarian National Science Fund) (Grants No. T 048801 and K 75889) for financial support for this project. The author thanks for the permanent help and cooperation to Dr. Imre Foldi, David Ouvrard and Thierry Bourgoïn and to Muséum National d'Histoire Naturelle, Département Systématique et Evolution, Entomologie CP 50, for the financial help of this study. The Author thank Dr Jon H. Martin for help in the Natural History Museum, London and to Isabel Izquierdo and Paris Mercedes in the Museo Nacional de Ciencias Naturales, Madrid (Spain), for the help. The author is grateful to Dr. D. J. Williams, Dr. Daniele Matile Ferrero, Dr. Dug Miller, Dr. Chris Hodgson, Dr. Penny Gullan Dr. Evelina Danzig, Ilya Gavrilov, and a lot of other colleagues for the permanent help in my coccidological work. Special help to Dr. Tibor Jermy and Dr. Bora Kaydan for the corrections on the first draft of the manuscript.

REFERENCES

- BEN-DOV, Y., 1993 - A systematic catalogue of the soft scale insects of the world (Homoptera: Coccoidea: Coccidae) with data on geographical distribution, host plants, biology and economic importance. Flora and Fauna Handbook, No. 9. Sandhill Crane Press, Gainesville, FL, 1-536.
- BEN-DOV, Y., HODGSON, C.J., MILLER, D.R., 1997 - Changes and comments on the taxonomy and nomenclature of some taxa in the families Coccidae, Eriococcidae and Pseudococcidae (Homoptera: Coccoidea). *Phytoparasitica*, 25: 199-206.
- BEN-DOV, Y., MILLER, D.R., GIBSON, G.A.P., 2006 - ScaleNet: a database of the scale insects of the World. Scales in a Region Query Results. <http://www.sel.barc.usda.gov/Scalenet/Scalenet.HTM> (last updated in 24 February 2009).
- BORCHSENIUS, N.S., 1948 - On the revision of the genus *Eriococcus* Sign. (Insecta, Homoptera, Coccoidea). *Doklady Akademii Nauk SSSR*. N.S., 38: 1-382.
- BORCHSENIUS, N.S., 1949 - Insects Homoptera. suborders mealybugs and scales (Coccoidea). Family mealybugs (Pseudococcidae). Vol. VII. Fauna SSSR. Zoologicheskij Institut Akademii Nauk SSSR, N.S. 38. (In Russian). Akademya Nauk, Moscow, 1-382.
- BOURGOIN, T., 1997 - In P. Grandcolas The origin of biodiversity in Insects: Phylogenetic tests of Evolutionary scenarios. *Mémoires du Muséum National d'Histoire Naturelle*, Éditions du Muséum, Paris, 114-118
- BURCKHARDT, D. and OUVRARD, D. (2006): The taxonomy, biogeography and host plant relationships of jumping plant-lice (Hemiptera: Psyllidae) associated with creosote bushes (*Larrea* spp., Zygophyllaceae). *Systematic Entomology*, 32: 136-155.
- COOK, L.G., 2003 - *Apiomorpha gullanae* sp.n., an unusual new species of gall-inducing scale insect (Hemiptera: Eriococcidae). *Australian Journal of Entomology*, 42: 327-333.
- COOK, L., GULLAN, P.J., 2001 - Are the enlarged ducts of *Eriococcus* (Hemiptera: Coccoidea: Eriococcidae) plesiomorphic? *Entomologica*, 33: 59-66.
- COOK, L.G., GULLAN, P.J., 2004 - The gall-inducing habit has evolved multiple times among the eriococcid scale insects (Sternorrhyncha: Coccoidea: Eriococcidae). *Biological Journal of the Linnean Society*, 83: 441-452.

- COOK, L.G., GULLAN, P.J., TRUEMAN, H.E., 2002 - A preliminary phylogeny of the scale insects (Hemiptera: Sternorrhyncha: Coccoidea) based on nuclear small-subunit ribosomal DNA. *Molecular Phylogenetics and Evolution*, 25: 43-52.
- CRISP, M.D., ARROYO, M.T.K., COOK, L.G.M., GANDOLFO, JORDAN, A.G.J., McGlone, M.S., WESTON, P.H., WESTOBY, M., WILF, P., LINDER, H.P., 2009 - Phylogenetic biome conservatism on a global scale. *Science*, 458: 754-756.
- DANZIG, E.M., 1962 - Revision of the genus *Rhizococcus* Signoret (Homoptera, Coccoidea) of the USSR fauna. *Entomologicheskoe Obozrenye*, 41: 839-860.
- DANZIG, E.M., 1975 - New species of the genus *Acanthococcus* Sign. (Homoptera, Coccoidea, Eriococcidae) from the Far East of the USSR. *Entomologicheskoe Obozrenye*, 54: 62-81.
- DANZIG, E.M., 1980 - Coccoids of the Far East USSR with a phylogenetic analysis of the coccoid fauna of the World. (In Russian). Nauka, Leningrad, 1-367.
- DZIEDZICKA A., KOTEJA J., 1971 - Revision of the species of the genus *Rhizococcus* Signoret (Homoptera, Coccoidea) occurring in Poland. *Acta Zoologica Cracoviensia*, 16: 557-579.
- EASTOP, V.F., 1978 - Diversity of the Sternorrhyncha within major climatic zones. *Symposia of the Royal Entomological Society of London*, 9: 71-88.
- EASTOP, V.F., 1979 - Sternorrhyncha as angiosperm taxonomists. *Symp. Bot. Upsal.*, 22: 120-134.
- ERKILIC, L.B., KAYDAN, M.B., KOZÁR, F., 2009 - Description of a new species of Eriococcidae (Hemiptera: Coccoidea) from Turkey and keys to identify eriococcid species known from Turkey. *Turkish Journal of Entomology* (in print), 1-10.
- FERRIS, G.F., 1957 - A review of the family Eriococcidae (Insecta: Coccoidea). *Microentomology*, 22: 81-89.
- FOLDI, I., 1997 - Defense Strategies in scale insects: phylogenetic interference and evolutionary scenarios (Hemiptera, Coccoidea). *Memoires du Museum National d'Histoire Naturelle (N.S.) Serie A, Zoologie*, 173: 203-230.
- FOLDI, I., KOZÁR, F., 2007 - New species and new records of *Eriococcus* (Hemiptera, Coccoidea, Eriococcidae) from South America. *Zootaxa*, 1573: 51-64.
- GOUX, L., 1948 - Les caractères spécifiques chez les *Eriococcus* et la signification des microfilières tubulaires. *Bulletin de la Société Linnéenne de Provence*, 16: 66-69.
- GOUX, L., 1989 - Contribution à l'étude de la morphologie des *Eriococcus* avec description d'une espece nouvelle (Homoptera, Coccoidea, Eriococcidae). *Bulletin de la Société Linnéenne de Provence*, 40: 19-23.
- GULLAN, P.G., 1984a - A revision of the gall-forming coccoid genus *Apiomorpha* Rübsaamen (Homoptera: Eriococcidae: Apiomorphinae). *Austral journal of Zoology, Supplementary Series*, 97: 1-203.
- GULLAN, P.G., 1984b - A revision of the gall-forming coccoid genus *Cylindrococcus* Maskell (Homoptera: Eriococcidae). *Austral journal of Zoology*, 32: 677-690.
- GULLAN, P.G., 1999 - A new genus of subcortical coccoids (Hemiptera: Coccoidea: Eriococcidae) on *Eucalyptus*. *Memoirs of Museum Victoria*, 57: 241-250.
- GULLAN, P.J., COOK, L.G. 2001 - Are cochineal insects eriococcids *Entomologica*, 33: 91-99.
- GULLAN, P.J., COOK, L.G., 2007 - Phylogeny and higher classification of the scale insects (Hemiptera: Sternorrhyncha: Coccoidea). *Zootaxa*, 1668: 413-425.
- GULLAN, P.J., GILIOME, J.H., HODGSON C.J., COOK, L.G., 2006 - The Systematics and biology of the South African gall-inducing scale insect, *Calycicoccus merwei* Brain (Hemiptera: Coccoidea: Eriococcidae). *African Entomology*, 14: 13-33.
- GULLAN P.J., MILLER D.R., COOK L.G., 2005 - Gall-inducing scale insects (Hemiptera: Sternorrhyncha: Coccoidea). In: Raman A., Schaefer C.W., Withers T.M. (eds.), *Biology, ecology and evolution of gall-inducing arthropods: volume 1*. New Delhi: Oxford & IBH Publishing Co. Pvt., LTD, 159-229.

- GULLAN, P.J., STRONG, K.L., 1997 - Scale insects under eucalypt bark: a revision of the Australian genus *Phacelococcus* Miller (Hemiptera: Coccoidea: Eriococcidae). *Australian Journal of Entomology*, 36: 229-240.
- GWIAZDOWSKI, R.A., VAN DRIESCHE, R.G., DESNOYERS, A., LYON, S., SAN-AN WU, KAMATA, N., NORMARK, B.B., 2006 - Possible geographic origin of beech scale, *Cryptococcus fagisuga* (Hemiptera: Eriococcidae), an invasive pest in North America. *Biological Control*, 39: 9-18.
- HARDY, N.B., GULLAN, P.J. 2007a - A new species of *Phacelococcus* Miller (Hemiptera: Coccoidea: Eriococcidae) on *Bursaria* (Pittosporaceae). *The Australian Entomologist*, 34 : 85-91.
- HARDY, N.B., GULLAN, P.J., 2007b - A new genus and four new species of felt scales on *Eucalyptus* (Hemiptera: Coccoidea: Eriococcidae) in south-eastern Australia. *Australian Journal of Entomology*, 46: 106-120.
- HARDY, N.B., GULLAN, P.J., HENDERSON, R.C., COOK, L.G., 2008 - Relationships among felt scale insects (Hemiptera: Coccoidea: Eriococcidae) of southern beech, *Nothofagus* feeding genus *Madarococcus* Hoy. *Invertebrate Systematics*, 22: 365-405.
- HENDERSON, R.C. 2006 - Four new species and a new monotypic genus *Hoheriococcus* (Hemiptera: Coccoidea: Eriococcidae) associated with plant galls in New Zealand. *New Zealand Entomologist*, 29: 37-57.
- HENDERSON, R.C., 2007a - A new genus and species of felt scale (Hemiptera: Coccoidea: Eriococcidae) from epiphyte communities of northern rata (*Metrosideros robusta* Cunn.: Myrtaceae) canopy in New Zealand. *New Zealand Entomologist*, 30: 25-33.
- HENDERSON, R.C., 2007b - Three new genera and six new species of felt scales (Hemiptera: Coccoidea: Eriococcidae) from mountain habitats in New Zealand. *Zootaxa*, 1449: 1-29.
- HODGSON, C.J., 1994 - *Eriochiton* and a new genus of the scale insect family Eriococcidae (Homoptera: Coccoidea). *Journal of the Royal Society of New Zealand*, 24: 171-208.
- HODGSON, C.J., 2001 - Preliminary phylogeny of some non-margarodid Coccoidea (Hemiptera) based on adult male characters. *Bollettino di Zoologia Agraria e Bachicoltura*, 33: 129-137.
- HODGSON, C.J., HENDERSON, R.C., 1996 - A review of the *Eriochiton spinosus* (Maskell) species-complex (Eriococcidae: Coccoidea), including a phylogenetic analysis of its relationships. *Journal of The Royal Society of New Zealand*, 26: 143-204.
- HODGSON, C.J., MILLER, D.R., 2002 - A new genus and two new species of felt scales (Hemiptera: Coccoidea: Eriococcidae) from Chile, with comments on zoogeographical affinities between the eriococcid faunas of southern South America and New Zealand. *Systematic Entomology*, 27: 191-209.
- HODGSON, C.J., TRENCHVA, K., 2008 - A review of Eriococcidae (Hemiptera: Sternorrhyncha: Coccoidea) on *Quercus* species in the western Palaearctic, with a redescription of *Eriococcus roboris* Goux and *E. thymelaeae* Newstead, and a description of a new species. *Zootaxa*, 159: 1-38.
- HOY, J.M. 1962 - Eriococcidae (Homoptera: Coccoidea) of New Zealand. *New Zealand Department of Scientific and Industrial Research Bulletin*, 146: 1-219.
- HOY, J.M. 1963. A Catalogue of the Eriococcidae (Homoptera: Coccoidea) of the World. *New Zealand Department of Scientific and Industrial Research Bulletin*, 150: 1-260.
- KAYDAN, B.M., KOZÁR, F., 2008 - Two new genera and species of Eriococcidae (Hemiptera: Sternorrhyncha: Coccoidea) with new data on the family in Turkey. *Zootaxa*, 1848: 16-26.
- KONDO, T., HARDY, N., COOK, L., GULLAN, P., 2006 - Description of two new genera and species of Eriococcidae (Hemiptera: Coccoidea) from southern South America. *Zootaxa*, 1349: 19-36.

- KOSZTARAB, M. 1968 - Cryptococcidae, a new family of the Coccoidea (Homoptera). *Virginia Journal of Science*, 19: 12.
- KOSZTARAB, M., KOZÁR, F., 1988 - Scale Insects of Central Europe. Akadémiai Kiadó, Budapest, 1-456.
- KOTEJA, J., 1974a - Comparative studies on the labium in the Coccinea (Homoptera). *Zeszyty Naukowe Akademii Rolniczej w Krakowie*, 27, 89: 1-162.
- KOTEJA, J., 1974b - On the phylogeny and classification of the scale insects (Homoptera, Coccinea) (discussion based on the morphology of the mouth parts). *Acta Zoologica Cracoviensia*, 19: 267-325.
- KOTEJA, J. 1985 - Essay on the prehistory of the scale insects (Homoptera, Coccinea). *Annales Zoologici*, 38: 321-328.
- KOTEJA, J., 1988 - Reviewer's remark, p. 277 in: Kosztarab M., Kozár F. (eds.), *Scale insects of Central Europe*. Akadémiai Kiadó, Budapest.
- KOTEJA, J., ZAK-OGAZA, B., 1981 - Kaweckia gen. n. in the Eriococcidae (Homoptera, Coccoidea) and notes on related genera. *Acta Zoologica Cracoviensia (Zoologia)*, 25: 501-518.
- KOZÁR, F., 1990a: Zoogeographical considerations. In: Rosen D (ed.) *Armored Scale Insects, their biology, natural enemies and control*. vol. A., Elsevier, Amsterdam-Oxford-New York-Tokyo, 135-148.
- KOZÁR, F., 1990b - Why are there so few scale insects (Homoptera: Coccoidea). *Proceedings of the 6th International Symposium of Scale Insect Studies, Cracow, August 6-12, 1994, Part II*: 13-17.
- KOZÁR, F., 1995 - New data on the zoogeography of Palearctic Coccoidea (Homoptera). *Israel J. of Entomology*, 29: 103-108.
- KOZÁR, F., 2004 - *Ortheziidae of the World*. Plant Protection Institute, Hungarian Academy of Sciences, Budapest, Hungary, 1-525.
- KOZÁR, F., BEN-DOV, Y., 1997 - Zoogeographical considerations and the status of the knowledge of the family. In: Y. Ben-Dov and C. J. Hodgson (Eds.), *Soft scale insects their biology, natural enemies and control World Crop Pests*. vol. 7A, Elsevier, Amsterdam-Lausanne-New York-Oxford-Shanon-Singapore-Tokyo, 213-228.
- KOZÁR, F., DROZDJÁK, J., 1987 - Some questions concerning the knowledge of Palearctic Coccoidea (Homoptera). *Bollettino del Laboratorio di Entomologia Agraria 'Filippo Silvestri'*, 43 (Suppl.): 97-105.
- KOZÁR, F., KINDELMAN, P., 1987 - Constraints on coccid speciation in various latitudes (Abstracts). In: *Organisational Constrains on the Dynamics of Evolution*. Inter. Symp. 29 Jun - 3 July, 1987, Budapest, Hungary, 30 p.
- KOZÁR, F., KONCZNÉ BENEDICTY, Z., 2007 - *Rhizoecinae of the World*. Plant Protection Institute, Hungarian Academy of Sciences, Budapest, 1- 617.
- KOZÁR, F., KONCZNÉ BENEDICTY, Z., 2008 - Description of three new genera, five new species and some additional data on the taxonomy and distribution of Neotropic Eriococcidae (Homoptera Coccoidea Eriococcidae). *Bollettino di Zoologia agraria e di Bachicoltura*, 40: 79-90.
- KOZÁR, F., KONCZNÉ BENEDICTY, Z., HODGSON, C.J. 2008 - A new felt scale genus (Hemiptera: Sternorrhyncha: Eriococcidae) from Papua New Guinea, with descriptions of two new species. *Zootaxa*, 1934: 47-62.
- KOZÁR, F., MARTIN, J.H., KONCZNÉ BENEDICTY, Z., 2007 - Revision of *Gossypariella* Borchsenius with description of new species (Homoptera Coccoidea Eriococcidae). *Bollettino di Zoologia agraria e di Bachicoltura*, 39: 79-90.
- KOZÁR, F., WALTER, J., 1985 - Check-list of the Palearctic Coccoidea (Homoptera). *Folia Entomologica Hungarica*, 46: 63-110.

- KOZÁR, F., WILLIAMS, D.J., KONCZNÉ BENEDICTY, Z., 2009 - Descriptions of a new genus and four new species of the scale insect family Eriococcidae from the Austro-Oriental Region (Hemiptera: Coccoidea). *Zootaxa*, 179: 1-15.
- KÖHLER, G., 1998 - Eriococcidae. In: Kozár, F. (ed.) *Catalogue of Palaearctic Coccoidea* (pp. 371-402). Plant Protection Institute, Hungarian Academy of Sciences, Budapest, Hungary, 1-526.
- MATILE-FERRERO, D., 1988 - Homoptères Coccoidea de Nouvelle-Calédonie. 1. Un nouveau genre cryptique d'Eriococcidae. *Mémoires du Muséum National d'Histoire Naturelle Série A Zoologie*, 142: 67-74.
- MILLER, D.R., 1991 - Systematic analysis of *Acanthococcus* species (Homoptera: Coccoidea: Eriococcidae) infesting *Atriplex* in western North America. *Proceedings of the Entomological Society of Washington*, 93: 333-355.
- MILLER, D.R., GIMPEL, M.E., 1996 - Nomenclatural changes in the Eriococcidae (Homoptera: Coccoidea). *Proceedings of the Entomological Society of Washington*, 98: 597-606.
- MILLER, D.R., GIMPEL, M.E., 2000 - A Systematic Catalogue of the Eriococcidae (Felt Scales) (Hemiptera: Coccoidea) of the World. Intercept Ltd, Andover, 589 p.
- MILLER, D.R., GONZALES, R.H., 1975 - A taxonomic analysis of the Eriococcidae of Chile. *Revista Chilena de Entomología*, Santiago, 9: 131-163.
- MILLER, D.R. KOSZTARAB, M., 1979 - Recent advances in the study of scale insects. *Annual Review of Entomology*, 24: 1-27.
- MILLER, D.R., MILLER, G.L., 1992 - Systematic analysis of *Acanthococcus* (Homoptera: Coccoidea : Eriococcidae) in the Western United States. *Transactions of the American Entomological Society*, 118: 1-106.
- MILLER, D.R., MILLER, G.L. 1993 - Eriococcidae of the Eastern United States (Homoptera). *Contributions of the American Entomological Institute*, 27: 1-91.
- MILLER, D.R., WILLIAMS, D.J., 1976 - Proposed conservation of the family-group name Eriococcidae Cockerell, 1899 (Insecta, Homoptera) and the designation of a type species for *Eriococcus* Targioni-Tozzetti, 1868 under the plenary powers Z.N. (S.) 2140. *Bulletin of Zoological Nomenclature*, 33: 118-123.
- OUVARD, D., KOZÁR, F. 2009 - Links between host-plant type and site of feeding as revealed by the evolution of Palaearctic Eriococcidae (Sternorrhyncha, Coccoidea). *Annales de la Société Entomologique de France*, 45: 101-118.
- SIGNORET, V., 1875 - Essai sur les Cochenilles ou Gallinsectes (Homoptères-Coccides), 14e partie. *Annales de la Société Entomologique de France*, 5: 15-40.
- TANG, F.T., HAO, J., 1995 - The Margarodidae and others of China (Homoptera: Coccinea of Insecta). Beijing, P. R. China: Chinese Agricultural Science Technology Press, 1-738.
- TEREZNIKOVA, E.M. 1981 - Scale insects: Eriococcidae, Kermesidae and Coccidae. (In Ukrainian). *Fauna Ukraini. Akademya Nauk Ukrainskoi RSR. Institut Zoologii. Kiev*, 20: 1-215.
- WILLIAMS, D., 1984 - Some aspects of the zoogeography of scale insects (Homoptera: Coccoidea). In: Z. Kaszab (Editor), *Verhandlungen des Zehnten Internationalen Symposiums über Entomofaunistik Mitteleuropas (SIEEC)*, 15-20 August 1983, Múzsák Közművelődési Kiadó, Budapest, pp 331-333.
- WILLIAMS, D.J., 1985 - The British and some other European Eriococcidae (Homoptera: Coccoidea). *Bulletin of the British Museum (Natural History) Entomology Series*, 51: 347-393.
- WILLIAMS, D.J., 2007 - Scale insects of the families Asterolecaniidae and Eriococcidae (Hemiptera: Coccoidea) in New Caledonia. *Journal of Natural History*, 41: 1343-1366.
- WILLIAMS, D.J., MARTIN, J.H., 2003 - Description of a new species of *Ovaticoccus* Kloet (Hemiptera: Coccoidea, Eriococcidae) from Belize, with remarkably large hind coxae and causing leaf-curl galls. *Zootaxa*, 367: 1-6.

- WILLIAMS, D.J., WATSON, G.W., 1990 - The Scale Insects of the Tropical South Pacific Region (Part 3) The soft scales (Coccidae) and other families. C.A.B. International Institute of Entomology, London, 1-267.
- WU, San an, 2000 - Descriptions of male and immature stages of *Cryptococcus ulmi* Tang et Hao (Homoptera: Coccoidea: Eriococcidae) with brief notes on its biology. *Entomotaxonomia*, 22: 251-256.
- WU, San an, WEI XIAO, 2003 - *Kuwanina parva* (Maskell) A newly recorded felted scale from China. *Journal of Beijing Forestry University*, 25: 84-85.

DR FERENC KOZÁR - Plant Protection Institute, Hungarian Academy of Sciences, Herman Ottó út
15. 1022 Budapest, H-1525 P.O.Box 102, Hungary. E-mail: h2405koz@ella.hu

Accettato il 16 luglio 2009