

CONTRIBUTION TO THE KNOWLEDGE OF CUBAN SCALE INSECTS (HEMIPTERA; COCCOMORPHA), WITH THE ADDITION OF *COLOBOPYGA WASHINGTONIAE* FERRIS, 1942 (HALIMOCOCCIDAE), A NEW RECORD FOR THE COUNTRY

CONTRIBUCIÓN AL CONOCIMIENTO DE LOS INSECTOS ESCAMA DE CUBA (HEMIPTERA; COCCOMORPHA), CON ADICIÓN DE *COLOBOPYGA WASHINGTONIAE* FERRIS, 1942 (HALIMOCOCCIDAE), COMO UN NUEVO REGISTRO PARA EL PAÍS

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ABSTRACT: The paper compiles studies on scale insects conducted primarily between 1972 and 1975 at INIFAT (Santiago de Las Vegas, Havana, Cuba), which until now were not summarized and reflected ecofaunistically in works by other scientists. From 35 locations, a total of 26 species belonging to 6 families were recognized, mainly as pests in citrus and coffee cultures. *Toumeyella cubensis* Heidelberg & Köhler, 1979 was described as a new species, endemic for Cuba. Furthermore, this article provides previously unknown studies on *Colobopyga coperniciae* Ferris, 1952 (endemic in Cuba), and *C. washingtoniae* Ferris, 1942 (Halimococcidae), introduced with endemic Cuban palm species to the Botanical Garden of Jena / Germany. *Colobopyga washingtoniae* constitutes a new record for the Cuban fauna, and the fan palm *Coccothrinax crinita* represents a new host for this species worldwide.

KEYWORDS: Coccoidea, *Citrus*, *Coffea*, *Colobopyga*, Cuba, endemic species, pest species, *Toumeyella*.

RESUMEN: En este trabajo se compilan estudios sobre insectos escama realizados principalmente entre 1972 y 1975 en el INIFAT (Santiago de las Vegas, La Habana, Cuba) y que hasta ahora no están resumidos ni reflejados ecofaunísticamente en otros trabajos realizados de otros científicos. De 35 localidades se reconocieron un total de 26 especies pertenecientes a 7 familias, principalmente como plagas en plantaciones de cítricos y café. *Toumeyella cubensis* Heidelberg & Köhler, 1979 fue descrito como una nueva especie, endémica de Cuba. Además, se proporcionan algunos resultados desconocidos sobre *Colobopyga coperniciae* Ferris, 1952 (endémica en Cuba) y *C. washingtoniae* Ferris, 1942 (Halimococcidae), introducidas con palmeras endémicas cubanas al Jardín Botánico de Jena, Alemania. *Colobopyga washingtoniae* constituye un nuevo registro para la fauna cubana, así como la palma *Coccothrinax crinita* un nuevo hospedante para la especie en el mundo.

PALABRAS CLAVES: Coccoidea, *Citrus*, *Coffea*, *Colobopyga*, Cuba, especies endémicas, plagas, *Toumeyella*.

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INTRODUCTION

A comprehensive list of scale insects of Cuba at actual state (2010) was published by *Mestre Novoa et al.* (2015). It based on the world database of scale insects (*Garcia Morales et al.*, 2016), on a literature survey as well as on material deposited in the Cuban Institute of Ecology and Systematics (IES). Together with more recent publications, a total of 180 species in 14 families has been registered. Included were papers, dealing first with Cuban scale insects, mainly important as pest species (*Houser*, 1918; *Ballou*, 1926; *Bruner et al.*, 1945), until several recent studies (*Mestre Novoa et al.* 2015, 2016, 2017, 2018, 2021a). Only some older studies were missing, already done in 1972-1975 at the Institute of Fundamental Research on Tropical Agriculture "Alejandro de Humboldt" (INIFAT, Santiago de Las Vegas), comprising two unpublished theses as well as published papers in German periodicals (see references). Therefore, the present contribution mainly summarizes these coccidological studies in citrus and coffee cultures throughout the Isle of Cuba. They primarily were dealing with the biology and ecology of scale insect species, which are still important pests in Cuban crops, and so far should also be valuable as detailed studies for the Cuban scale insect fauna. Furthermore, included are unrecognized results about two *Colobopyga* species on endemic palm species, with *C. washingtoniae* Ferris, 1942 as a new record for the Cuban fauna.

MATERIAL AND METHODS

COCCIDOLOGICAL STUDIES AT INIFAT (1972-1975)

The former Institute of Tropical and Subtropical Agriculture at the Karl-Marx-University of Leipzig (G.D.R.) maintained close relations to the Instituto Nacional de las Investigaciones Fundamentales en la Agricultura Tropical "Alejandro de Humboldt" (INIFAT) of the Cuban Academy of Sciences in Santiago de Las Vegas. Throughout the 1970s, PhD students from the G.D.R. worked each for two years on several applied research topics of their doctorate theses. From 1972-1975 (under the auspices of Prof. Dr. Heinz Fankhänel) two extensive studies on scale insects were done, as pest species in citrus (*Heidel*, 1975) and coffee cultures (*Köhler*, 1977).

SCALE INSECTS IN CITRUS CULTURES

Systematic studies on the occurrence of scale insects on citrus crops (primarily *Citrus sinensis*) were conducted in 1972-1974 over a period of 15 months

in plantations with and without the use of pesticides near Güira de Melena (Prov. Artemisa), Bejucal (Prov. Mayabeque) and Rancho Boyeros (Prov. La Habana). All individual insects were counted based on their infestation on the leaves during various stages of the orange development, from flowering to fruit formation and harvest. Infestation on the fruit and trunk was also recorded. During the studies, up to 23,000 individuals of different scale insects had to be counted and evaluated in individual plots. In addition, all major citrus growing areas in Cuba in that time were visited, sometimes repeatedly, and plantations in production were examined for scale insect infestation. The results on the regional significance of scale insects and factors influencing their population dynamics were presented in studies by *Heidel* (1975, 1980, see also *Table 1*).

The species were determined using the literature available in the library at the INIFAT and extended to the newest international publications in that time. Because of the geographical proximity, also *Merrill* (1953, Revision of Florida Coccoidea) and *Dekle* (1965, Diaspididae of Florida) were used. *De Lotto* (1969) published about old and new soft scales (and mealybugs), resulting that Cuban material sampled by W. Heidel and hitherto determined as *Saissetia oleae* (Olivier, 1791), was found to be *S. neglecta* De Lotto, 1969. According to *Ben-Dov* (1993), the holotype of *S. neglecta* is from Florida, Pine Island, on Grapefruit, but he did not mention Cuba in his world catalogue.

SCALE INSECTS IN COFFEE CULTURES

From 1973-1975 coccidological studies in coffee cultures focused on the green coffee scale, *Coccus viridis* (Green, 1889), on *Coffea arabica* var. caturra, mainly in Plan Cacahual nearby Santiago de Las Vegas (*fig. 1*). In the field in 1974/75, during regular leaf sampling the population dynamics and infestation rates were studied, comparing four plots (á 30 trees) in the sun with four plots under shadow trees. Furthermore, greenhouse rearing experiments with *C. viridis* were done on *Coffea arabica* var. catuai in the INIFAT to study morphological, biological and ecological aspects, including life cycle and parasites. The investigations were accompanied by study trips to traditional Cuban coffee regions in the provinces Guantánamo, Sancti Spiritus and Artemisa/Pinar del Rio, with collecting and preserving scale insect material. In February 1975, in the coffee garden of Topes de Collantes / Escambray on four *Coffea* species and 12 arabica cultivars the rough infestation with *C. viridis* was estimated. All the results were presented in studies by *Köhler* (1976, 1977, 1978, 1980a, b). The *Coccus viridis* group, originating from Eastern Africa, had been revised by *De Lotto* (1960).

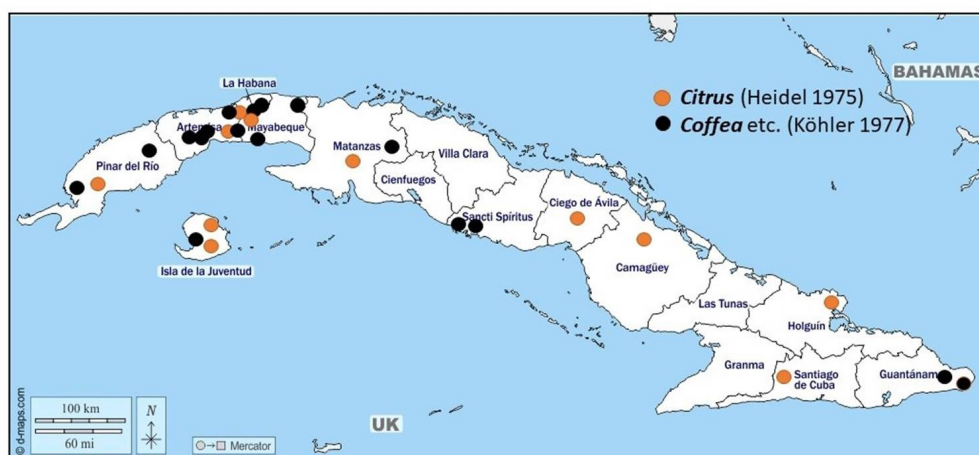


FIGURE 1. Map with the distribution of the sampled localities during 1972 and 1975 at INIFAT on citrus and coffee cultures.

FIGURA 1. Mapa con la distribución de las localidades muestreadas entre 1972 y 1975 por el INIFAT en cultivos de café y cítricos.

To be sure in this pest species, material from Cuba was sent to Giovanni De Lotto for determination and confirmation, and he also sent slides for comparison.

HALIMOCOCCIDS ON ENDEMIC CUBAN PALM SPECIES

In 1966 the German botanist Dr. Johannes Bisse was sent from the Friedrich-Schiller-University of Jena to La Habana as consultant of the Botanical Department, involved in lectures (en la Escuela de Ciencias Biológicas de la Universidad de La Habana), organizing the Flora Cuba Project with the G.D.R. (Berlin and Jena), including several expeditions throughout Cuba to collect living plants as well as herbarium material, and finally involved in the reconstruction of the new Botanical Garden of La Habana. Following that, in the 1980s the Jena Botanical Garden received seeds as well as remarkable plant species from Cuba, including endemic palms, originating from the lowland region of the Southern Pinar del Rio province. Palms of two endemic species were transported in the 1980s to the Botanical Garden of the Jena University. Later two of them were found to be infested by scale insects, two species of the family Halimococcidae, which due to their mass reproduction finally destroyed the palms. The halimococcid species of the genus *Colobopyga* were determined as adult females, using the key of Deitz (1979). Material from these outbreaks was studied and published in two papers (Köhler, 1987; Köhler & Schrameyer, 2023). Considering the endemic host plants and all the other circumstances, the scale insect species were regarded as originating from Cuba and therefore belonging to the Cuban fauna.

RESULTS

SCALE INSECTS IN CITRUS CULTURES

Besides the biology, ecology, distribution and infestation of scale insect species, in more detail *Selenaspidus articulatus* (Morgan, 1889), the studies resulted in a list of all significant scale insects in citrus crops in that time, assessing their frequency and severity of the infestation. Of the 26 scale insect species in Cuban citrus orchards known to date, 16 species were found in the plantations examined, while the remaining 10 species were not. Table 1 gives an overview of their occurrence in Cuban citrus crops and their frequencies in investigated plots in that time. Furthermore, an illustrated determination key (with ink drawings) was developed for practitioners, based on visual characteristics (measures, colours) of adult females and partly males. During these studies, two systematic aspects in the genera *Saissetia* and *Toumeyella* became important (Heidel, 1975, 1980).

For the first time, the species *Saissetia neglecta* De Lotto, 1969 was repeatedly found. Our Cuban material, hitherto determined as *Saissetia oleae* (Olivier, 1791), was found to be *S. neglecta*, confirmed by De Lotto in 1975. Following that, *S. oleae* should be only a minor plague in Cuban citrus crops (Heidel, 1975, 1980). Mestre Novoa *et al.* (2001) recognized *S. neglecta* as new for Cuba and were also confirming records of this species for other host plants in the provinces Sancti Spiritus, Cienfuegos and Mayabeque.

Another prominent taxon in citrus cultures was mentioned since Ballou (1926) until Pruña & Alayo (1973, Isla de La Juventud) as *Toumeyella* sp., described later by Heidel & Köhler (1979) as a new species *T. cubensis* because of their distribution in several regions of Cuba, with information

TABLE 1. Overview of the occurrence of scale insects (Insecta: Homoptera: Coccinea) in different citrus crops in Cuba and its frequency in investigated plots (after [Heidel, 1980](#)).TABLA 1. Resumen de la ocurrencia de cochinillas (Insecta: Homoptera: Coccinea) en diferentes cultivos de cítricos en Cuba y su frecuencia en las parcelas investigadas (según [Heidel, 1980](#)).

Family / Species	First report	Citrus		
		sinensis	paradisi	aurantifolia
Fam: Margarodidae				
Icerya purchasi Maskell, 1881*	Bruner & Arango (1927)	x	x	
Fam: Pseudococcidae				
Planococcus citri Risso, 1813*	Cook & Horn (1908)	x	x	
Pseudococcus longispinus Targ., 1868*	Ballou (1926)	x		
Fam: Coccidae				
Ceroplastes cirripediformes Comstock, 1881	Ballou (1926)	x	x	
Ceroplastes floridensis Comstock, 1881 **	Cook & Horn (1908)	x	x	
Coccus hesperidum Linnaeus, 1758 ***	Cook & Horn (1908)	x	x	x
Milviscutulus mangiferae (Green, 1889)	Bruner et al. (1908)	x		
Coccus viridis (Green, 1889) **	Ballou (1926)	x	x	x
Saissetia coffeae Walker, 1852*	Cook & Horn (1908)	x	x	
Saissetia neglecta De Lotto, 1969 **	Heidel (1975; 1980)	x	x	
Saissetia oleae Olivier, 1791	Cook & Horn (1908)	x		
Toumeyella sp. Cockerell,1895* Toumeyella cubensis Heidel & Köhler, 1979*	Ballou (1926) Heidel & Köhler (1979)	x	x	
Fam: Diaspididae				
Aonidiella comperei Mc Kenzie, 1937	Bruner et al. (1945)	x		
Aspidiotus hederae Vallot, 1894	Houser (1918)	x		
Chrysomphalus dictyospermi Morgan, 1889	Houser (1918)	x		
Chrysomphalus ficus Ashm.	Cook & Horn (1908)	x	x	
Lepidosaphes beckii Newman, 1869 ****	Cook & Horn (1908)	x	x	x
Lepidosaphes gloverii Packard, 1869 ****	Cook & Horn (1908)	x	x	x
Lopholeucaspis cockerelli Grandpre & Charmoy, 1899	Valdez Barry (1959)	x		
Mycetaspis personata Comstock, 1883	Bruner et al. (1945)	x		
Parlatoria cinerea Doane & Hadden, 1909	Valdez Barry (1959)	x		
Parlatoria pergandii Comstock,1881*	Cook & Horn (1908)	x		
Parlatoria zizyphi Lucas, 1853 ****	Bruner et al. (1945)	x		
Pinnaspis strachani Colley, 1899*	Houser (1918)	x	x	x
Selenaspis articulatus Morgan, 1889 ****	Houser (1918)	x	x	
Unaspis citri Comstock, 1883 ****	Cook & Horn (1908)	x	x	x

Frequency scale of occurrence in lots investigated in 1972 and 1973: **** euconstant (76-100%),

*** constant (51-75%), ** accessory (26-50%), * accidental (1-25%).

about phenology, dynamics and infestation rate. The species had been found regularly in Güira de Melena (Artemisa Province) and Bejucal (Mayabeque Province) in spring (April and May) and autumn (September to November), but mainly in low population densities, and was largely unknown to farmers and plant protection practitioners (Heidel, 1975). Unfortunately, their description had to be done without any possibility to compare it with other *Toumeyella* species from Central and Northern America. Decades later, Williams & Kondo (2008) summarized the current composition of the New World genus *Toumeyella* with 16 species from Northern America to Brazil (now 21 species) including the above-mentioned species from Cuba. So far known, *Citrus* species are the only hosts of *T. cubensis* in Cuba, which in the genus *Toumeyella* was never reported from *Citrus* and other Rutaceae from other countries (Kondo & González, 2014), resulting in an endemic status of this species for Cuba, already described by Heidel (1975). Following that, Mestre Novoa *et al.* (2015) included this species in the list of Cuban scale insects. Otherwise, due to the different host genera than *Citrus*, it must be assumed still another species under *Toumeyella* sp. in Cuba (Appendix 1). More detailed studies are needed to solve this problem.

SCALE INSECTS IN COFFEE CULTURES

The studies focussed on the main pest species, the polyphagous green scale of coffee *Coccus viridis* (Green, 1889) (Köhler, 1977, 1978, 1980a). The species was not only detected in nearly all coffee plantations visited throughout Cuba, but also on citrus crops and other hostplants. In contrast to citrus crops, on coffee (by only superficial observations) three other scale insect species were detected (Table 2). Otherwise, in polyculture of coffee with guava and avocado, a total of eight scale insect species was found on *Coffea*, but with *C. viridis* as the most common one (Mestre Novoa, 1999; Mestre Novoa *et al.*, 2006). Following this, *C. viridis* belongs to those five coccid species, which are essential in maintaining ecological network interactions (Mestre Novoa *et al.*, 2021b).

During 1973-75 in greenhouse rearing of *C. viridis*, males were found for the first time after their discovery by P. E. Keuchenius at the beginning of the 20th century in Java (Köhler, 1976). By studying some aspects of the parasite complex, the fungus *Verticillium lecanii* was most important, together with eight taxa of Chalcidoidea with lower parasitic rates in coffee plantations (Köhler, 1980b).

HALIMOCOCCIDS ON ENDEMIC CUBAN PALM SPECIES

Two palm individuals of two endemic fan palm species of the subfamily Coryphoideae (Moya López & Leiva Sánchez, 2000), originating from Western

Cuba, were imported in the 1980s to the Botanical Garden of the University of Jena / Germany. Here in the tropical glasshouses mass infestations developed by two scale insect species of the genus *Colobopyga* (family Halimococcidae), which only could be brought to Germany with those palms, where they normally live in the depth of folded leaf sheets (fig. 2). As typically for the genus *Colobopyga*, the two larval stages as well as the adult female (of 0.7 mm length) live in sclerotized bottles, which can be individually rather variable (fig. 3 and 4).



FIGURE 2. Leaf fan of *Coccothrinax crinita* from the Jena Botanical Garden, with mass infestation of *Colobopyga washingtoniae*, February 2016. Photo by K. Schrameyer.

FIGURA 2. Hoja de *Coccothrinax crinita* del Jardín Botánico de Jena, Alemania, mostrando una infestación de *Colobopyga washingtoniae*, febrero 2016. Fotografía: K. Schrameyer.

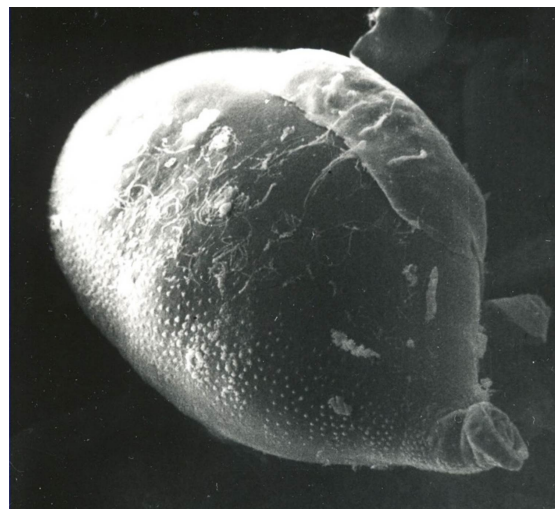


FIGURE 3. Bottle-like shell of *Colobopyga coperniciae* with the female inside. REM-photo, 100×. Photo: W. Fischer.

FIGURA 3. Escama de *Colobopyga coperniciae* con la hembra adentro. REM-foto, 100×. Fotografía: W. Fischer.

Colobopyga coperniciae Ferris, 1952

Material examined: Germany, Jena Botanical Garden

Host plant: *Colpothrinax wrightii* Schaedler, 1875, introduced from Cuba (Las Ovas, Pinar del Rio province)

Examples: all developmental stages (females, males, 2nd and 1st instar larvae, slides, REM-photographs, drawings, Fig. 3)

Collection: G. Köhler, 1983/84

It was the second record of this halimococcid species after its description by Ferris, 1952, originally described on material collected in 1951 from the palm *Copernicia hospita* from Santa Clara / Cuba, resulting in an endemic status of this scale insect species. Because of the brief description based on few morphological properties and on the original slides the species was re-described in their developmental stages, with informations about morphometry and life-cycle (Köhler, 1987).

Colobopyga washingtoniae Ferris, 1942

Material examined: Germany, Jena Botanical Garden

Host plant: *Coccothrinax crinita* (R. D. Hoyt) Becc. [valid author names according Moya López (2020)]

Examples: adult females (slides, photos, Fig. 4 and 5)

Collection: K. Schrameyer, Heilbronn, Germany, 2016

It differs from other *Colobopyga* species by a ring of wax pores in front of the vulva and a pygidium with one pair of flattened setae. The species was described by Ferris (1942) as *Palmaricoccus washingtoniae* from Mexico (Baja California Norte, Cataviña) on *Washingtonia robusta*, and Ferris (1952) later erected a new genus *Colobopyga*. Until now this was the only known locality and hostplant (García Morales *et al.*, 2016). The present occurrence of *C. washingtoniae* is the first evidence for Cuba and for *Coccothrinax crinita* as a new host palm taxon (Köhler & Schrameyer, 2023). Both *Colobopyga* species were hitherto not recognized in Cuba, where at most endemic palm species should be studied coccidologically in more detail.

SPECIES, HOST PLANTS AND LOCALITIES

Summarizing the data from our scale insect studies 1972-75 at the INIFAT, a total of at most 26 species from 6 families was recognized, observed and sampled in about 35 localities of 11 provinces throughout Cuba (Fig. 1). They included scale insects as pests of four *Citrus* species (Heidel, 1975, 1980), four *Coffea* species and 13 arabica cultivars (Köhler 1977, 1980a). Furthermore, three species of Halimococcidae from endemic Cuban palm species are mentioned (Table 2). For the Cuban fauna most of these species were well-



FIGURE 4. Female bottle of *Colobopyga washingtoniae*. Photo: K. Schrameyer.

FIGURA 4. Hembra de *Colobopyga washingtoniae*. Fotografía: K. Schrameyer.

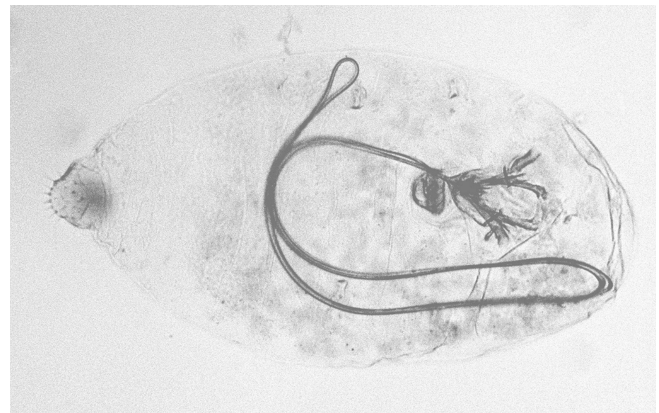


FIGURE 5. Mounted female of *Colobopyga washingtoniae*. Photo: K. Schrameyer.

FIGURA 5. Hembra montada de *Colobopyga washingtoniae*. Fotografía: K. Schrameyer.

known since the beginning of the 20th century, and already mentioned by Cook & Horne (1908), Houser (1918), Ballou (1926) and Bruner *et al.* (1945). But in 1972-1975 several new localities also of widespread species were registered and partly material had been collected (Table 2).

According to actual knowledge, there are three endemic scale insect species in Cuba: *Toumeyella cubensis* (Heidel & Köhler 1979), *Colobopyga coperniciae* Ferris, 1952 (Köhler, 1987) and *Hamonicoccus alayoi* Mestre & Kondo, 2018.

THE SCALE INSECT COLLECTION OF
DR. FERNANDO DE ZAYAS († 1983)

During his stay in Cuba, the first author had the opportunity to visit the well-known Cuban zoologist Dr. Fernando de Zayas in 1974 in his house in Havana-Vedado. Two of his 504 insect boxes contained 60 samples of Coccoidea (dry material from Cuba), each sample (on a leaf or a twig) between cotton wool below and above in a glass tube, which was closed by a red substance (probably signature paint). The glass tubes were additionally fixed by small pieces of wood. Dr. Zayas allowed to notice the scale insect species. In total, 20 species and 4 genus sp. in 7 families were registered, which are listed below here in the actual and the original spelling (syn. in parentheses). Obviously, this is the first record about his scale insect collection, which hitherto had not been published.

Asterolecaniidae: *Russellaspis pustulans pustulans* (Cockerell) (syn. *Asterolecanium pustulans*)

Coccidae: *Ceroplastes floridensis* Comstock, *Ceroplastes stellifer* (Westwood) (syn. *Vinsonia stellifera* Westw.), *Coccus longulus* (Douglas) (syn. *Coccus elongatus* Sign.), *Milviscutulus mangiferae* (Green) (syn. *Coccus mangiferae*), *Protopulvinaria pyriformis* (Cockerell), *Saissetia oleae* (Oliver), *Saissetia* sp., *Toumeyella* sp.

Diaspididae: *Aonidiella* sp., *Aspidiotus destructor* Cockerell, *Diaspidiotus perniciosus* (Comstock) (syn. *Aspidiotus perniciosus* Comst.), *Diaspis echinocactus opuntiae* (Bouché), *Chionaspis pinifoliae* Fitch, *Pinnaspis strachani* (Cooley) (syn. *Hemichionaspis minor* (Mask.)), *Howardia biclavis* Comstock, *Ischnaspis longirostris* (Signoret), *Lepidosaphes beckii* (Newman), *Selenaspis articulatus* (Morgan), *Xanthophthalma concinnum* Cockerell

Eriococcidae: *Capulinia sallei* Signoret (syn. *Lecanium sallei*)

Margarodidae: *Margarodes* sp.

Monophlebidae: *Icerya purchasi* Maskell, *Palaeococcus* sp. (the genus is present in Cuba with *Crypticerya rosae* (Riley y Howard), deposited in the dry collection of C. H. Ballou, cited by Mestre Novoa *et al.*, 2015).

Ortheziidae: *Insignorthesia insignis* (Browne) (syn. *Orthezia insignis* Sign.)

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of German and Cuban staff members. Prof. Dr. Heinz Fankhänel (†) supervised both authors and carried out car trips to the main citrus and coffee regions of Cuba. Our doctorate colleagues in that time, Jürgen Pohlen (WH), Volker and Hannelore Tenckhoff (GK) considerably supported the field work. Giovanni de Lotto (†) proved two coccid species, and Dr. Fernando de Zayas (†) allowed to visit his coccid collection. In communal residence (in Miramar/La Habana) with Dr. Johannes Bisse (†), the first author got valuable insights to the flora of Cuba. Some halimococcid photos were provided by Klaus Schrameyer (Phytopathological Service, Heilbronn). After half a century, it was an extending pleasure to find in Sra. Nereida Mestre Novoa, M. Sc., a professional coccidologist and mentor, which provided valuable comments to a former manuscript, sent PDFs of her numerous papers, gave in 2025 a personally welcome to second author in La Habana, and changed with him several informations decisive for the final manuscript. Dr. Carlos Mancina accepted the manuscript for Poeyana.

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APPENDIX 1. List of coccid species sampled in Cuba 1972-1975 during phytopathological studies at INIFAT, Santiago de Las Vegas. Families and species in alphabetical order. Material: A - in ethylalcohol, D - dry material, DR - drawing, M - Mounted slides; all collected by Günter Köhler.

ANEXO 1. Listado de especies de cóccidos muestreados en Cuba entre 1972 y 1975 durante los estudios en el INIFAT, Santiago de Las Vegas. Las familias y las especies se presentan en orden alfabético. Materiales: A - en alcohol etílico, D - material seco, DR - dibujos, M - montados en slides; todo colectado por Günter Köhler.

Family / Specie	Host plants	Locality	Province	Season	Source
Asterolecaniidae					
<i>Bambusaspis ?bambusae</i> (Boisduval, 1869)	<i>Bambus vulgaris</i>	Tapaste	Mayabeque	23/09/73 (A)	coll. Köhler
	<i>Bambus</i> sp.	Santiago de las Vegas	La Habana	24/06/74 (D)	coll. Köhler
Coccidae					
<i>Ceroplastes floridensis</i> Comstock, 1881	<i>Citrus limon</i>	Santiago de las Vegas	La Habana	24/06/74 (DR)	coll. Köhler
	<i>Citrus sinensis</i>	Güira de Melena	Artemisa	1972-1974	Heidel (1975, 1980)
		Rancho Boyeros Isla de la Juventud	La Habana Isla de la Juventud		
<i>Coccus hesperidum</i> Linnaeus, 1758	<i>Citrus</i> sp.	Güira de Melena	Artemisa	11/07/74 (DR)	coll. Köhler
	<i>Citrus sinensis</i>	Guane	Pinar del Rio	1972-1974	Heidel (1975, 1980)
		Güira de Melena	Artemisa		
		Rancho Boyeros	La Habana		
		Ceballos	Ciego de Ávila		
		Jagüey Grande	Matanzas		
		Contramaestre	Santiago de Cuba		
	<i>Citrus paradisi</i>	Isla de la Juventud	Isla de la Juventud	1972-1974	Heidel (1975, 1980)
	<i>Citrus aurantifolia</i>	Banes	Holguín	1972-1974	Heidel (1975)
	<i>C. limon</i>	Caimito	Artemisa	1973-1975	Köhler (1977, 1980a)
	<i>C. paradisi</i>	Nueva Gerona	Isla de la Juventud	1972-1974	Heidel (1975)
<i>Coccus viridis</i> (Green, 1889)	<i>C. sinensis</i>	Guane	Pinar del Rio	1972-1974	Heidel (1975)
		Ceballos	Ciego de Ávila		
		Jagüey Grande	Matanzas		
		Contramaestre	Santiago de Cuba		
		Isla de la Juventud	Isla de la Juventud		
		Banes	Holguín	1972-1974	Heidel (1975)
	<i>C. sinensis</i>	Güira de Melena	Artemisa	1972-1973	Heidel (1975, 1980)
	<i>C. sinensis</i>	Rancho Boyeros	La Habana	11/09/73 (A)	coll. Köhler
		Alquizar	Artemisa		
	<i>Coffea arabica</i>	Las Terrazas (Sierra del Rosario)	Artemisa	1973-1975 01/11/73	Köhler (1977, 1980a) coll. Köhler
	<i>Coffea arabica</i>	La Salud	Artemisa	1973-1975	Köhler (1977, 1980a)
	<i>Coffea arabica</i>	Batabanó	Artemisa	1973-1975 07/11/73 (A)	Köhler (1977, 1980a) coll. Köhler
	<i>Coffea arabica</i>	San Blas	Cienfuegos	1973-1975	Köhler (1977, 1980a)
	<i>Coffea arabica</i> , 12 cultivars <i>C. canephora</i> <i>C. dibowsky</i> <i>C. liberica</i>	Topes de Collantes (coffee garden)	Sancti Spiritus	1973-1975	Köhler (1977, 1980a)
	<i>Coffea arabica</i>	Baracoa	Guantánamo	1973-1975	Köhler (1977, 1980a)
	<i>Coffea arabica</i>	Maisí	Guantánamo	1973-1975	Köhler (1977, 1980a)

Family / Specie	Host plants	Locality	Province	Season	Source
	<i>C. arabica</i> var. <i>Bourbon</i>	Felicitades (Guamuhaya)	Sancti-Spiritus	1973-1975	Köhler (1977, 1980a)
	<i>C. arabica</i> var. <i>Bourbon</i>	Jibacoa (near Matanzas)	Mayabeque	24/04/74 (M)	coll. Köhler
	<i>C. arabica</i> var. <i>Catuai</i>	San Antonio de los Baños	Artemisa	12/07/74 (A)	Köhler (1978), coll. Köhler
	<i>C. arabica</i> var. <i>Caturra</i>	Cacahual	La Habana	1973-1975 02/08/74 (D)	Köhler (1976, 1977, 1978, 1980a, b) coll. Köhler
	<i>Ixora</i> sp.	Hotel "Colony"	Isla de la Juventud	1973-1975 04/11/73 (A, M)	Köhler (1977) coll. Köhler
	<i>Psidium guayaba</i>	Motembo	Villa Clara	1973-1975	Köhler (1977, 1980a)
	<i>Psychotria</i> sp.	Soroa	Artemisa	1973-1975 01/12/74 (M)	Köhler (1977, 1980a) coll. Köhler
<i>Eucalymnatus tessellatus</i> (Signoret, 1873)	<i>Cocos nucifera</i>	Güira de Melena	Artemisa	11/07/74 (D)	coll. Köhler
<i>Milviscutulus mangiferae</i> (Green, 1869)	<i>Mangifera indica</i>	Cacahual Santiago de las Vegas Trinidad	La Habana La Habana Sancti Spiritus	18/11/74 (D/DR) 18/12/73(A), 13/05/75 (A)	coll. Köhler
<i>Parasaissetia nigra</i> (Nietner, 1861)	unknown	La Habana / Parque Zoológico	La Habana	13/11/1974 (DR)	coll. Köhler
<i>Saissetia coffeae</i> (Walker, 1852)	<i>Coffea arabica</i> var. <i>Caturra</i>	Cacahual	La Habana	25/08/75 (A) 25/06/74 (D)	Köhler (1980a) coll. Köhler
	<i>Citrus sinensis</i>	Guane Güira de Melena Ceballos Jagüey Grande Contramaestre	Pinar del Rio Artemisa Ciego de Ávila Matanzas Santiago de Cuba	1972-1974	Heidel (1975, 1980)
	<i>C. paradisi</i>	Isla de la Juventud	Isla de la Juventud	1972-1974	Heidel (1975, 1980)
	<i>C. aurantifolia</i>	Banes	Holguín	1972-1974	Heidel (1975, 1980)
<i>Saissetia neglecta</i> De Lotto, 1969	<i>C. sinensis</i>	Güira de Melena Ceballos	Artemisa Ciego de Ávila	1972-1974	Heidel (1975, 1980)
<i>Saissetia oleae</i> (Olivier, 1791) [maybe with <i>S. neglecta</i>]	<i>C. sinensis</i>	Guane Güira de Melena Rancho Boyeros Jagüey Grande Contramaestre	Pinar del Rio Artemisa La Habana Matanzas Santago de Cuba	1972-1974	Heidel (1975, 1980)
	<i>C. paradisi</i>	Isla de la Juventud	Isla de la Juventud	1972-1974	Heidel (1975, 1980)
	<i>Coffea arabica</i> var. <i>Caturra</i>	Cacahual	La Habana	07/05/74 (D)	coll. Köhler
<i>Saissetia</i> sp..	<i>Microcycas ? revoluta</i>	Viñales/Eremita	Pinar del Rio	30/12/73 (A)	coll. Köhler
	<i>Coffea arabica</i> var. <i>Caturra</i>	Cacahual	La Habana	02/06/75 (M)	coll. Köhler
<i>Toumeyella cubensis</i> Heidel & Köhler, 1979	<i>Citrus sinensis</i>	Güira de Melena Rancho Boyeros Ceballos	Artemisa La Habana Ciego de Ávila	1972-1974	Heidel (1975, 1980), <i>T. sp.</i>)
	<i>C. sinensis</i>	Güira de Melena Guane Rancho Boyeros	Pinar del Rio Artemisa La Habana	15/02/74 (A)	Heidel (1975), Heidel & Köhler (1979), coll. Köhler

Family / Specie	Host plants	Locality	Province	Season	Source
		Bejucal	Mayabeque		
		Jagüey Grande	Matanzas		
		Contramaestre	Santiago de Cuba		
	<i>C. sinensis</i>	Güira de Melena	La Habana	25/09/73 (A, M)	coll. Köhler
	<i>C. sinensis</i>	Ceballos	Ciego de Ávila	15/02/74 (M)	coll. Köhler
	<i>C. paradisi</i>	Isla de la Juventud	Isla de la Juventud	1972-1974	Heidel (1975, 1980, <i>T. sp.</i>)
<i>Toumeyella</i> sp.	<i>Persea americana</i>	Cacahual	La Habana	30/07/74 (D)	coll. Köhler
Diaspididae					
<i>Aonidiella orientalis</i> (Newstead, 1894)	<i>Citrus paradisi</i>	Isla de la Juventud	Isla de la Juventud	05/11/73 (A)	coll. Köhler
<i>Aspidiotus ?destructor</i> Cockerell, 1869	<i>C. sinensis</i>	Güira de Melena	La Habana	11/07/74 (D)	coll. Köhler
<i>Chrysomphalus aonidum</i> (Linnaeus, 1758) [syn. <i>Ch. ficus</i> Ashmead, 1880]	<i>Citrus sinensis</i>	Guane Güira de Melena Jagüey Grande Ceballos Contramaestre	Pinar del Rio Artemisa Matanzas Ciego de Ávila Santiago de Cuba	1972-1974	Heidel (1975, 1980)
	<i>C. paradisi</i>	Isla de la Juventud	Isla de la Juventud	1972-1974	Heidel (1975, 1980)
<i>Ischnaspis longirostris</i> (Signoret, 1882)	<i>Arenga whithii</i>	Santiago de las Vegas	La Habana	18/07/74	coll. Köhler
	<i>Coffea arabica</i> var. <i>Liberica</i>	Topes de Collantes	Sancti-Spiritus	14/05/75	coll. Köhler
	<i>Coffea arabica</i> var. <i>Catuai</i>	Topes de Collantes	Sancti-Spiritus	09/04/75	coll. Köhler
<i>Lepidosaphes beckii</i> (Newman, 1869)	<i>Citrus sinensis</i>	Guane Güira de Melena Rancho Boyeros Jagüey Grande Ceballos Contramaestre	Pinar del Rio Artemisa La Habana Matanzas Ciego de Ávila Santiago de Cuba	1972-1974	Heidel (1975, 1980)
	<i>C. paradisi</i>	Isla de la Juventud	Isla de la Juventud	1972-1974	Heidel (1975, 1980)
	<i>C. aurantifolia</i>	Banes	Holguín	1972-1974	Heidel (1975, 1980)
<i>Lepidosaphes gloverii</i> (Packard, 1869)	<i>Citrus sinensis</i>	Guane Güira de Melena Rancho Boyeros Jagüey Grande Ceballos Contramaestre	Pinar del Rio Artemisa La Habana Matanzas Ciego de Ávila Santiago de Cuba	1972-1974	Heidel (1975, 1980)
	<i>C. sinensis</i>	Santiago de las Vegas	La Habana	06/08/74 (D)	coll. Köhler
	<i>C. paradisi</i>	Isla de la Juventud	Isla de la Juventud	1972-1974	Heidel (1975, 1980)
	<i>C. aurantifolia</i>	Banes	Holguín	1972-1974	Heidel (1975, 1980)
<i>Parlatoria pergandii</i> Comstock, 1881	<i>Citrus sinensis</i>	Guane Güira de Melena Jagüey Grande Ceballos Contramaestre	Pinar del Rio Artemisa Matanzas Ciego de Ávila Santiago de Cuba	1972-1974	Heidel (1975, 1980)
<i>Parlatoria ziziphi</i> (Lucas, 1853)	<i>Citrus sinensis</i>	Ceballos	Ciego de Ávila	15/02/74	Köhler (DR)
<i>Pinnaspis strachani</i> (Cooley, 1899)	<i>Citrus sinensis</i>	Guira de Melena	Artemisa	1972-1974	Heidel (1975, 1980)
	<i>C. aurantifolia</i>	Banes	Holguín	1972-1974	Heidel (1975, 1980)

Family / Specie	Host plants	Locality	Province	Season	Source
<i>Selenaspidus articulatus</i> (Morgan, 1889)	<i>Citrus sinensis</i>	Guane	Pinar del Rio	1972-1974	Heidel (1975, 1980)
		Güira de Melena	Artemisa		
		Rancho Boyeros	La Habana		
		Jagüey Grande	Matanzas		
		Ceballos	Ciego de Ávila		
		Contramaestre	Santiago de Cuba		
	<i>C. sinensis</i>	Güira de Melena	Artemisa	11/07/74 (D)	coll. Köhler
	<i>C. paradisi</i>	Isla de La Juventud	Isla de La Juventud	1972-1974	Heidel (1975, 1980)
	<i>C. sinensis</i>	Alquízar	Artemisa	24/09/1973	Köhler (DR)
		Güira de Melena	Artemisa		
<i>C. sinensis</i>	Santiago de las Vegas	La Habana	13/11/74 (D)	coll. Köhler	
<i>Unapis citri</i> (Comstock, 1881)	<i>Citrus sinensis</i>	Guane	Pinar del Rio	1972-1974	Heidel (1975, 1980)
		Güira de Melena	Artemisa		
		Rancho Boyeros	La Habana		
		Jagüey Grande	Matanzas		
		Ceballos	Ciego de Ávila		
		Contramaestre	Santiago de Cuba		
	<i>C. paradisi</i>	Isla de la Juventud	Isla de la Juventud	1972-1974	Heidel (1975, 1980)
	<i>C. aurantifolia</i>	Banes	Holguín	1972-1974	Heidel (1975, 1980)
	<i>Citrus sinensis</i>	Santiago de las Vegas	La Habana	13/06/74 (D) 15/11/74 (A)	coll. Köhler
		<i>Citrus sinensis</i>	La Fé (Plan Citrico Guane)	Pinar del Rio	25/12/73 (D)
Halimococcidae					
<i>Colobopyga coperniciae</i> Ferris, 1952	<i>Coccothrinax?</i>	Las Ovas	Pinar del Rio	outbreak 1983/84	Köhler (1987)
	<i>Colpothrinax wrightii</i>	⇒ Jardín Botánico de Jena	Jena/Alemania		
<i>Colobopyga washingtoniae</i> (Ferris, 1942)	<i>Coccothrinax crinita</i>	Pinar del Rio ⇒ Jardín Botánico de Jena	Pinar del Rio Jena/Alemania	outbreak 2016	Köhler & Schrameyer (2023)
Monophlebidae					
<i>Icerya purchasi</i> Maskell, 1879	<i>Casuarina equisetifolia</i>	Miramar	La Habana	17/11/1974 (D)	coll. Köhler
	<i>Citrus sinensis</i>	Güira de Melena	Artemisa	1972-1974	Heidel (1975, 1980)
	<i>C. paradisi</i>	Isla de la Juventud	Isla de la Juventud	1972-1974	Heidel (1975, 1980)
Ortheziidae					
<i>Insignorthezia insignis</i> (Browne, 1887)	Planta ornamental	Santiago de Cuba	Santiago de Cuba	26/08/74 (D)	coll. Köhler
Pseudococcidae					
<i>Planococcus citri</i> (Risso, 1813)	<i>C. sinensis</i>	Guane	Pinar del Rio	1972-1974	Heidel (1975, 1980)
		Güira de Melena	Artemisa		
		Jagüey Grande	Matanzas		
		Ceballos	Ciego de Ávila		
		Contramaestre	Santiago de Cuba		
	<i>C. paradisi</i>	Isla de la Juventud	Isla de la Juventud	1972-1974	Heidel (1975, 1980)
<i>Pseudococcus longispinus</i> (Targioni Tozzetti, 1867)	<i>C. sinensis</i>	Güira de Melena	Artemisa	1972-1974	Heidel (1975, 1980)