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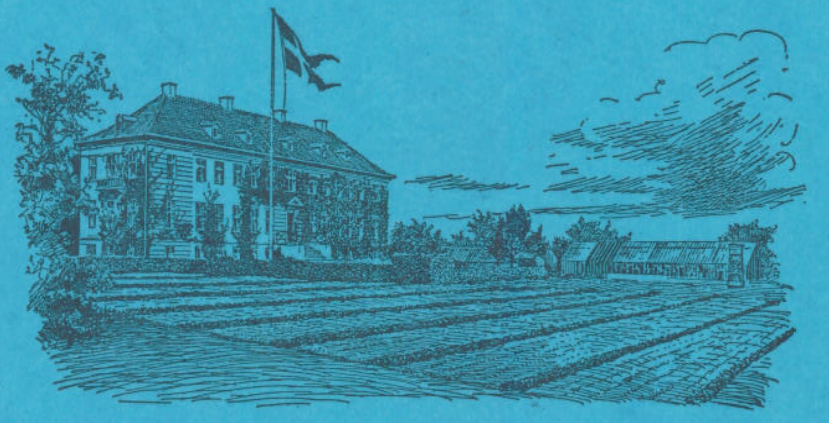
The Scale Insects (Homoptera: Coccoidea) of Denmark



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Statens plantepatologiske Forsøg (H. Ingv. Petersen).
Zoologisk afdeling (K. Lindhardt).

The Scale Insects (Homoptera: Coccoidea) of Denmark

E. Kozarzhevskaya, Principal Botanical Garden, Academy of Science of the USSR, Moscow

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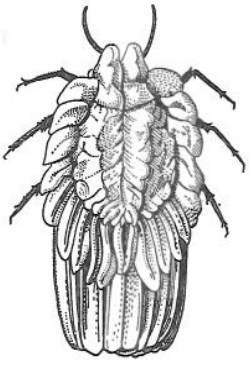
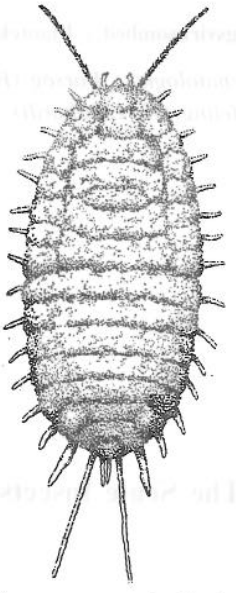
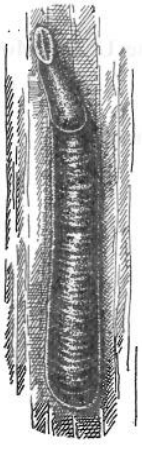


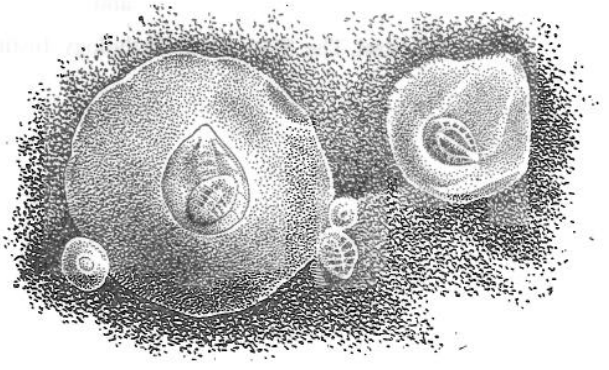
Orthezia urticae (L.)



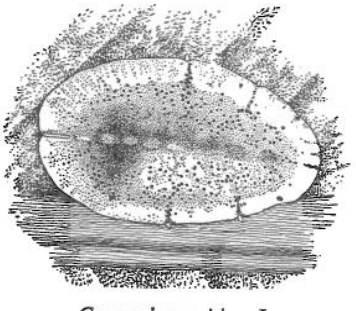
Phenacoccus aceris (Sign.)



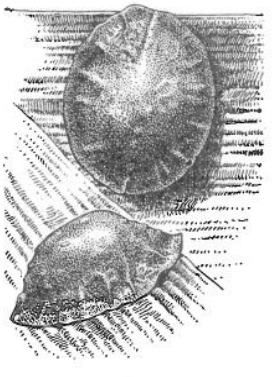
Ischnaspis longirostris (Sign.)



Aspidiotus nerii Bouché



Coccus hesperidum L.



Saissetia coffeae (Walker)

(From N. Borchsenius)

Contents

Introduction

The purpose of this study is to revise the *Coccoidea* or scale insects of Denmark.

The information given in this paper is mainly based upon a revision of old Danish collections and the authors' own collections. But it also includes examination of additional material submitted for identification from various collectors and other sources throughout the country.

The authors believe that this work could be of help to entomologists and other scientists engaged in plant protection. Likewise it should be useful to specialists, workers in quarantine services and to students. It is our hope this paper will stimulate some interest in Danish coccids, and help to accumulate additional records and biological data. The study of Danish coccids becomes increasingly necessary to ascertain which are the economically important pests in order to help advisers and gardeners and to provide a better basis for methods of control.

Acknowledgements

We are very grateful to all those, who have made this work possible.

Especially we would like to express our warm gratitude to direktor of The State Plant Pathology Institute H. Ingv. Petersen and to Dr. S. L. Tuxen and his staff of entomologists of the Zoological Museum for providing the necessary facilities and for much help.

For valuable suggestions and for identification of some species we are much obliged to Dr. D. J. Williams, The Commonwealth Institute of Entomology, London, Prof. A. S. Balachowsky and D. Matile-Ferrero, The Natural History Museum, Paris, and Dr. E. Danzig, The Zoological Institute, Leningrad.

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To the many other persons, who have helped us in various ways, we wish to express our most sincere thanks.

The senior author's stay and work in Denmark was supported by the Danish Ministry of Education; this is also gratefully acknowledged.

List of Abbreviations

ZM – Zoological Museum, Copenhagen University.
VAU – Royal Veterinary and Agricultural University.
PPI – State Plant Pathology Institute.
PPS – Government Plant Protection Service.
BGCU – Botanical Garden, Copenhagen University.
BGÅU – Botanical Garden, Århus University.
w/l – Without locality
w/d – » date
w/p – » plant
w/c – « collector
H – species mentioned in K. Henriksen's publication.

Material and Methods of Study

During the years 1972 and 1973 investigations were conducted on the coccids of Denmark. The main part of this study is the revision of the collections of ZM, VAU and PPI. All the specimens in the collections were originally unmounted and the authors have prepared a series of microscope slides. Specimens have been treated by boiling in potassium hydroxide, staining with acid fuchsin and mounting in canada balsam.

A collection of preparations and samples of coccids on their host-plants (dry or in alcohol) is now in ZM.

Some additional collecting was done by the authors, but coccids were only collected when time permitted. Scales and mealybugs were collected chiefly in greenhouses (state, commercial and private), but outdoors (forests, arboreta, nurseries, gardens) as well. Some material was received from PPS, and several collectors, whose names are mentioned, collected single species. Most of the coccids have been identified by the authors and some by other coccid specialists.

As a result of the investigations the list of coccids totals 61 species, 32 of which were new to the Danish fauna. The latter are marked with + on the left, and greenhouse species are marked with * on the right in the list. Families are given in systematic order and genera are in alphabetical order. The description of each species includes the full scientific name, common name, the most important references, type locality and hosts. Also included are the distribution, additional hosts, habitat, economic importance, and notes concerning taxonomic changes. The taxonomic categories as well as the specific nomenclature are those generally accepted by most authors, and the generic nomenclature is that accepted by Morrison and Morrison (1966). The citations of literature have been restricted to a selection of the more important references.

Most of the material was collected in Zealand and relatively little was from Jutland and Funen. Bornholm is very poorly represented. No material was available from other islands of the country.

It is obvious that the knowledge of the Danish coccid fauna is still incomplete. Much additional collecting remains to be done, with particular attention to be paid to the greenhouse plants.

List of the Species

Ortheziidae

Newsteadia floccosa (De Geer)
Orthezia insignis Browne*
Orthezia urticae (L.)

Pseudococcidae

\+ *Chorizococcus brevicruris* McKenzie *
\+ *Geococcus coffeae* Green *
Phenacoccus aceris (Signoret)
Planococcus citri (Risso) *
Pseudococcus longispinus (Targioni-Tozzetti) *
\+ *Pseudococcus microcirculus* McKenzie *
\+ *Pseudococcus obscurus* Essig *
\+ *Rhizoecus cacticans* (Hambleton) *
\+ *Rhizoecus dianthi* Green *
\+ *Spilococcus cactearum* McKenzie *
\+ *Spinococcus calluneti* (Lindinger)
\+ *Trionymus perrisii* (Signoret)

Eriococcidae

Cryptococcus fagisuga (Lindinger)
\+ *Eriococcus devoniensis* (Green)
\+ *Eriococcus insignis* (Newstead)
Gossyparia spuria (Modeer)
Kermes quercus (L.)

Asterolecaniidae

Asterodiaspis variolosa (Ratzeburg)
Bambusaspis bambusae (Boisduval) *

Coccidae

\+ *Chloropulvinaria floccifera* (Westwood)
Coccus hesperidum L. *
Eriopeltis festucae (Fonscolombe)
\+ *Eriopeltis lichtensteini* (Signoret)
\+ *Eriopeltis rasinae* Borchsenius

+ *Eriopeltis stammeri* Schmutterer
Eucalymnatus tessellatus (Signoret)*
+ *Eulecanium tiliae* (L.)
+ *Lecanopsis formicarum* Newstead
Palaeolecanium bituberculatum (Targioni-Tozzetti)
+ *Parafairmaria gracilis* Green
+ *Parasaissetia nigra* (Nietner) *
Parthenolecanium corni (Bouché)
+ *Parthenolecanium fletcheri* (Cockerell)
+ *Parthenolecanium persicae* (Fabricius)
+ *Parthenolecanium pomeranicum* (Kawecki)
+ *Physokermes piceae* (Schrank)
Pulvinaria vitis (L.)
Saissetia coffeae (Walker) *
Saissetia oleae (Olivier) *
+ *Coccus sp.* *
+ *Pulvinaria sp.* *

Diaspididae

+ *Abgrallaspis cyanophylli* (Signoret) *
+ *Anamaspis lowi* (Colvée)
+ *Aspidiotus elaeidis* Marchal *
Aspidiotus nerii Bouché *
Aulacaspis rosae (Bouché)
Chionaspis salicis (L.)
Chrysomphalus aonidum (L.) *
+ *Diaspis echinocacti* (Bouché) *
+ *Diaspis boisduvalii* Signoret *
+ *Diaspis bromeliae* (Kerner) *
Furchadaspis zamiae (Morgan) *
Ischnaspis longirostris (Signoret) *
Lepidosaphes ulmi (L.)
Parlatoria proteus (Curtis) *
Pinnaspis aspidistrae (Signoret) *
Pinnaspis buxi (Bouché) *
+ *Quadraspidiotus perniciosus* (Comstock)

Two species mentioned by Henriksen are not listed: *Rypersia corynephori* Sign. and *Eulecanium coryli* L. (for explanation – see in text).

Historical background

More than 50 years have passed since the first list of Danish coccids by *K. Henriksen* (1921) was published. His work was a good attempt to bring together all available information published by several workers at the end of the 19th and beginning of the 20th centuries. In his paper he noted 31 species 15 of which occurred in greenhouses and 16 outdoors. He gave brief notes of these coccids, their known distribution in the world and some references. Unfortunately, after that time nobody studied this group seriously in Denmark, and only a small amount of information concerning Danish coccids has been published.

In 1923 J. E. V. Boas published »Dansk Forstzoologi«; short notes of some widely distributed species are given including *Asterolecanium variolosum, Chionaspis salicis, Cryptococcus fagi, Lecanium corni, Lepidosaphes ulmi* and *Pulvinaria vitis.*

Later, in three editions of a book about garden pests written by *Prosper Bovien & Mathias Thomsen* (1933, 1945, 1950), information was given on hosts, economic importance and control of 15 common Danish species. Similar information was given in »Den grønne Bog« (*Dahl* and *Hejndorf,* 1965).

It should be pointed out that some papers have been published about damage caused by the important species *Cryptococcus fagisuga,* and reasons for its periodic outbreaks (*Bejer-Petersen,* 1959, 1964a, *Bejer-Petersen* and *Koch,* 1964, *Holstener-Jørgensen* and *Eiselstein,* 1969). A detailed report of this pest as it occurs in Denmark has been presented by *Thomsen, Buchwald* and *Hauberg* (1949). Mention has been made on another forest pest, *Physokermes piceae.* The larva of the beetle *Brachytarsus nebulosus* Forst. feeds on this species which is common on *Picea excelsa* in Bommerlund, Jutland, (*Dahl* and *Bejer-Petersen,* 1960). *Chionaspis salicis* was widespread on ash trees in 1963 (*B. Bejer-Petersen,* 1964).

Host relations and economic importance

Coccids or as they are usually termed mealybugs and scales form a large and important group of phytophagous insects, containing many species of economic importance and cause serious damage to commercial ornamen-

tal and forest plants. Many of these insects are noxious pests in tropical and subtropical regions of the world. Some species can heavily infest plants in northern latitudes, also in the open and in greenhouses.

Scales and mealybugs live on a variety of trees, shrubs and grasses. Feeding on the sap, coccids cause such damage as leaf fall, deformation of leaves and twigs, and stunting and killing of plants. Some coccids make pits in their hosts such as *Asterodiaspis variolosa* and *Gossyparia spuria*. Species of the family *Coccidae* excrete honeydew, causing 'sooty moulds' to appear on the plants.

Of the coccids a large group of species lives on a wide variety of plants (polyphagous). Among these are *Parthenolecanium corni, Lepidosaphes ulmi, Quadraspidiotus perniciosus, Coccus hesperidum* and *Pseudococcus obscurus*. Others may be limited to several related plant families (oligophagous), such as *Aulacaspis rosae*. Still others are confined to a single host species (monophagous), such as *Cryptococcus fagisuga, Parthenolecanium pomeranicum, Spilococcus cactearum* and *Pseudococcus microcirculus*. Some species of coccids seem to restrict their feeding to one part of the plant such as leaves, stems or bark. These include *Kermes quercus* on the bark, *Diaspis echinocacti* on the foliage, *Geococcus coffeae* and *Rhizoecus cacticans* only on the roots, while many other species live indiscriminately on leaves, twigs, stems, trunks and fruits.

In Denmark the most important coccids are pests in greenhouses. Some of them cause permanent damage. Heavy infestation caused by *Geococcus coffeae* has been observed on many plants in BGÅU. This mealybug was imported on plants from Thailand and has spread inside greenhouses. Great damage has occurred on some cacti and succulent plants in several commercial and private greenhouses and in BGCU, caused by *Rhizoecus cacticans, R. dianthi* and *Diaspis echinocacti*. Eradication of the root-infesting species is very difficult. In 1973 in Hellerup *Nerium oleander* was heavily infested by *Aspidiotus nerii, Saissetia oleae* and *Pseudococcus obscurus*.

Extensive damage of some plants by the common species *Coccus hesperidum, Saissetia coffeae* and *Ps. obscurus* was noticed in some greenhouses.

In the open, some common species occasionally become pests. The most important native coccid is *Cryptococcus fagisuga,* or Felted Beech Coccus, which often kills beech trees. Serious outbreaks of this pest were noted from time to time in different forest districts. In 1959 a heavy attack was reported from Vejle, Jutland. In 1964 in Brahetrolleborg, Funen, a heavy infestation resulted in the felling of 4.000 trees. Damage by this insect was also noted in Zealand, Falster and Lolland.

Several cases of heavy infestation and damage were observed by the authors in the open on fruit, ornamental, forest plants and grasses. Blackberry and raspberry were infested by *Parthenolecanium corni* and *Lepidosaphes ulmi,* roses by *Aulacaspis rosae,* oaks by *Asterodiaspis variolosa,* beech by *Cryptococcus fagisuga* and some species of grasses by *Eriopeltis festucae* and other species of that genus. Some rather rare species are increasingly observed in orchards, nurseries, gardens and forests.

It should be pointed out that by their inconspicuous nature and their habitat some coccids are difficult to detect, in particular when only a few individuals are present.

Geographical Distribution

Knowledge of the native coccids of Denmark is imperfect at present. Only 31 species have been discovered, which are mostly common ones, widely distributed in the forests of the temperate zone of Europe. They are confined to trees, shrubs and grasses. The most widely distributed scale insects in Denmark are: *Cryptococcus fagisuga, Chionaspis salicis, Lepidosaphes ulmi, Parthenolecanium corni* and *Eriopeltis festucae*. Others are found more rarely, such as *Phenacoccus aceris, Gossyparia spuria, Parthenolecanium pomeranicum* and *Aulacaspis rosae. Quadraspidiotus pernisiosus* is absent now and not mentioned in the table.

The knowledge of the Coccid fauna of Sweden, Finland and especially Norway is still incomplete. It is difficult, therefore, to come to any conclusions on the zoogeography of the area. The distribution of species in these countries together with that in Iceland and Greenland have been summarized in a table, which may be useful for understanding zoogeographic relationships of these species. This is the first attempt to list all known Scandinavian coccid species.

Distribution of *Coccoidea* known from Scandinavia, Finland, Iceland and Greenland.

	Denmark	Norway	Sweden	Finland	Iceland	Greenland
Ortheziidae						
Newstedia floccosa	+		+	+		
Orthezia cataphracta		+	+	+	+	+
O. urticae	+		+	+		
Ortheziola vejdovskyi			+			
Margarodidae						
Matsucoccus pini			+			
Porphyrophora polonica			+			
Steingelia gorodetskia			+			
Pseudococcidae						
Ceroputo balachowskyi			+			
Chnaurococcus subterraneus			+			
Heliococcus bohemicus				+		
H. osborni			+			
H. radicicola			+			
Heterococcus variabilis			+			
Peliococcus balteatus			+			
P. manifectus			+			
Phenacoccus aceris	+		+	+		
P. hordei				+		
P. piceae			+			
P. venustus					+	+
Planococcus vovae				+		
Spinococcus calluneti	+		+			
Trionymus incertus					+	
T. perrisii	+					
T. thulensis					+	
Pseudococcinae spp.						+
Eriococcidae						
Cryptococcus fagisuga	+		+			
Eriococcus agropyri				+		
E. devoniensis	+			+		
E. graminicola				+		
E. granulatus					+	
E. greeni				+		
E. insignis	+			+		
Gossyparia spuria	+	+		+		
Kermes quercus	+			+	+	
Pseudochermes fraxini				+	+	
Asterolecaniidae						
Asterolecanium arabidis				+		
A. fimbriatum				+		
Asterodiaspis variolosa	+			+		
Coccidae						
Chloropulvinaria floccifera	+					
Eriopeltis festucae	+				+	
E. lichtensteini	+			+	+	
E. rasinae	+			+		
E. stammeri	+					
Eulecanium tilia	+					
Lecanopsis formicarum	+					
Luzulaspis scotica				+		
Palaeolecanium bituberculatum	+			+		
Parafairmaria gracilis	+			+		
Parthenolecanium corni	+	+		+	+	
P. fletcheri	+			+		
P. persicae	+					
P. pomeranicum	+			+		
Physokermes piceae	+			+	+	
Pulvinaria vitis	+			+	+	
Pulvinaria sp.						+
Diaspididae						
Anamaspis lowi	+			+		
Aulacaspis rosae	+			+		
Chionaspis salicis	+			+	+	
Lepidosaphes ulmi	+	+		+	+	
Nuculaspis abietis				+		
Quadraspidiotus bavaricus		+		+		
Q. ostraeformis				+		
Q. zonatus				+		

The literature on coccids from the mentioned countries is small. The best survey of Swedish *Coccoidea* was made by *Ossiannilsson* (1951, 1959), who gave a list of 47 native

species and 32 greenhouse species.

The fullest information about the coccid fauna of Finland was given in a list of insects by *Hellen* (1922, 1923, 1926, 1941). Another paper (*Vappula,* 1965) completes the list.

Other contributions to the knowledge of Finnish scale insects have been given in Enumeratio (1935), *Saalas* (1946), *Tiensuu* (1951), *Thunberg* (1966) and *Löyttyniemi* (1971). The number of native species now known in Finland is 17 outdoors, and 10 are known from greenhouses. (Large piceae scale not mentioned in table).

Unfortunately, records of coccids from Norway are few. The occurrence of only five species was mentioned in the literature: *Gossyparia spuria* by *Hoy* (1963), *Lepidosaphes ulmi* and *Quadraspidiotus bavaricus* by *Borchsenius* (1966), *Parthenolecanium corni* by *Fjelddalen* (1954), and *Orthezia cataphracta* by *Ossiannilsson* (1951). Even from greenhouses only *Coccus hesperidum, Aspidiotus nerii (hederae), Pinnaspis aspidistrae* and *Saissetia coffeae (hemisphaericum)* are known (*J. Fjelddalen,* 1953, 1954, 1957).

The known Coccid fauna of Iceland totals 7 species (*Green,* 1931, *Ossiannilsson,* 1955). Two of them – *Pinnaspis aspidistrae* and *Pseudococcus sp.* – are known from greenhouses. The other four species described by Green: *Eriococcus granulatus, Phenacoccus venustus, Trionymus thulensis* and *T. incertus* have not been reported from other areas. The commonest species in Iceland is *Arctorthezia cataphracta* (Olaf.).

Coccids from Greenland were mentioned by *Henriksen* (1939) in his revised list of the insects. These are *Orthezia cataphracta, Phenacoccus venustus, Pulvinaria sp.* (on *Salix* roots) and *Pseudococcinae spp.*

It is interesting to note, that two new species of scale insects have been described from Ellesmere Island in arctic Canada, which is near to Greenland. They are: *Pulvinaria ellesmerensis* Rich. on *Salix arctica* and *Pseudococcus altoarcticus* Rich. on *Dryas integricolia* and in yellow water traps (*Richards,* 1964).

Key to the Families of Coccids in Denmark

1. Abdominal spiracles present. Body of insect with wax plates; ovisac carried by adult female ..... **Ortheziidae**
   Abdominal spiracles absent; ovisac not carried by adult female ..... 2.
2. Body with 8-shaped pores. Antennae of female reduced; legs absent or reduced to small tubercles, body inside a waxy test ..... **Asterolecaniidae**
   Body without 8-shaped pores ..... 3.
3. Anal opening covered dorsally by a pair of sclerotized triangular plates. (In genus *Physokermes* anal plates lacking in adult female). Covering very variable, from hard and sclerotized to soft and wool-like ..... **Coccidae**
   Anal opening without such plates .... 4.
4. Pygidium present, formed by last four abdominal segments. Female without a cellular and setigerous anal ring; antennae reduced, legs absent or rarely present as small tubercles; with removable scale cover ..... **Diaspididae**
   Pygidium absent. Anal ring of female cellular and setigerous; without removable scale cover ..... 5.
5. Dorsal ostioles present; with from 0 till 4 ventral circuli. Body normally with different types of pores; the insects in life covered with a white powdery secretion; during oviposition producing a wooly ovisac ..... **Pseudococcidae**
6. Dorsal ostioles and ventral circuli absent. Tubular ducts of a distinctive type, being reflexed at inner end into a definite cup; the majority of species with well developed anal lobes the insects secreting a dense felt-like ovisac ..... **Eriococcidae**

Synopsis of the Species

Family Ortheziidae

Newsteadia floccosa (De Geer)

Coccus floccosus De Geer, 1778.
Orthezia (Newsteadia) floccosa, Green 1902.
Newsteadia floccosa (De Geer), Newstead, 1903,

Henriksen, 1921, Hellen, 1921, Morrison, 1925, Borchsenius, 1950, Morrison, 1952.

Type Locality and Host:
Under dry leaves of spruce (*Picea*), on the soil, by Modeer; locality not mentioned.

Occurrence in Denmark:
Zealand: Rude Hegn, 5/3 1872, Schlick, w/p. H.
Ørholm, 11/5 1973, Schlick, w/p. H.
Lyngby, 11/4 1874, Schlick, on moss. H.
Gribskov, w/d, Meinert, under bark. H.
Dyrehaven, Copenhagen, 20/4 1924, Ditlevsen, under bark of *Alnus*.
Strødam, Hillerød, 13/7 1932, Tuxen, in soil of fir-forest.
Hulsø, 9/7 1932, Tuxen, among fallen leaves.
Helsinge, 11/11 1973, authors, among fallen leaves. 'Beech-forest'.
Dyrehaven, Copenhagen, 27/2 1974, Enghoff, stone wall, under stone.
Jutland: Rye, w/d, Schiødte, w/p. H.
Frøslev, 22/10 1973, Enghoff, *Picea* plantation.
Frøslev, 30/10 1973, Enghoff, *Picea* plantation.
Funen: Odense, w/d, N. P. Jørgensen, w/p. H.
Bornholm: Almindingen, 19/6 1920, E. Rosenberg, between leaves. H.

Distribution:
Recorded from Austria, Belgium, Czechoslovakia, England, France, Finland, Germany, Hungary, Ireland, Poland, Rumania, Scotland, Spain, Sweden, USSR, Australia.

Additional Hosts and Habitat:
Usually found among damp moss and sphagnum, dead leaves, stems of grasses and other plants. Borchsenius (1950) reported it from the branches and stems of oak, pine-tree, *Helianthemum, Glechoma* and *Luzula*. It was also mentioned from ants' nest (Newstead, 1903) and on wet timber at the 300 feet level (Green, 1902).

Notes:
Green (1902) suggested the name *Newsteadia* for this insect and Morrison (1925) placed it in the *Ortheziinae* and then to the *Ortheziidae* (1952).

Orthezia insignis Browne*

Common name:
Greenhouse *Orthezia,* Greenhouse Mealybug; known in England as »Kew Bug«, and popularly known in Ceylon as »Lantana Bug«.
Orthezia insignis Browne, Dec. 1887.
Orthezia insignis Douglas, Jan. 1888.
Orthezia insignis Douglas, Newstead, 1903, Henriksen, 1921, Morrison, 1925, Borchsenius, 1950.
Orthezia insignis Browne, Lindinger, 1935, Morrison, 1952.

Type Locality and Host:
England, Royal Botanic Gardens at Kew, on *Strobilanthes,* a Chinese plant which had been in the Economic House three years.

Occurrence in Denmark:
Zealand: Copenhagen, BGCU, w/c, on *Strobilanthes aspera.* H.
Copenhagen, BGCU, Dec. 1920, w/c, w/p.

Distribution:
Widespread in the tropics and in greenhouses.

Additional Hosts:
Polyphagous. Green (1899) gave a complete list of the known host plants in 15 plant families. The mealybug has a wide host distribution and is reported from numerous plants in greenhouses and outdoors.

Habitat:
Lives on leaves and stems.

Economic Importance:
Does not seem to be an economic important species in Danish greenhouses now, but heavy infestations could damage ornamental plants.

Notes:
The family *Ortheziidae* has been revised by Morrison (1925, 1952). This insect was known

under the authorship of J. W. Douglas since its first description. Lindinger (1935) investigated this matter and showed that Browne's publicaton appeared in print before Douglas' description.

Orthezia urticae (L.)

Common name:
Nettle Mealybug.
Aphis urticae, L., 1758.
Orthezia urticae (L.), Newstead, 1903, Henriksen, 1921, Morrison, 1925, Hellen, 1926, Borchsenius, 1950, Morrison, 1952.

Type Locality and Host:
Germany, by P. Forsskål, on *Urtica*.

Occurrence in Denmark
Zealand: Dyrehaven, Copenhagen, w/d, Meinert, w/p. H.
Boserup skov, Roskilde, 16/9 1893, w/p.
Jutland: Laurbjerg, 27/6 1875, Meinert, w/p. H.
Silkeborg, 1895, w/p.

Distribution:
Common in many countries of Europe; Iran, Iraq, Palestine, Hebrides and USSR (many localities).

Additional Hosts:
Polyphagous, on a large number of plants chiefly on *Urticaceae, Compositae, Euphorbiaceae, Labiatae* and numerous others.

Habitat:
Lives on the leaves, stems and branches.

Family Pseudococcidae

+ Chorizococcus brevicruris McKenzie*

Common name:
Short-legged Mealybug.
Chorizococcus brevicruris McKenzie, 1960, 1967.

Type Locality and Host:
Taken in quarantine at Honolulu, Hawaii, from California, on *Caralluma nebrowni* (*Asclepiadaceae*).

Occurrence in Denmark:
Zealand: Roskilde, 9/6 1972, Philipsen, on upper part of *Stapelia* (numerous).
Ringsted, Hjelmsølille, 9/6 1972, Philipsen, on the roots of *Huernia*.

Distribution:
Reported from North America (Arizona and California), but perhaps it has a wider distribution.

Additional Hosts:
Huernia spp., Stapelia spp. (Asclepiadaceae), Myrtillocactus geometrizans (Cactaceae).

Habitat:
Occurs on the upper crown and subterranean parts of its host.

Economic Importance:
May occasionally do extensive damage on succulent plants. The authors observed heavy infestation on *Huernia* and *Stapelia* in greenhouses, Copenhagen.

Notes:
McKenzie (1967) reported it as a rather serious pest of succulent plants in many nurseries throughout California.

+ Geococcus coffeae Green*

Geococcus coffeae Green, 1933.
Geococcus coffeae Green, Hambleton, 1946, Williams, 1958, Beardsley, 1959, De-Lotto, 1964, Beardsley, 1966, Williams, 1969, S. Mohammad Ali, 1970.

Type Locality and Host.
Dutch Guiana from »the coffee tree« (*C. liberica*).

Occurrence in Denmark:
Jutland: Århus, BGÅU, 17/7 1972, collected by the authors on the roots of following plants: *Caesalpinia pulcheriana, Capsicum annua, Coffea arabica, Coleus sp., Diaspyros montanus, Eleusine indica, Eranthemum variegatum, Ficus religiosa, Strobilantus, Bromeliaceae (Aechmea miniata, Billbergia nutans), Laeaceae.* It was

imported on plants from Thailand to greenhouses of BGÅU.

Distribution:
Widespread hypogaeic species. Apparently mostly in tropical and subtropical areas of the world. Reported from Dutch Guiana, India, Palau Island (Micronesia), Hawaii, Ceylon, Java, Malaya, Philippine Islands, Africa (Ghana, Kenya, Nigeria, Zanzibar).

Additional Hosts:
Roots of many plants such as: *Acacia koa, Canna indica, Cladium, Coffea arabica, Croton, Cyperus rotundus, Desplatzia dewevrei, ferns, Gerbera, Indigofera anil, Ipomeoa batatas* (sweet-potato), mango, *Nicotiana tabacum, oleander,* palms, *Physalis edulis,* pineapple, *Theobroma cacao,* etc.

Habitat:
Only on roots.

Economic Importance:
May be a dangerous pest in greenhouses. The authors observed rather heavy infestations on different plants in greenhouses of BGÅU. Eradication is difficult because of the root-infesting habit of the species. When plants are watered, mealybugs escape from the base of the plant pots and rapidly spread throughout the growing area.

Notes:
The identification of this species has been confused in many cases with *Geococcus radicum* Green from Ceylon on grass roots. Williams (1958) redescribed and figured *G. coffeae* and pointed out the differences between the two species.

Phenacoccus aceris (Signoret)

Common name:
Acer Mealybug, Canadian Apple Mealybug.
Pseudococcus aceris Signoret, 1875.
Phenacoccus aceris (Signoret), Hellen, 1921, Henriksen, 1921, Borchsenius, 1949, Williams, 1962, Vappula, 1965.

Type Locality and Host:
France, on *Acer,* and then on *Carpinus, Tilia* and *Castanea* as well.

Occurrence in Denmark:
Zealand: Dragerup Skov, 29/5 1887, Meinert, on *Quercus.* H.
Hellerup, Sept. 1917, K. Stephansen, on *Cytisus laburnum.* H.
Frederiksberg, VAU, 7/6 1921, Math. Thomsen, on *Pyrus malus.* H.
Strødam, 1930, J. Kryger, on *Betula.*
Jutland: Århus, 2/8 1965, Reitzel, on *Ribes sp.*

Distribution:
Palaearctic and nearctic regions. This is one of the most widely spread mealybugs in Britain on a variety of trees and very common on gorse (Williams, 1962).

Additional Hosts:
Polyphagous. Reported from numerous hosts and such genera as *Ulex, Acer, Quercus, Ulmus, Carpinus, Sorbus, Fagus, Laburnum, Buxus* etc.

Habitat:
Occurs on the trunks, twigs and leaves of its hosts.

Planococcus citri (Risso)*

Common name:
Citrus Mealybug.
Dorthezia citri Risso, 1813.
Pseudococcus citri (Risso), Ferris, 1918, Henriksen, 1921, Hellen, 1921, Borchsenius, 1949.
Planococcus citri (Risso), Ezzat and McConnell, 1956, Williams, 1962, De-Lotto, 1964, Vappula, 1965, Beardsley, 1966a, McKenzie, 1967.

Type Locality and Host:
Southern France, on *Citrus sp. (Rutaceae).*

Occurrence in Denmark:
Zealand: Copenhagen, BGCU, w/d, w/c, on *Hyophorbe verschaffelti, Arenya saccharifera, Ficus elastica, Pilocarpus pinnatifolius.* H.
Jutland: Århus, 18/7 1972, authors, on foliage

of *Euphorbia canariensis* (plant was brought from Can. Islands), single specimen.
Funen: Stige, 22/3 1973, authors, on the leaves of *Croton*.

Distribution:
Nearly cosmopolitan.

Additional Hosts:
Polyphagous. The host list of this pest is very long.

Habitat:
Occurs on the foliage, stems and fruits of its host.

Economic Importance:
Reported as a serious pest of citrus, vine, coffee, nerium, tomato and many other horticultural plants.
In Danish greenhouses it can be a dangerous pest on ornamental plants, especially on *Coleus, Croton,* and *Clerodendrum.*

Pseudococcus longispinus (Targioni- Tozzetti)*

Common name:
Long-tailed Mealybug.
Dactylopius longispinus Targioni-Tozzetti, 1867.
Pseudococcus adonium (Linnaeus), Henriksen, 1921, Hellen, 1926, Borchsenius, 1949, Williams, 1962.
Pseudococcus longispinus (Targioni-Tozzetti), De-Lotto, 1965, McKenzie, 1967.

Type Locality and Host:
According to the original description, this insect inhabits Africa, America and the warmer places in Europe. No specific host and locality were designated.

Occurrence in Denmark:
Zealand: Copenhagen, BGCU, w/d, w/c, on *Cycas circinalis, Dioon edule, Ficus elastica, Pilocarpus pinnatifolius.* H.

Distribution:
A tropical species and widely spread throughout the world, occurring mainly in greenhouses in northern latitudes.

Additional Hosts:
Reported from at great variety of unrelated host-plants.

Habitat:
Occurs on any part of the plant except roots.

Economic Importance:
Known to cause serious damage to citrus, vine, coffee, pineapple, avocado in southern countries but it is mentioned in several cases as a pest of ornamental plants in greenhouses.

Notes:
This mealybug is mainly known as *P. adonidum* (L.). De-Lotto (1965) presented a very complete account of the nomenclatural status of this insect.

+ **Pseudococcus microcirculus McKenzie***

Common name:
Orchid Mealybug.
Pseudococcus microcirculus McKenzie, 1960, 1967.

Type Locality and Host:
California, Contra Costa County, Lafayette (in nursery), 18/10 1954, on orchid (*Orchidaceae*).

Occurrence in Denmark:
Zealand: Copenhagen, BGCU, 9/8 1972, authors, on the foliage of *Lanium sp.* The plant was imported from Brazil.

Distribution:
Known from California, Florida.

Additional Hosts:
Found on the following *Orchidaceae: Brassavola nodosa, Cattleya sp., Dendrobium sp., Odontoglossum sp., Lanium sp.*

Habitat:
Occurs on the foliage, but feeds predominant on the subterranean parts of the host.

Economic Importance:
In heavy infestation this insect could be a dangerous pest in Danish greenhouses. Accord-

ing to McKenzie (1967) the greatest damage occurred in California nurseries in 1962. Eradication is difficult because of the root-infesting habit.

+ **Pseudococcus obscurus Essig***

Common name:
Obscure Mealybug.
Pseudococcus obscurus Essig, 1909.
Pseudococcus maritimus (Ehrhorn), Ferris, 1918, Beardsley, 1960.
Pseudococcus obscurus Essig, Wilkey and McKenzie, 1961, Beardsley, 1962, De-Lotto, 1967, McKenzie, 1967.

Type Locality and Host:
California, Los Angeles County, on the roots of *Opuntia sp. (Cactaceae).*

Occurrence in Denmark:
Zealand: Copenhagen, Kong Georgsvej 19, 10/8 1904, Meinert, w/p, under the name *Coccus Himantophylli n. sp.*
Copenhagen, Kong Georgsvej 19, 26/7 1905, Meinert, w/p, under the name *Coccus Himantophylli n. sp.*
Hørsholm, 12/5 1963, S. Tuxen, on cactus.
Ringsted, Hjelmsølille, 9/6 1972, Philipsen, on *Opuntia.*
Virum, 7/9 1972, authors, on succulent plants.
Hellerup, Tuborgvej, 14/3 1973, authors, on *Nerium oleander.*
Jutland: Århus, Juni 1972, authors, on cactus plants.
Lolland-Falster: Nykøbing, 2/9 1972, authors, on *Stephanotis sp., Evonymus sp., Hedera sp., Crassula rosularis.*

Distribution:
Since this mealybug was reestablished as a distinct species (Wilkey and McKenzie, 1961), it is known now as a common and widespread pest.

Additional Hosts:
Polyphagous. Recorded from a wide variety of unrelated host plants.

Habitat:
Occurs on any part of the plant.

Economic Importance:
One of the serious pests in Danish greenhouses. The authors observed a rather heavy infestation on *Nerium oleander* in Hellerup (1973).

Notes:
Ferris (1918) placed *P. obscurus* as a synonym of *P. maritimus* Ehrhorn. Wilkey and McKenzie (1961) reexamined the types of both species and concluded that they are distinct, that the valid name for this mealybug is now *P. obscurus* Essig and that numerous earlier identifications of *P. maritimus* (Ehrhorn) actually represent this species.

+ **Rhizoecus cacticans (Hambleton)***

Common name:
Cacticans Mealybug.
Ripersiella cacticans Hambleton, 1946.
Rhizoecus epiphyllis Ferris, McKenzie, 1960.
Rhizoecus cacticans (Hambleton), Williams, 1962, McKenzie, 1967.

Type Locality and Host:
Ecuador, Cayambe, on the roots of velvet grass, *Holcus lanatus (Graminea).*

Occurrence in Denmark:
Zealand: Ishøj, 13/4 1972, authors, on roots of *Aconium arborea atropurpurea* and *A. arborea fol. variegata.*
Ballerup, 13/4 1972, authors, on roots of *Mammilaria.*
Copenhagen, BGCU, 18/8 1972, authors, on roots of *Binghamia humboldtii, Hexachlamys edulis.*
Jutland: Århus, Herning, 18/7 1972, authors, on roots of *Vriesia splendens.* Århus, BGÅU, 18/7 1972, authors, on roots of *Caesalpina pulcheriana.* This species is probably widely distributed in greenhouses.

Distribution:
Known from North and South America and

greenhouses in England, Germany and other European countries.

Additional Hosts:
Bromus catharticus, Cyperus rotundus, Cyperus sp., Distichlis spicata, Echeveria sp., Epiphylum sp., Hamatocactus setispinus, Kleinia sp., Lobivia shaferi, Lobivia sp., Lolium perenne, Mammillaria sp., Phyllocactus sp., Saintpaulia ionantha, Sempervivum sp.

Habitat:
Feeds on the roots of its host-plants.

Economic Importance:
One of the most dangerous pests in Danish greenhouses. Eradication is difficult because of the root-infecting habits of the species.

Notes:
This species belongs to a group similar to *R. albidus* and *R. elongatus* (Williams, 1962) and *R. browni* McKenzie (1967).

+ **Rhizoecus dianthi Green***
Rhizoecus dianthi Green, 1926.
Morrisonella dianthi (Green), Hambleton, 1946.
Coccidella dianthi (Green), Hambleton, 1946.
Rhizoecus dianthi Green, Williams, 1962.

Type Locality and Host:
England, Surrey, Wisley, Royal Horticultural Society's Gardens, on the roots of *Dianthus plumarius* and *D. barbatus.*

Occurrence in Denmark:
Zealand: Copenhagen, BGCU, 9/8 1972, authors, on roots of *Chlorophytum comosum, C. capansa, Withania somnifera, Solanum sodomaeum.*
Jutland: Århus, BGÅU, 18/7 1972, authors, on roots of *Pelargonia odoratissimum, P. quercifolium, Yucca afoifolia, Disphyma crassifolium, Aeonium spraegeri.*

Distribution:
Mentioned from England and Sweden, but it probably occurs in many other countries.

Additional Hosts:
Known from *Chlorophytum sp., Dracaena stricta, Fuchsia sp., Eryngium bromeliaefolium, Aspidistra lurida, Adiantum sp.*

Habitat:
Occurs only on the roots.

Economic Importance:
Can be a serious pest of some ornamental plants in Danish greenhouses. The authors observed heavy infestations on *Withania somnifera* and *Chlorophytum comosum* in BGCU. Eradication is difficult because of the root-infecting habits of the species.

Notes:
This species comes very close to *R. cyperalis* (Hambleton) described from El Salvador and the authors agree with Williams (1962) that the two species may be identical. It is also related to *R. pritchardi* McKenzie (1960), which is known as a serious pest of African violet *(Saintpaulia)* in California.

Ripersia corynephori Signoret
Ripersia corynephori Signoret, 1875, Henriksen, 1921, H. Morrison and E. Morrison, 1966.

Type Locality and Host:
France, 1875, by M. Perris, on *Corynephorus canescens.*

Occurrence in Denmark:
Jutland: Rebild, 10/7 1910, J. P. Kryger, on roots of grass, associated with ants, *Lasius flavus.* H.

Notes:
Henriksen listed this mealybug found by Kryger in 1920. In the absence of specimens in the collection it is remaining a question whether this mealybug was *R. corynephori* or not. Henriksen placed *R. tomlinii* Newstead as a synonym of *R. corynephori.* If so, Kryger's mealybug may be *R. tomlinii,* which is now *Euripersia tomlinii* (Williams, 1962).

+ **Spilococcus cactearum McKenzie***

Common name:
Cactus Mealybug.

Pseudococcus mamillariae Bouché, Green, 1930 (misidentification).
Spilococcus cactearum McKenzie, 1960, Williams, 1962, McKenzie, 1967.

Type Locality and Host:
California, on horse crippler cactus, *Homalocephala tescensis (Cactaceae)* 4/10 1948, Alameda County, Berkeley (University of California Botanical Garden).

Occurrence in Denmark:
Zealand: Ringsted, Hjelmsølille, 9/6 1972, Philipsen, on roots of cactus plant.
Copenhagen, 15/3 1973, Buch, on the green fleshy parts and between spines of *Echinopsis*.

Distribution:
Distributed in USA, Mexico and greenhouses in Europe.

Additional Hosts:
Known only from *Cactaceae*.

Habitat:
Occurs on the foliage and subterranean parts of its host.

Economic Importance:
Occasionally heavy infestations are injurious to cactus plants.

Notes:
This mealybug has often been misidentified as *Pseudococcus mamillariae* Bouché. McKenzie (1960) presented a complete account of this insect. The body content turns black when boiled in potash.

+ **Spinococcus calluneti (Lindinger)**

Pseudococcus calluneti Lindinger, 1912.
Parapedronia calluneti (Lndgr.), Balachowsky, 1954, Ossiannilsson, 1959.
Spinococcus calluneti (Lndgr.), Danzig, 1960, Williams, 1962.

Type Locality and Host:
Germany, under soil, on the roots of *Calluna vulgaris*.

Occurrence in Denmark:
Jutland: Filsø Avlsgård, 14/8 1972, H. Kauri (from Norway). The insect was found by sieving the soil under a young oak in fir forest.

Distribution:
Known from Germany, England and USSR (Leningrad region, Latvia).

Additional Hosts:
Apparently confined to *Calluna spp.* and *Erica spp.* Williams (1962) and Danzig (1959, 1960) mentioned it on *Vaccinium myrtillus, V. vitis idaea, V. uliginosum, Empetrum nigrum, Oscycoccos quadripetalus* and isolated numbers on *Ramischia secunda* and wild strawberry.

Habitat:
Feeds mainly on the roots, but occurs on the upper part of the stems as well.

Economic Importance:
Danzig (1959, 1960) reported on its abundance and as a common species in the Leningrad region.

Notes:
The original description (Lindinger, 1912) is very short and not illustrated. Perfect pictures and description were given by Danzig (1960) and Williams (1962).
Prof. H. Kauri sent mealybugs to Ossiannilsson, who kindly informed the authors (pers. comm. 1974).

+ **Trionymus perrisii (Signoret)**

Westwoodia perrisii Signoret, 1875.
Trionymus perrisii (Sign.), Williams, 1962.

Type Locality and Host:
France, Mont-de-Marsan, on *Calamagrostis arundinacea* and *Sphagnum*.

Occurrence in Denmark:
N. Jutland: Skagen, Grenen, 31/12 1973, H. Enghoff, on grass in open field under a board.

Distribution:
France, Germany, Holland, USSR. Common species in Britain.

Additional Hosts:
Reported from *Deschampsia caespitosa, Holcus sp., Festuca rubra, Agrostis sp., Calamagrostis epigeias.*

Habitat:
Lives at the base of the leaf sheath.

Family Eriococcidae

Cryptococcus fagisuga Lindinger

Common name:
Felted Beech Coccus.
Coccus fagi Baerensprung, 1849.
Cryptococcus fagi (Baer.), Douglas, 1890, Henriksen, 1921, Thomsen, Buchwald and Hauberg, 1949, Bejer Petersen, 1959, 1964a, Holstener-Jørgensen, and Eiselstein, 1969.
Cryptococcus fagisuga Lindinger, 1936, Borchsenius, 1949, Kosztarab, 1959, Hoy, 1963.

Type Locality and Host:
Germany, Berlin, on *Fagus.*

Occurrence in Denmark:
Zealand: Søndermarken, w/d, Rostrup, on *Fagus.* H.
Dyrehaven, 1915, Maltbæk, on *Fagus.* H.
Sorgenfri, Sept. 1917, Henriksen, on *Fagus.* H.
Sorgenfri, 8/7 1921, Henriksen, on *Fagus.* H.
Geelskov, 25/9 1921, Henriksen, on *Fagus.* H.
Hæsede skov, Sept. 1931, E. B. Hoffmeyer, on the trunk of beech.
Rude Skov, 24/4 1938, Prof. A. Jensen, w/p.
Jutland: Velling Skov, Sept. 1901, Boas, on *Fagus.* H.
Frijsenborg, w/d, Winge, on *Fagus.* H.
Lolland-Falster: Pandebjerg, 20/3 1913, w/c, on *Fagus.* H.
Henriksen mentioned this species as common in Frederiksværk-Tisvilde districts. The authors observed it in Danstrup, Nøddebo, Farum. The Felted Beech Coccus is distributed throughout the country, mostly in Zealand, Lolland-Falster, Funen and eastern part of Jutland.

Additional Hosts:
Exclusively confined to *Fagus.*

Habitat:
This Coccid prefers crevices or uneven parts of the bark, on trunks, and thick branches, rarely stems and mainly occurs on old beeches.

Economic Importance:
The paramount pest in Danish forests, several serious outbreaks have been reported during recent years. As a result of the coccid sucking the sap, brown areas of dead cells appear in the bark and cracks form on the outer surface. This pest is accompanied by barkbeetles which facilitate the invasion of fungi. Damage to the wood makes it unsuitable for timber.

Notes:
The name *C. fagisuga* was offered by Lindinger (1936) instead of *C. fagi* Baerensprung preoccupied by *Coccus fagi* Sulze, 1776, and accepted later by some coccidologists.
Hoy (1963) confirmed the position of this genus in the familiy of *Eriococcidae.*

+ Eriococcus devoniensis (Green)
Rhizococcus devoniensis, Green, 1896.
Acanthococcus devoniensis (Green), Borchsenius, 1949, Ossiannilsson, 1959.
Eriococcus devoniensis (Green), Newstead, 1903, Schmutterer, 1952, Hoy, 1963.

Type Locality and Host:
England, South Devon, Budleigh, Salterton, 1896, by E. Green, on *Erica cinerea.*

Occurrence in Denmark:
Zealand: Bodals Mose, 23/8 1931, Kryger, on *Erica,* on *Erica-Calluna* field.

Distribution:
England, France, Germany, Netherlands, Sweden, Corsica, Sardinia.

Additional Hosts:
Erica sp., E. tetralix, Calluna vulgaris.

Habitat:
Lives on the shoots, distorting them; the terminal part of the shoot is mostly twisted in a rosette-shaped knot.

Notes:
Borchsenius (1948) considered the genus *Acanthococcus* Signoret to be valid. Hoy (1963) placed it as a synonym of *Eriococcus*.

+ Eriococcus insignis Newstead

Eriococcus insignis Newst., 1891, 1903, Green, 1926, Ossiannilsson, 1951, Schmutterer, 1952, Hoy, 1963.
Rhizococcus insignis (Newst.), Borchsenius, 1949, Danzig, 1959, Ossiannilsson, 1959.

Type Locality and Host:
England, at Ince and Manley, Cheshire, 1890, on *Agrostis vulgaris, Rumex, Pteris* and *Ulex*. Frequently on the same leaf with *Eriopeltis festucae*.

Occurrence in Denmark:
Zealand: Haslev, Munkeskov, 1/9 1939, J. P. Kryger, on grass.

Distribution:
England, France, Germany, Italy, Sweden, Channel Islands, Sicily, Iraq, USSR.

Additional Hosts:
Agropyron repens, Agrostis vulgaris, Agrostis sp., Bromus mollis, Bromus sp., Calamagrostis arundinaceae, Cynodon dactylon, Dactylis glomerata, Elymus sp., Holcus latanus, Poa sp., Pteris sp., Pteridium aquilinum, Rumex sp., Ulex sp., Urtica dioica.

Habitat:
Lives on the leaves.

Notes:
Coccid specialists have held varying views as to the generic status (Morrison and Morrison, 1966). Borchsenius (1948, 1949) maintained the validity of *Rhizococcus* Signoret, but Hoy (1963) regarded it as a synonym of *Eriococcus*.

Gossyparia spuria (Modeer)

Common name:
Elm-tree Scale, Elm Dark Louse.
Coccus spurius Modeer, 1778 (original designation) = *Coccus ulmi* L. (1761).
Gossyparia ulmi (Mod.), Signoret, 1875, Merrill, 1901.
Gossyparia spuria (Mod.), Cockerell, 1899, Henriksen, 1921, Borchsenius, 1949.

Type Locality and Host:
Sweden, on one and two year old branches of *Ulmus*, in abundance.

Occurrence in Denmark:
Zealand: Gentofte, w/d, J. P. Kryger, on *Ulmus*. H. There is no material in the collection.

Distribution:
Common in Europe, USSR and North America, and reported from Japan and Iran. Distributed throughout the elm range.

Additional Hosts:
Monophagous. Confined to *Ulmus*.

Habitat:
Lives on the trunks, branches and stems of elm and causes the formation of pits. Usually infests isolated branches.

Economic Importance:
Can be a dangerous pest to *Ulmus* in Danish nurseries.

Notes:
Hoy (1963) regarded *Gossyparia* as a valid genus and confirmed its assignment to the *Eriococcidae*.

Kermes quercus (L.)

Coccus quercus (L.), 1758.
Kermococcus quercus (L.), Silvestri, 1911, Henriksen, 1921, Borchsenius, 1960.
Kermes quercus (L.), Cockerell, 1899, Green, 1920, Hellen, 1926, Balachowsky, 1950, Schmutterer, 1952, Hoy, 1963, Vappula, 1965.

Type Locality and Host:
Found on *Quercus robur*. Locality not mentioned.

Occurrence in Denmark:
Zealand: Jægerspris, Storkeegen, 5/6 1932, w/c, on oak. Jægerspris, Storkeegen, 28/5 1933, K. Henriksen, on oak.
Jutland: Engesvang, Kragelund Skov, 1913, R. H. Stamm, on *Quercus*. H.

Distribution:
Reported from Europe and European part of the USSR.

Additional Hosts:
Confined to *Quercus*.

Habitat:
Lives in the crevices of the bark of trunks and thick branches.

Economic Importance:
Occasionally a pest of young oaks in Danish nurseries.

Notes:
Morrison and Morrison (1966) stated that *Kermes* Boitard is valid and Williams (1969) agreed with them that *Kermococcus* is a synonym of *Kermes*. The genus *Kermes* is regarded as a member of the *Eriococcidae* (Hoy, 1963).

Family Asterolecaniidae

Asterodiaspis variolosa (Ratzeburg)

Common name:
Golden Oak Scale.
Coccus variolosus Ratz., 1870.
Asterolecanium variolosum (Ratz.), Henriksen, 1921, Boas, 1923, Russell, 1941, Ossiannilsson, 1951, Schmutterer, 1952, Kosztarab, 1959.
Asterodiaspis variolosa (Ratz.), Borchsenius, 1960,

Type Locality and Host:
Germany. Kunersdorf, near Potsdam, on oak, 1870.

Occurrence in Denmark:
Zealand: Boserup, 24/10 1909, K. Henriksen. Galls deformed by *Andricus sieboldii* (some females on the twigs of oak).
Tylstrup, w/d, Th., w/p (AVU collection).
Bramsnæsvig, 1/6 1936, K. Henriksen, on *Quercus*.
Langtved Færgekro v. Bramsnæsvig, 30/5 1937, K. Henriksen, on *Quercus*.
Giesegaard, 16/6 1941, w/c, on oak.
Hellerup, 22/5 1969, Reitzel, on *Quercus robur*.
Rude Skov, (N. Copenhagen), 29/9 1973, H. Enghoff, on young *Quercus*.
Lolland: Einsiedelsborg, Apr. 1921, Boas, on *Quercus*. H.
Radsted, Apr. 1921, Boas, on *Quercus*. H.
Knuthenborg Park, 1/9 1922, M. Thomsen.

Distribution:
Widely distributed throughout oak range.

Additional Hosts:
Confined to *Quercus*.

Habitat:
Lives on the bark of the plant and forms pits.

Economic Importance:
Well known for its damage. Several cases of heavy infestation and damage of oaks were reported from European countries, USSR, Africa, New Zealand and USA. It may be found in different parts of Denmark, where oaks are inhabited and can cause serious damage to young oaks in nurseries. The authors observed heavy infestation on some young oaks in Rude Skov, Zealand.

Notes:
Signoret (1876a) erected the genus *Asterodiaspis*. Russell (1941) placed this name as a synonym of *Asterolecanium* Targioni-Tozzetti. Borchsenius (1960) resurrected this genus, recognized it as valid, described two new species, and redescribed and transferred several species to it.

Bambusaspis bambusae (Boisduval)*

Common name:
Bamboo Scale.

Chermes bambusae Boisduval, 1869.
Asterolecanium bambusae (Boisd.), Henriksen, 1921, Russell, 1941, Beardsley, 1966.
Bambusaspis bambusae (Boisd.), Borchsenius, 1960, S. Mohammed Ali, 1970.

Type Locality and Host:
Algeria, Algiers, Garden of Hamma, on *Bambusa arundinacea* and *B. distorta.*

Occurrence in Denmark:
Zealand: Copenhagen, BGCU, w/d, Henriksen, on *Bambusa arundinacea* and *Arundinaria glaucescens* H. There are no samples in the collection.

Distribution:
Widespread where bamboo and cane grow.

Additional Hosts:
Confined to bamboo and cane.

Habitat:
Lives on the stems and both surfaces of leaves.

Economic Importance:
Known to cause serious damage to bamboo. In Denmark it can occasionally become a pest in Botanical Gardens (greenhouses).

Notes:
The genus *Bambusaspis* was suggested by Cockerell (1902). Russell (1941) placed this name as a synonym of *Asterolecanium* Targioni-Tozzetti. Borchsenius (1950) accepted the name as valid.

Family Coccidae

In the family *Coccidae* the status of some species seems to be doubtful.
The treatment according to the »*corni-coryli* complex« has been variable during the last years.

Parthenolecanium corni (Bouché) is commonly accepted by present-day coccidologists. But there is no clear way of knowing *P. coryli* (L). The position is similar with *E. tiliae* and *E. mali* (Schrank). One more species – *P. rufulum* (Cockerell) – is very close to *E. corni.* Boratynski and Williams (1964) gave a good description and illustrated it.
All records in Danish collections are referred by Henriksen and later by other entomologists as *P. corni* and *P. coryli.* There is considerable uncertainty in regard to the identity of species belonging to this group and the opinion is here held that some of the identifications are erroneous. Most of the material was unsatisfactory for making preparations for microscopical examination (heavily sclerotized old females). A revision of all records referring to *corni-coryli* revealed mainly *P. corni* (and probably *rufulum)* and some *P. persicae* and *E. tiliae.* Further investigation on this matter is necessary before the correct identity of these species and occurrence in the country can be established.

Parthenolecanium corni (Bouché)

Common name:
Brown Fruit Scale.

Lecanium corni, Bouché, 1844, Hellen, 1926.
Eulecanium corni (Bouché), Henriksen, 1921, Vappula, 1965.
Coccus corni (L.), Ossiannilsson, 1951.
Eulecanium coryli (L.), Henriksen, 1921, Ossiannilsson, 1951.
Parthenolecanium corni (Bouché), Borchsenius, 1957, Ossiannilsson, 1959, Saakyan-Baranova, Sugonyaev, Sheldeshova, 1972.

Type Locality and Host:
Germany, on *Cornus sanguineus, Pyrus, Tilia, Corylus, Ribes rubrum* and other trees.

Distribution:
Widely distributed throughout the world, including Europe.

Additional Hosts:
Widely polyphagous, known from 130 different fruit, ornamental and forest trees and bushes.

Habitat:
Lives on the leaves, twigs, branches and trunks. A polymorphic species.

Economic Importance:
One of the common pests of fruit bushes and ornamental shrubs in the country. Damage may occassionally be severe and result in the death of plants.

Notes:
This coccid has a long list of synonyms under different generic and specific names *(Lecanium, Eulecanium, Coccus, Physokermes) (corni, coryli, ribes)* and by Borchsenius (1957) placed *L. corni* Bouché as type-species with *L. coryli* Sulc., a synonym. Investigation of the brown fruit scale (Saakyan-Baranova and oth.) showed a connection between polyphagism and polymorphism of this species.

+ **Parthenolecanium persicae (Fabricius)**

Common name:
Oblong Scale, Wide Scale.
Chermes persicae, Fabricius, 1776.
Parthenolecanium persicae (Fabr.), Borchsenius, 1957, Williams, 1964.

Type Locality and Host:
Found on the twigs of *Amygdalus* and *P. persica.* Locality not mentioned.

Occurrence in Denmark:
Zealand: w/l, w/d, Schiødte, on *Rosa,* under *Eulecanium corni.* H.

Distribution:
Europe, USSR, North America, Argentina, Turkey, Korea, India, Australia, New Zealand, North Africa.

Additional Hosts:
Polyphagous. Known from many fruit and ornamental plants, such as *Vitis, Malus, Prunus, Ribes, Pyrus, Rosa, Clematis* etc.

Habitat:
Feeds on leaves, twigs, branches and trunks. First stage found underneath leaves.

Economic Importance:
Reported as a pest of vine. Can damage some fruit and ornamental plants.

Notes:
Differs from closely related species by shape and size of marginal setae, which are long and with filament-like tips.

+ **Eulecanium tiliae (L.)**

Coccus tiliae L., 1758.
Eulecanium tilia (L.), Cockerell, 1906, Borchsenius, 1957.

Type Locality and Host:
Sweden, on *Tilia europaea.*

Occurrence in Denmark:
Zealand: Jonstrupvang, 5/6 1896, O.R., on *Corylus avellanae.*
Copenhagen, Ermelunden, 12/6 1924, Kryger, on *Ulmus.*

Distribution:
West Europe, Iran, Iraq, North America, USSR.

Additional Hosts:
Known from *Tilia, Acer, Alnus, Sorbus, Populus, Betula, Malus* and some other plants.

Habitat:
Lives on the twigs.

Eriopeltis spp.

To this group the authors have paid more attention because there are difficulties in studying external characters.
»Wooly« species in the collection are published in Henriksen's list under the name of *Eriopeltis festucae.* A revision has added some more coccid species to the Danish fauna such as *E. stammeri, E. rasinae, Lecanopsis formicarum, Eriococcus devoniensis,* and *E. insignis.* Two samples in the collection under the name *E. festucae* have not been revised, becau-

se of the absence of females and presence of only ovisacs with the eggs:

1) Sorup Hegn v. Fredensborg, 16/10 1921, prof. A. Jensen.
2) Hillerød, 26/9 1920. *Aira flexuosa,* Henriksen, 1/10 1920.

Key to the Danish species of Eriopeltis

(on microscopic characters)

1. Stout spines present only on anterior, posterior and sides of the body; dorsal surface with small spines .. E. *lichtensteini Sign.* Stout spines (large and small) present all over dorsal surface, except narrow strip along the mid-line of body ..... 2.
2. Large stout conical spines in the middle part of the body more numerous than small stout conical spines. Small lateral spines frequent ..... *E. stammeri Schmutt.* Small stout conical spines in the middle part of the body more numerous than large stout conical spines. Small lateral spines rare ..... 3.
3. Stout spines on the frontal part of the body set close to each other, distance between them equal or less than diameter of base ..... *E. festucae (Fonsc.)* Stout spines on frontal part of body rare, distance between them equal (or more) than length of one ..... *E. rasinae Borchs.*

Key to the Danish species of Eriopeltis

(on external characters and host-plants)

1. Ovisac of the female large. 9,5-13 mm long and 3,5-5,8 mm wide, white, very densely felted, without curly woolly filaments. Eggs pinkish. Lives on *Calamagrostis spp.* (mostly) ..... *E. lichtensteini Sign.* Ovisac of the female smaller, 6,0-8,7 mm length, white, with curly woolly filaments ..... 2.
2. Ovisac feltish, with filaments, elongate, convex, 7,6-8,7 mm length and 3,5 mm width. – ♀ – pale pink. Lives on *Agrostis spp.* ..... *E. rasinae Borchs.* Ovisac woolly, with filaments, fluffy, white ..... 3.
3. Ovisac formed of long curly woolly filaments, very fluffy, oval, convex, 6 mm length and 3-3,5 mm width. – ♀ – pale – yellow or mauve; larva – dark orange; egg – reddish pink. Lives on *Deschampsia flexuosa* (mostly) ..... *E. festucae (Fonsc.)* Ovisac moderate fluffy, 6 mm length. – Larva – oval, reddish. Lives on *Brachypodium, Festuca, Agropyrum* .... *E. stammeri Schmutt.*

Eriopeltis festucae (Fonscolombe)

Coccus festucae Boyer de Fonscolombe, 1834.
Eriopeltis festucae (Fonsc.), Signoret, 1871, Henriksen, 1921, Hellen, 1921, Borchsenius, 1957, Vappula, 1965.

Type Locality and Host:
France, Aix, on *Festuca phoenicoides* and *F. caespitosa.*

Occurrence in Denmark:
Zealand: Lillerød, Sønderskov Mose, Aug. 1935, Kryger, w/p.
Danstrup, 22/8 1972, authors, on *Deschampsia flexuosa,* in beech forest.
Nødebo, Oct. 1973, authors, on grass.
Helsinge, 11/11 1973, authors on *Deschampsia flexuosa,* in high beech forest, partly under fallen leaves, abundant.
Jutland: Skanderborg, Dyrehave, Oct. 1921, E. Gram, on grass.

Distribution:
Reported from England, Finland, Germany, Hungary, USSR, North America, Israel, Iran, Iraq. According to Borchsenius (1957) the distribution requires investigation.

Additional Hosts:
Known from *Festuca, Agropyrum, Brachypodium.*

Habitat:
Lives on the leaves of grasses.

Notes:
Close to *E. rasinae.*

+ **Eriopeltis lichtensteini Signoret**

Common name:
Smallreed Coccid.

Eriopeltis lichtensteini Sign., 1876, Hellen, 1938, Suomalainen, 1949, Tiensuu, 1951, Ossiannilsson, 1951, Borchsenius, 1957.

Type Locality and Host:
France, Hyeres (by V. Signoret) and Montpellier (by Lichtenstein). Some specimens were from Holland (by Ritzema).

Occurrence in Denmark:
Jutland (middle part): Silkeborg, Sejs, 14/10 1973, Bødker and H. Enghoff, on *Calamagrostis*, near lake, in forest, under high pine-trees (rather abundant).

Distribution:
England, France, Germany, Finland, Ireland, Holland, Poland, Sweden, Spain, USSR.

Additional Hosts:
Feeds on different species of *Calamagrostis*. Tiensuu (1951) mentioned a few individuals on *Melica nutans* and *Luzula pilosa*.

Habitat:
Lives on the leaves. Prefers wet, half shadowed forests.

Economic Importance:
No visible damage was observed, because the colony was heavily infested with parasites and predators.

Notes:
One parasite – *Pachyneuron coccorum* L. *(Hym., Chalcidoidea, Pteromalidae)* and one predator – *Leucopis (Leucopomia) silesiaca* Egg. *(Dipt., Chamaemyiidae)*, determined by O. Lomholdt (ZM) and E. Rald (ZM) consequently, were reared from *E. lichtensteini* in Denmark. Some other parasites and predators are mentioned by Tiensuu and Borchsenius. Attack by its natural way can be the reason of its rare and sporadic occurrence (Tiensuu).

+ **Eriopeltis rasinae Borchsenius**

Eriopeltis rasinae Borchsenius, 1956, 1957, Danzig, 1959, Ossiannilsson, 1959.

Type Locality and Host:
USSR, Latvia, in *Pinus* forest, near Riga, on *Agrostis vulgaris*.

Occurrence in Denmark:
Zealand: Copenhagen, Amager, 30/4 1893, Meinert, on grass. H. (under the name *E. festucae)*.
Asserbo Overdrev, 12/10 1919, Kryger, on grass. H. (under the name *E. festucae*).
Dyrehaven, 3/7 1921, K. Henriksen, on grass. H. (under the name *E. festucae)*.

Distribution:
Known from Sweden and USSR (Leningrad region and Latvia).

Additional Hosts:
Lives on *Agrostis vulgaris*. Ossiannilsson (1959) reported it from *Agrostis tenuis* and *Deschampsia flexuosa*.

Habitat:
Lives on the leaves.

Notes:
All three records were mentioned in Henriksen's list (1921) under the name *E. festucae*. This species is very close to *E. festucae*, but differs in some characters (see key).

+ **Eriopeltis stammeri Schmutterer**

Eriopeltis stammeri Schmutterer, 1952, Borchsenius, 1956, 1957.

Type Locality and Host:
Germany. Bubenreuth and eastern part of Adlitz, on *Festuca ovina*.

Occurrence in Denmark:
Zealand: Boserup Skov, 26/8 1894, Raunkjær, w/p.
S. Rostrup, 1/11 1921, w/c, on grass.

Lillerød, Sønderskov Mose, Aug. 1935, Kryger, w/p.
Boserup, Oct. 1938, Kryger, on grass.

Distribution:
Czechoslovakia, Germany.

Additional Hosts:
Known from *Brachypodium pinnatum, Festuca ovina, Agropyrum sp.*

Habitat:
Lives on leaves. Original specimens were found on warm dry sandy soil in shadow.

Coccus hesperidum L.*

Common name:
Soft Brown Scale.
Coccus hesperidum L., 1758, Henriksen, 1921, Borchsenius, 1957, Vappula, 1965.
Lecanium hesperidum (L.), Bovien and Thomsen, 1950, Fjelddalen, 1954.

Type Locality and Host:
Sweden, on evergreen trees in greenhouses.

Occurrence in Denmark:
Zealand: Copenhagen, BGCU, w/d, w/c, on *Caryota mitis, Colocasia inodora, Codicium variegatum, Canna gigantea* and *Brexia spinosa.* H.
Lyngby, PPI, 17/8 1965, Reitzel, on *Asplenium nidus.*
Hørsholm, Arboretum, 12/7 1972, authors, on *Raphithamnus spinosus* and *Sophora microphylla.*
Jutland: Århus, greenhouses of Bot. Institute, 20/7 1972, authors, on *Catha cassioides.*
Funen: Odense, 1/2 1971, Reitzel, on *Laurus.*
Stige, 2/6 1972, authors, on St. Amon (orchid).
Allested, 10/7 1973, O. Bugge, on *Nerium oleander.*
It is a common species in Danish greenhouses.

Distribution:
Cosmopolitan.

Additional Hosts:
The host list of this pest is long.

Habitat:
Lives on the leaves, stems and twigs.

Economic Importance:
Known to cause serious damage to ornamental plants in greenhouses and many subtropical and tropical plants in open.

+ Chloropulvinaria floccifera (Westwood)
Coccus floccifera, Westw., 1870.
Pulvinaria floccifera (Westw.), Steinweden, 1946, Borchsenius, 1950.
Chloropulvinaria floccifera (Westw.), Borchsenius, 1957, Danzig, 1972.

Type Locality and Host:
France, on *Camellia.*

Occurrence in Denmark:
Zealand: Køge, Tyme, 5/7 1972, authors on *Ilex pyramidalis,* in nursery (abundant).

Distribution:
Widespread.

Additional Hosts:
Polyphagous. Recorded from *Ilex, Thea, Taxus, Citrus, Laurus, Euonymus, Hedera* and many other plants.

Habitat:
Feeds on the leaves and twigs, rare on branches and trunks with thin bark.

Economic Importance:
Known as a dangerous pest of *Ilex, Camellia, Laurus, Taxus.* Females excrete honey-dew (in abundance), which attracts fungi and plants become black.
The authors saw a heavy infestation on *Ilex* by this pest.

Eucalymnatus tessellatus (Signoret)*
Lecanium tessellatum Signoret, 1873.
Eucalymnatus tessellatus (Signoret), Henriksen, 1921, Borchsenius, 1957.

Type Locality and Host:
France, Montpellier, on *Caryota ursus* (in greenhouse).

Occurrence in Denmark:
Zealand: Copenhagen, BGCU, w/d, Henriksen, on *Caryota mitis* and *Arenia saccharifera*. H.

Distribution:
Widespread. Outdoors in tropical and subtropical areas. Known from greenhouses in America, Europe and Asia.

Additional Hosts:
Polyphagous; recorded from a long list of hosts including a number of ornamental plants such as *Cinnamomum, Trachycarpus, Phoenix, Euphorbia, Ficus, Annona, Laurus* etc.

Habitat:
Lives on the leaves and twigs.

Economic Importance:
In large numbers may cause damage to some ornamental plants.

+ Lecanopsis formicarum Newstead

Lecanopsis formicarum Newst., 1893, 1893a, 1903, Schmutterer, 1952, Borchsenius, 1957.

Type Locality and Host:
England, Chesil Beach, in nest of *Formica nigra*.

Occurrence in Denmark:
Zealand: Lillerød, Sønderskov Mose, Aug. 1935, Kryger.
Jutland: Vedersø Klit, 25/5 1947, J. Th. Skovgaard, w/p.
Vedersø Klit, 25/5 1949, J. Th. Skovgaard, w/p.
Saltholm, Island, East of Copenhagen, w/l, 3/6 1934, K. Henriksen, w/p.
Møn, Island: Ulfshale, May 1926, E. Nielsen, on grass, under stone.

Distribution:
England, France, Germany, Czechoslovakia, Italy, Spain, Switzerland.

Additional Hosts:
Reported from grasses.

Habitat:
Feeds on the roots and lower part of stems, under leaves. Known from short stiff grass which grows on sand-hills (Newstead, 1903).

Notes:
Some specimens of *Dusmetia ceballosi* Nerc. were in sample from Ulfshale. Determined by O. Lomholdt, Z.M.

Palaeolecanium bituberculatum (Targioni-Tozzetti)

Lecanium bituberculatum Targ.-Tozz., 1868, Signoret, 1873.
Eulecanium bituberculatum (Targ.-Tozz.), Henriksen, 1921.
Palaeolecanium bituberculatum (Targ.-Tozz.), Borchsenius, 1957.

Type Locality and Host:
Targioni-Tozzetti (1868) indicated *Lecanium bituberculatum nob. sp.n.*, but without description. Later, Signoret (1873), described it as a common species on whitethorn at Florence and in the south of France.

Occurrence in Denmark:
Zealand: Copenhagen, w/d, Fogh, on *Crataegus*. H.
Frederiksberg, w/d, w/c, on *Crataegus*. H.
Lyngby, 13/4 1921, Math. Thomsen, on *Pyrus malus*.

Distribution:
Reported from many European countries, USSR, Iran, Iraq, North Africa, USA.

Additional Hosts:
Known from *Malus, Prunus, Cydonia* and other plants of the family *Rosaceae;* on *Corylus* and *Juglans* as well.

Habitat:
Larvae feed on leaves, adult females on the twigs and branches of plants.

Economic Importance:
It is a rare species. Mostly isolated infestations on branches and twigs.

Notes:
Although *Crataegus* is common throughout the country this species was rarely found on this host-plant.

+ **Parafairmairia gracilis Green**
Parafairmairia gracilis Green, 1916, Schmutterer, 1952, Borchsenius, 1957, Danzig, 1959.

Type Locality and Host:
England, Surrey, Camberley, leaves of various grasses and sedges in rough uncultivated meadows.

Occurrence in Denmark:
N. Zealand: Ryget, 22/9 1939, Dr. Henriksen, on bark of *Betula*. (Some females under scales with eggs; some dry larvae).

Distribution:
Known from England, Germany, Sweden, USSR.

Additional Hosts:
Green and Borchsenius reported this scale from grasses and sedges (generally), Danzig from *Carex sp.* and *Agropyron repens*, Schmutterer from *Carex digitata* and *C. brizoides*.

Habitat:
As far as known it lives on the leaves and does not produce ovisacs. In Denmark it was found on the bark of *Betula*, but Henriksen did not mention the part of the tree; probably lower part, near the grasses.

Notes:
Parafairmairia is a very peculiar and remarkable insect with white nacreous covering scale, which is divided into distinct polygonal plates, like the carapace of a tortoise. Only four species of the genus are known at present: *bipartita* Sign. (France), *delicata* and *hissarica*, Borchs. (USSR) and *gracilis* Green (England). Henriksen put this scale in ZM collection under the name – *Coccidae sp.* and noted it as probably new species.

+ **Parasaissetia nigra (Nietner)***
Common name:
Nigra Scale.
Lecanium nigrum Nietner, 1861.
Saissetia nigra (Nietn.), Borchsenius, 1957, Schmutterer, 1957.
Parasaisettia nigra (Nietner), Takahashi, 1955, De-Lotto, 1965.

Type Locality and Host:
Ceylon, on coffee.

Occurrence in Denmark:
Zealand: Copenhagen, BGCU, 2/11 1931, Th., w/p.

Distribution:
Widespread. Reported from tropical and subtropical parts of the world and from European, American and Japanese greenhouses.

Additional Hosts:
Polyphagous. Recorded from a long list of hosts but mostly known as a pest of ornamental plants.

Economic Importance:
At present it is of no economic importance in Danish greenhouses but might become a dangerous pest.

Notes:
This scale was mostly known in recent years under the generic name *Saissetia*. Takahashi (1955) assigned it as type-species of his new genus – *Parasaissetia* and De-Lotto (1965) accepted it.
The main characters for differentiating the new genus from *Saissetia* are: the slenderness of the tarsi and the absence of a free tibiotarsal articulation (by Takahashi) and a more reliable character (by De-Lotto) – the shape of

the dorsal setae, which are cylindrical or slightly swollen at the apex, while in *Saissetia* they are strongly spiniform to stoutly conical.

+ **Parthenolecanium fletcheri (Cockerell)**

Lecanium Fletcheri Cockerell, 1893, Kawecki, 1954.
Eulecanium arion (Lindinger), Schmutterer, 1952.
Parthenolecanium fletcheri (Ckll.), Borchsenius, 1957, Schmutterer, 1957.

Type Locality and Host:
Canada, on *Thuja*. According to Cockerell (1893) no locality is given by Fletcher; very probably the specimens were on a cultivated tree at Ottawa.

Occurrence in Denmark:
This species is mentioned in »Den grønne bog« (M. Dahl and F. Hejndorf, 1965) under the name *Eulecanium arion*. There are no samples in the collection.

Distribution:
Holland, France, Germany, Poland, Sweden, Switzerland, Canada, USSR.

Additional Hosts:
Confined to *Thuja*.

Habitat:
Larvae and females feed on twigs and foliage of *Thuja*.

+ **Parthenolecanium pomeranicum (Kawecki)**

Common name:
Yew Scale.
Lecanium corni-crudum Green, 1930.
Eulecanium crudum (Green), Schmutterer, 1957.
Parthenolecanium pomeranicum (Kaw.), 1954, Borchsenius, 1957, Ossiannilsson, 1959.

Type Locality and Host:
Poland, Pomerania, Wierzchlas, the yew-trees reservation, on yew (*Taxus*).

Occurrence in Denmark:
Zealand: Lyngby, 3/6 1944, w/c, on *Taxus*, Lyngby, 3/6 1944, w/c, on *Thuja* and *Taxus*, (The record on *Thuja* appears to be a mistake; examination of the specimens indicated only *pomeranicum*).

Distribution:
Reported from Czechoslovakia, England, France, Germany, Holland, Hungary, Poland, USSR.

Additional Hosts:
Confined to *Taxus*. Record of this species by Ossiannilsson (1951) on arbor-vitae (*Thuja*) was corrected by him in 1959 as *Parthenolecanium fletcheri* (Ckll.).

Habitat:
Lives on the undersurface of the foliage, twigs, stems and branches of yew-trees.

Economic Importance:
Known as a pest in nurseries and ornamental plantations.

Notes:
Kawecki (1954) described the scale from *Taxus* as a new species under the name *pomeranicum* and fully revised the situation of Green's first species from yew and *Aralia*.

+ **Physokermes piceae (Schrank)**

Coccus piceae Schrank, 1801.
Physokermes hemicriphus (Dalman), Schmutterer, 1956, Löyttyniemi, 1971.
Physokermes piceae (Schr.), Hellen, 1923, Borchsenius, 1957.

Type Locality and Host:
Germany, on the needles of *Picea*.

Occurrence in Denmark:
Zealand: Jægerspris, Nordskov, 6/10 1935, O. Ryberg, on *Picea excelsa*, cultivated.
Jutland: Kistrup, –/8 1932, Boas, on *Picea excelsa*, in plantation.

Bommerlund, 31/5 1950, Bejer-Petersen, on *Picea excelsa*, plantation.

Distribution:
Distributed in palaearctic and nearctic regions.

Additional Hosts:
Confined to *Picea*. Schmutterer noted it on *Abies*.

Habitat:
Females and larvae live under the bud-scales of annual branches.

Economic Importance:
Known as a serious pest of *Picea*. Can be a dangerous pest in Danish nurseries.

Notes:
First mentioned in literature by Geoffroy in 1762 under the name *Chermes abietis rotundus*, first description of the species was made by Schrank in 1801.
At present there is some doubt regarding *Physokermes piceae* Schrank, 1801 and *P. hemicryphus* Dalman, 1825, which has long been considered as a synonym of the first one. Schmutterer (1956) recognized *hemicryphus* and *piceae* as distinct and confirmed *hemicryphus* as the type-species. He used the name *piceae* for the large picea scale and the name *hemicryphus* – for the small picea scale, put *P. abietis* as a synonym of *hemicryphus* (1956, 1957). Later, Borchsenius (1957) accepted *piceae* as type-species and placed *hemicryphus* and *abietis* as synonyms of it. He used the name *piceae* for common small picea scale and *latipes* for large picea scale.

Pulvinaria vitis (L.) (= betulae L.)

Common name:
Vine Cottony Scale, Betula Cottony Scale.

Coccus vitis L., 1758.
Pulvinaria vitis (L.), Newstead, 1903, Henriksen, 1921, Hellen, 1926, Steinweden, 1946, Ossiannilsson, 1951, 1959, Schmutterer, 1952, Borchsenius, 1957.

Type Locality and Host:
Europe, on grape.

Occurrence in Denmark:
Zealand: Copenhagen, Ordrup skov, 28/4 1893, stud. Rasmussen, on *Vitis*. H.
Copenhagen, w/d, Dybdal, on *Vitis*. H.
Furesø, near Holte, 16/6 1893, Boas, on *Alnus*. H.
Roskilde, 9/6 1911, K. Bardenfleth, on *Ribes grossulariata*. H.
Holte, 30/5 1915, Kryger, on *Sorbus*. H.
Tisvilde, 7/7 1918, J. Kryger, on *Betula*. H.
Helsingør, w/d, P. Heiberg, on the roots of beech. H.
Lyngby, –/4 1927, Thomsen, on vine.
Nørreskov, near Furesø, 13/6 1940, Thomsen, w/p.
Jutland: Århus, summer hothouse of Bot. Institute, 18/7 1972, authors, on *Salix sp.*
Bornholm: Finnedalen, 1/10 1918, Ellen Hansen, on the roots of *Betula*. H.
w/l, 1/10 1918, Boas, on *Salix*. H.

Distribution:
Reported from Europe, N. America, Iran, Turkey, USSR. Occurs in forests, parks, nurseries, gardens.

Additional Hosts:
Polyphagous. Recorded from a variety of hosts, such as *Malus, Pear, Betula, Alnus, Sorbus, Salix, Acer, Carpinus, Pyrus, Ribes* and *Vitis*.

Habitat:
Lives on twigs and stems, occurs on roots. First stage larvae on the leaves.

Economic Importance:
Can be numerous and occasionally damage is done to plants in nurseries in Denmark.

Notes:
It is accepted by coccidologists now that *P. betulae* is a synonym of *P. vitis*, but *P. ribesii* is probably a valid species.

Saissetia coffeae (Walker)*

Common name:
Hemisphaerical Scale.

Lecanium coffeae Walker, 1852.
Saissetia coffeae Déplanche, 1859.
Lecanium hemisphaericum Targioni-Tozzetti, 1867, Fjelddalen, 1954.
Saissetia hemisphaerica (Targ.-Toz.), Henriksen, 1921, Hellen, 1921, Borchsenius, 1957, Vappula, 1965.
Saissetia coffeae (Walker), Williams, 1957, De-Lotto, 1965, Beardsley, 1966a, Ben-Dov, 1971.

Type Locality and Host:
Ceylon. Destroys the coffee plantation.

Occurrence in Denmark:
Zealand: Copenhagen, BGCU, w/d, w/c, on *Cycas circinalis, revoluta* and *sparcia, Hovea sp., Brescia spinosa.* H.
Copenhagen, BGCU, 1926, w/c.
Strødam, 1/5 1929, J. P. Kryger, on fern.
Hellerup, 1/11 1942, K. Steffenson, on *Mahonia* fern.
Holte, Sept. 1971, N. Møller-Andersen, on fern.
Hørsholm, 25/4 1972, authors, on *Brassia verrucosa* and *Asplenium nidus.*
Funen: Stige, 2/6 1972, authors, on St. amon (orchid).
w/1, 22/5 1973, K. Damgård, on *Nephrolepis* »Boston«.
Rislinge, 8/8 1973, J. Knudsen, on *Asplenium nidus.*
Harslev, 3/10 1973, J. Knudsen, on *Asplenium nidus.*
Ringe, 16/12 1973, K. Damgård, on *Platycerium bifurcatum.*
Søhus, 7/3 1974, D. Bugge, on *Aphelandra squamosa.*

Additional Hosts:
One of the common greenhouse coccids. On various plants; mostly a pest of ferns. Merrill (1952) listed this species from a variety of hosts.

Habitat:
Lives on the leaves, twigs and stems.

Economic Importance:
Can be a dangerous pest on some ornamental plants especially ferns in Danish greenhouses.

Notes:
This insect is well known in entomological literature under the name of *Saissetia* (or *Lecanium*) *hemisphaerica* (Targioni-Tozzetti). However, Williams (1957) examined Walker's original material, confirmed its identity with *hemisphaerica* and concluded that *Saissetia coffeae* (Walker) should now be used in place of *S. hemisphaerica* (Targ.-Toz.).

Saissetia oleae (Olivier)*

Common name:
Black Scale, Olive Mealybug.

Coccus oleae Olivier, 1791.
Lecanium oleae Walker, 1852, Newstead, 1903, Lindinger, 1935.
Saissetia oleae (Bern.), Henriksen, 1921, Hellen, 1926, Balachowsky, 1927, Schmutterer, 1952, Borchsenius, 1957, Vappula, 1965, De-Lotto, 1965.
Saissetia oleae (Oliver), De-Lotto, 1971.

Type Locality and Host:
France and Italy, on olive, myrtle and *Phyllyrea.*

Occurrence in Denmark:
Zealand: Copenhagen, BGCU, w/d, w/c, on *Brexia spinosa.* H.
Hørsholm, 25/4 1972, authors, on leaves and stems of *Nerium oleander.*
Hellerup, 14/3 1973, authors, on *Nerium oleander* (abundant).
Jutland: Århus, BGÅU, 17/7 1972, authors, on *Nerium oleander.*
Funen: Harslev, 1/8 1972, J. Knudsen, on *Ficus benjamina.*

Distribution:
Widespread.

Additional Hosts:
Polyphagous. Recorded from a wide variety

of hosts, such as citrus, olive, apple, pear, plum and many ornamental plants.

Habitat:
Lives on the leaves and twigs, rarely on the branches and trunks.

Economic Importance:
Known to cause serious damage to citrus, olive, vine, but it can occasionally become a pest of ornamental plants in Danish greenhouses. The authors observed heavy infestation on *Nerium oleander*.

Family Diaspididae

+ **Abgrallaspis cyanophylli (Signoret)***

Common name:
Cyanophyllum Scale.
Aspidiotus cyanophylli Signoret, 1869.
Abgralaspis cyanophylli (Signoret), Borchsenius, 1966.

Type Locality and Host:
Paris, Luxembourg Garden, on *Cyanophyllum magnificum*, a Venuzuelan plant.

Occurrence in Denmark:
Zealand: Copenhagen, VAU, 18/11 1934, Lemcke, on *Cereus silvestri*.
Helsingør, 18/1 1968, Reitzel, on *Selenicereus sp.* (*Cactaceae*).

Distribution:
Widespread in tropical and subtropical parts. In greenhouses it is known as a pest of orchids, cacti and palms.

Additional Hosts:
Polyphagous. Known from unrelated plants of 44 different families (Borchsenius, 1966).

Habitat:
Lives on the leaves.

Economic Importance:
A rare species in Denmark but could be a pest of some ornamental plants.

+ **Anamaspis lowi (Colvée)**
Leucacpis lowi (Colvée), Borchsenius, 1966.

Type Locality and Host:
Spain, Valencia, on *Pinus*.

Occurrence in Denmark:
The occurrence of this species in Denmark was recorded by Balachowsky (1953) and Borchsenius (1966).
Not present in Danish collections, but this scale is common on *Pinus* in Europe and could perhaps be found in Denmark as well.

Distribution:
Recorded from Belgium, Holland, Germany, France, Sweden, and other European countries; USSR, Turkey, Morocco.

Additional Hosts:
Confined to *Pinus*.

Habitat:
Lives on the needles.

Economic Importance:
Known in Central Europe (Schmutterer, 1957) as a pest and causes damage to its host-plants together with other conifer coccids. According to Kosztarab (1959) this insect is the most important scale on pine in Hungary.

Notes:
Some workers have regarded the generic name as a synonym of *Leucaspis* Targ.-Tozzetti.

+ **Aspidiotus elaeidis Marchal***
Aspidiotus elaeidis Marchal, 1909, Borchsenius, 1966.

Type Locality and Host:
Africa, Porto-Novo (Dahomey). Collected by M. Dybowski on the leaves of oil palm, *Elaeis guineensis* accompanied by *Aspidiotus destructor*.

Occurrence in Denmark:
Zealand: Kokkedal, 20/1 1969, Reitzel, on *Ficus elastica.*

Distribution:
Reported from some localities in Africa only.

Additional Hosts:
Found on some plants of such families as *Palmae (Coccos, Elaeis), Loranthaceae (Viscum), Rosaceae (Chrysobalanus), Meliaceae (Xylocarpus), Euphorbiaceae (Bridelia, Manihot), Ochnaceae (Lophira), Ebenaceae (Diospyros), Oleaceae (Olea), Apocynaceae (Arduina, Funtumia).*

Habitat:
Lives on the leaves.

Economic Importance:
At present it is a rare species in the country, recorded only once. It can be introduced with plants from Africa and become a pest in greenhouses.

Aspidiotus nerii Bouché*

Common name:
Oleander Scale, White Scale, Ivy Scale.
Aspidiotus hederae Vall., Henriksen, 1921, Fjelddalen, 1953.
Aspidiotus nerii Bouché, 1833, Borchsenius, 1966.

Type Locality and Host:
According to Bouché (1833) it was found on numerous different plants in greenhouses under warm and cold conditions. Original country is probably America.

Occurrence in Denmark:
Zealand: Vanløse, May 1923, Thomsen, on *Hedera helix.*
Copenhagen, 1/10 1966, Reitzel, on *Agave sp.*
Hellerup, 19/4 1972, authors, on *Nerium oleander.*
Hellerup, 14/3 1973, authors, on *Nerium oleander.*
Jutland: Vejle, 26/2 1971, Reitzel, *Kentia sp. (Howea).*
Funen: Stige, 9/11 1973, J. Knudsen, on *Aucuba japonica variegata.*

Distribution:
Widespread in tropical and subtropical areas and in greenhouses and on houseplants as well.

Additional Hosts:
Polyphagous. According to Borchsenius (1966) known from plants of more than 89 botanical families.

Habitat:
Occurs on the trunks, branches, stems, leaves and fruits of its host-plants.

Economic Importance:
In Denmark the Oleander scale is not regarded as a serious pest, but it may cause damage to ornamental plants. The authors observed heavy infestations on some plants of *Acacia, Ceanothus thyrsiflorus* and *Dunalia sp.* in Copenhagen Botanical Garden, 19/4 1972.

Notes:
This scale was often mentioned in literature under the name – *A. hederae* Vallot. Borchsenius (1966) and Morrisons (1966) came to the conclusion that the name *nerii* should be accepted and *hederae* considered as a synonym.

Aulacaspis rosae (Bouché)

Common name:
Rosa Scale.
Aspidiotus rosae Bouché, 1833.
Aulacaspis rosae (Bouché), Henriksen, 1921, Balachowsky, 1954a, Borchsenius, 1966.

Type Locality and Host:
According to Bouché (1833) this scale was found on the stems and old twigs of rose in the garden. Locality not mentioned.

Occurrence in Denmark:
Zealand: Hellerup, Sept. 1907, K. Stephensen, roses. H.

Sandbjerg, 13/2 1974, C. J. Hansen, roses.

Distribution:
Widely distributed throughout the world including Europe.

Additional Hosts:
Oligophagous; commonly found on the plants of the family *Rosaceae*, especially on *Rosa* and *Rubus*.

Habitat:
Lives on the leaves, twigs and branches.

Economic Importance:
Not regarded as an important pest in this country, but from other countries it is known to cause serious damage to roses, blackberry and raspberry.

Notes:
This species comes close to *A. mali* Borchs.

Chionaspis salicis (L.)

Common name:
Willow Scale, European Willow Scale.
Coccus salicis (L.), 1758.
Chionaspis salicis (L.), Henriksen, 1921, Balachowsky, 1954a, Borchsenius, 1966.

Type Locality and Host:
On bark of *Salicis hermaphroditicae*.

Occurrence in Denmark:
Zealand: Copenhagen, 5/6 1858, Jap. Stenstrup, on *Salix lanceolata*. H.
Køge, Strøby, Aug. 1899, R. H. Stamm, on *Salix sp.* H.
Tisvilde Hegn, 12/10 1919, Kryger, on *Betula*. H.
Gribsø, 26/9 1929, w/c, on *Vaccinium myrtillus*. H.
Gribsø, 26/9 1920, Henriksen, on *Alnus glutinosa*. H.
Hørsholm, 12/7 1972, authors, on *Salix sp.*
Rude skov, 29/9 1973, H. Enghoff, on *Salix sp.*
Holte, 20/10 1973, authors, on *Salix sp.*
Jutland: Vejle, –/7 1915, Boas, on *Fraxinus*. H.
Rye-Nørreskov, 4/6 1934, Stamm, on *Vaccinium myrtillus*. H.
Hald, 15/8 1934, G. Larsson, on *Vaccinium* in oak-forest.
Erslev (Mors), 5/8 1934, G. Larsson, on *Salix sp.*
Funen: Glorup, 15/8 1891, Lyman, on *Fraxinus*. H.
Nyborg, 22/4 1972, authors, on *Salix sp.*

Distribution:
Europe, USSR, Turkey, Iran, North Africa.

Additional Hosts:
Polyphagous. Known from plants of 17 botanical families (Borchsenius, 1966); more usual hosts are *Salix, Populus, Acer, Fraxinus, Tilia, Corylus* etc. Mentioned as a pest of *Ribes*.

Habitat:
Lives usually on the trunks and branches, rarely on leaves.

Economic Importance:
One of the common scales in Denmark. Can be a dangerous pest in nurseries and orchards.

Notes:
This species is known as the European Willow Scale and differs in some characters from American Willow Scale – *Ch. salicisnigrae* (Walsh), with the common name – Black Willow Scale (Balachowsky, 1954). Danzig (1970) placed *Ch. salicisnigrae* as a synonym of *Ch. salicis*.

Chrysomphalus aonidum (L.)*

Common name:
Circular Black Scale, Florida Red Scale.
Coccus aonidum (L.), 1758.
Chrysomphalus aonidum L., Henriksen, 1921, Borchsenius, 1966.

Type Locality and Host:
Found on Indian tree. In Asia on evergreen trees, such as *Camellia* and others.

Occurrence in Denmark:
Zealand: Copenhagen, BGCU, w/d, w/c, on *Allamanda verticillata, Brexia spinosa, Cycas circinalis, Ilex salicifolia, Mangifera indica. Pandanus veitchii, Phoenix juba.* H.
Copenhagen, BGCU, 2/11 1931, Th., w/p.

Distribution:
Widespread in tropical and subtropical areas and in some greenhouses in northern latitudes. In Sweden this scale was found only on imported citrus fruits. Schmutterer (1959) mentioned the distribution of this insect in Denmark and in neighbouring countries of Belgium, England, Holland and Germany.

Additional Hosts:
Widely polyphagous; reported from a variety of plants in more than 76 unrelated botanical families (Borchsenius, 1966).

Habitat:
Lives on the leaves and fruits of its hosts.

Economic Importance:
Known as one of the most dangerous pests of citrus. In this country it may cause serious damage to ornamental plants.

Notes:
The Circular Black Scale was often mentioned in literature under the name *C. ficus* Ashmed. Borchsenius (1966) and Morrison and Morrison (1966) accepted the Linnaean name of the species *C. aonidum* (L.). According to Morrison and Morrison the type specimens of *aonidum* were examined in the collection of the Linnaean Society of London by Williams (1960, in lit.), who decided that *ficus* Ashmed was identical with it.

+ **Diaspis echinocacti (Bouché)***
Common name:
Cactus Scale.
Aspidiotus echinocacti Bouché, 1833.
Diaspis echinocacti (Bouché), Borchsenius, 1966.

Type Locality and Host:
Bouché (1833) mentioned this species as living on *Cactus sp.*, especially on *Echinocactus.* Probably it was introduced from Mexico.

Occurrence in Denmark:
Zealand: Copenhagen, AVU, 2/3 1972, authors, on *Opuntia sp.*
Ringsted, Hjelmsølille, 9/6 1972, Phillipsen, on *Opuntia.*

Distribution:
Mostly known from tropical and subtropical parts. Reported from greenhouses in such countries as England, Germany and USSR; outdoors in France, Italy and Spain.

Additional Hosts:
Confined to *Cactaceae.*

Habitat:
Lives on the foliage of its host.

Economic Importance:
A very dangerous pest of cacti. The authors observed very heavy infestations of some *Opuntia* plants in commercial and private greenhouses, Copenhagen.

+ **Diaspis boisduvalii Signoret***
Common name:
Boisduval Scale.
Diaspis boisduvalii, Signoret, 1869, Balachowsky, 1954a, Borchsenius, 1966.

Type Locality and Host:
France, Paris, the Luxembourg conservatories, on many orchids. According to Morgan (1890) Signoret artistically figured it.

Occurrence in Denmark:
Zealand: Fredensborg, 12/2 1970, Reitzel, on *Catleya.*
Copenhagen, BGCU, 18/8 1972, authors, on

Catleya loddigesii and *Odontoglossum grande*.
Virum, 7/9 1972, authors, on *Nerogelia tricola* and orchid.
Jutland: Åbyhøj, 4/10 1966, Reitzel, on *Vriesia*.

Distribution:
Known from tropical and subtropical countries. Reported from greenhouses of England, Germany, Sweden and USSR; outdoors in European countries: France, Italy, Portugal and Spain.

Additional Hosts:
Lives on leaves and branches.

Economic Importance:
Serious pest of many greenhouse plants. The authors observed heavy infestation on orchids.

+ Diaspis bromeliae (Kerner)*

Common name:
Pineapple Scale.
Coccus bromeliae Kerner, 1778.
Diaspis bromeliae (Kerner), Borchsenius, 1966.

Occurrence in Denmark:
Zealand: Virum, 7/9 1972, authors, on *Nerogelia tricola*.
Funen: Odense, Søhus, 2/11 1969, Reitzel, on *Achmea fasciata*.

Distribution:
Some tropical and subtropical countries. Reported from greenhouses in Belgium, Czechoslovakia, France, Germany, Italy, Sweden, and USSR.

Additional Hosts:
Polyphagous. Known from the plants of 10 botanical families (Borchsenius, 1966).

Habitat:
Lives on leaves and stems.

Economic Importance:
May occasionally become a pest of ornamental plants.

Furchadaspis zamiae (Morgan)*

Common name:
Cycad Scale.
Diaspis zamiae Morgan, 1890.
Howardia zamiae (Morg.), Henriksen, 1921.
Furchadiaspis zamiae (Morg.), Balachowsky, 1954a, Borchsenius, 1966.

Type Locality and Host:
Portugal, Oporto, in the conservatories of Senr. Loureiro, on the stem and leaves of *Zamia villosa*, 1889.

Occurrence in Denmark:
Zealand: Copenhagen, BGCU, w/d, w/c, on *Dioon edule*. H.
There are no samples in the collections.

Distribution:
Known from tropical and subtropical parts of America, Africa, Asia and Australia. Reported from greenhouses in England, Germany, Sweden, USA and USSR.

Additional Hosts:
Found on some plants of such families as *Cycadaceae (Ceratozamia, Cycas, Dioon, Encephalartos, Macrozamia, Stangeria, Zamia), Anacardiaceae (Rhus)* and *Araliaceae (Cussonia)*.

Habitat:
Lives on leaves.

Economic Importance:
May cause damage to its host-plants.

Ischnaspis longirostris (Signoret)*

Common name:
Black-line Scale, Black Thread Scale.
Mytilaspis longirostris Signoret, 1882.
Ischnaspis filiformis Douglas, Henriksen, 1921.
Ischnaspis longirostris (Sign.), Balachowsky, 1954a, Borchsenius, 1966.

Type Locality and Host:
France, Paris, greenhouse of Museum by Houllet, on *Napoleona heudloti*. The plant was from Senegal, where this scale is known as a pest.

Occurrence in Denmark:
Zealand: Copenhagen BGCU, w/d, w/c, on *Hovea sp., Kentia spp., Livistona spp., Pandanus itilis, Phoenix spp.* etc. H.
Copenhagen, BGCU, Dec. 1920, w/c, on palm.

Distribution:
Widespread; known to occur around the world. Reported from greenhouses in Czechoslovakia, England, France, Germany, Sweden, USSR.

Additional Hosts:
Polyphagous; recorded from a wide variety of hosts of 35 botanical families (Borchsenius, 1966).

Habitat:
Lives on leaves.

Economic Importance:
At present it is a rare species in this country, but in cases of heavy infestation it might be a dangerous pest in Danish greenhouses.

Lepidosaphes ulmi (L.)

Common name:
Mussel Scale, Oyster-shell Scale, Appletree Bark Louse.
Coccus ulmi L., 1758.
Lepidosaphes ulmi (L.), Henriksen, 1921, Balachowsky, 1954a, Borchsenius, 1966.

Type Locality and Host:
On *Ulmus campestris.*

Occurrence in Denmark:
w/l, 14/4 1917, Rostrup, on *Vincetoxicum officinale.* H.
Zealand: Rude Hegn, April 1917, J. P. Kryger, on *Quercus.* H.
Gribsø, 20/9 1920, J. P. Kryger, on *Vaccinium myrtillus* and *V. vitis idaea.* H.
Lyngby, 17/5 1934, w/c, on apple.
Hørsholm, 12/6 1972, authors, on *Salix sp.*
Funen: Hofmansgave, w/d, Hofman Bang, on *Pyrus communis.* H.
V. Ulslev, v. Nysted, 16/10 1912, J. P. Michelsen, on *Pyrus communis.* H.
Odense, 8/8 1968, Reitzel, on *Salix sp.*
Lolland: Thoreby gl. skole, Oct. 1946, Kryger, w/p.

Distribution:
Cosmopolitan.

Additional Hosts:
Widely polyphagous. Known from plants of 34 botanical families.

Habitat:
Lives on the trunks, branches and twigs, rarely on leaves and fruits.

Economic Importance:
One of the common pest in parks, orchards and forests. Known as a serious pest of fruit and ornamental plants.

+ Quadraspidiotus perniciosus (Comstock)

Common name:
San José Scale, Chinese Scale, Perniciosus Scale.
Aspidiotus perniciosus Comstock, 1881.
Quadraspidiotus perniciosus (Comst.), Borchsenius, 1966.

Type Locality and Host:
California, in Santa Clara country, on apple, pear, plum etc.

Occurrence in Denmark:
The San José Scale was recognized by quarantine inspection in the middle of September 1964 on apple and pear trees, in the old orchard belonging to the estate of Glorup, Funen. According to the gardeners' observations of symptoms the infestation may have been introduced at least 5 years before. All necessary measures were taken by the Plant Protection Service: the trees were cut down, the roots removed, all of the material burnt, cleared land was ploughed and surrounding trees and shrubs were sprayed with spring tar oil of the

highest permissible dosage. Subsequent observations in this locality have showed the complete absence of San José Scale. No additional records have since been made.

Distribution:
Widespread. It has been introduced to all parts of the world.

Additional Hosts:
Widely polyphagous. The host list of this pest is very long; preferable hosts are fruit plants and some ornamental plants.

Habitat:
Lives on all upper parts of its host-plants.

Economic Importance:
Known as one of the most destructive scale insect, especially fruit trees, but also causes serious damage to some ornamentals.

Parlatoria proteus (Curtis)*

Common name:
Proteus or Sanseveria Scale, Small Brown Scale, Common Parlatoria Scale.
Aspidiotus proteus Ruricola (Curtis), 1843.
Parlatoria proteus (Curt.), Henriksen, 1921, Schmutterer, 1952, Borchsenius, 1966.

Type Locality and Host:
England, London, in greenhouses on the succulent leaves of some species of *Aloé* and *Amaryllis* (abundant).

Occurrence in Denmark:
Zealand: Copenhagen, BGCU, w/d, w/c, on *Cymbidium aloifolium*. H.
There are no samples in the collection.

Distribution:
Widespread in tropical and subtropical parts of Africa, Asia and America. Reported from greenhouses in Belgium, Czechoslovakia, England, France, Germany, Italy, Poland and USSR.

Additional Hosts:
Widely polyphagous. Known from 21 botanical families (Borchsenius, 1966).

Habitat:
Lives on the leaves.

Economic Importance:
Known as a serious pest of greenhouse-plants.

Pinnaspis aspidistrae (Signoret)*

Common name:
Fern Scale, Aspidistra Scale, Brazilian Snow-scale.
Chionaspis aspidistrae Signoret, 1869.
Hemichionaspis aspidistrae (Sign.), Henriksen, 1921.
Pinnaspis aspidistrae (Sign.), Balachowsky, 1954a, Fjelddalen, 1957, Borchsenius, 1966.

Type Locality and Host:
France, on *Aspidistra*.

Occurrence in Denmark:
Zealand: Copenhagen, 19/3 1916, K. Stephensen, on *Aspidistrae elatior*. H.
Copenhagen, BGCU, Febr. 1925, Thomsen, in herbarium of AVU.
Jutland: Vejle, 4/2 1971, Reitzel, on *Aspidistra sp.*

Distribution:
Widespread. In tropical and subtropical parts of the world. Reported from greenhouses and houseplants in Belgium, Czechoslovakia, England, Finland, France, Germany, Holland, Hungary, Poland, Sweden, USA and USSR.

Additional Hosts:
Widely polyphagous. Known from the plants of 28 unrelated botanical families. More preferable plants are ferns.

Habitat:
Lives on the leaves, leaf-stalks and twigs.

Economic Importance:
Bovien and Thomsen (1945) reported it as a very important pest of plants in greenhouses, mainly of ferns, (especially *Nephrolepis, Pteris)* and *Cycas.*

Pinnaspis buxi (Bouché)*

Common name:
Boxwood Scale, Pandanus Scale.
Aspidiotus buxi Bouché, 1851.
Pinnaspis buxi (Bouché), Henriksen, 1921, Borchsenius, 1966.

Type Locality and Host:
On *Buxus sempervirens*; localities not mentioned.

Occurrence in Denmark:
Zealand: Copenhagen, BGCU, w/d, w/c, on *Anthurium squamiferum, Ceperus alternifolius, Pandanus veitchii.* H.

Distribution:
Widespread. Outdoors in tropical and subtropical parts. Reported from greenhouses in Czechoslovakia, Germany, USSR.

Additional Hosts:
Polyphagous; recorded from the wide variety of hosts of 22 botanical families (Borchsenius, 1966).

Habitat:
Commonly found on the leaves, leafstalks and thin twigs.

Economic Importance:
Known as a pest of many greenhouse plants such as *Pandanus, Anthurium, Phillodendron, Ficus, Nerium, Hibiscus* etc.

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Summary

This paper presents all available information on coccids *(Homoptera:Coccoidea)* in Denmark. It is based on a revision of Danish collections, the authors own finds and additional material from various sources. Information is given on localities, distribution, hostplants, habitat, economic importance, and taxonomic categories for all 61 species, 31 of which occur in the open and 30 in greenhouses. 32 species are new to the Danish fauna.

A systematic list of the species is presented as well as keys to the Danish coccid families and the genus *Eriopeltis.* Further a first attempt has been made to give a survey of the zoogeographical affinities of all coccids known from Denmark, Finland, Iceland, Norway, Sweden, and Greenland.

Sammenfatning

Den foreliggende publikation giver oplysninger om alle de hidtil fundne arter af uldlus og skjoldlus i Danmark. Undersøgelsen er dels baseret på materiale stillet til rådighed af Zoologisk Museum i København, dels på materiale, der i årenes løb er indsendt til Statens plantepatologiske Forsøg. Desuden har forfatterne selv foretaget indsamlinger.

For de enkelte arter er der gjort rede for lokaliteter, udbredelse, værtplanter, habitat, dyrenes økonomiske betydning samt deres taxonomiske forhold. Undersøgelsen omfatter i alt 61 arter, af hvilke 31 er fundet på friland og 30 i væksthuse. 32 arter er nye for den danske fauna.

Der er udarbejdet bestemmelsesnøgle for de danske coccid-familier og en artsnøgle for slægten *Eriopeltis.* Endelig gives der en oversigt over samtlige coccidarter, der er fundet i Finland, Island, Norge, Sverige og på Grønland.

КРАТКОЕ СОДЕРЖАНИЕ

Работа содержит сведения по кокцидам Дании, полученные на основании анализа датских коллекций, сборов авторов и образцов, присланных из различных источников страны. Приведены списки видов, определительные таблицы семейств и рода Eriopeltis. 32 вида - новые для фауны Дании. По 61 виду кокцид, из которых 31 вид - обитатели открытого грунта и 30 - известны из оранжерей, приведены данные по систематическому положению, экологии, распространению в Дании и других странах и экономическому значению этих вредителей. Дан краткий обзор известных в настоящее время коцид Швеции, Норвегии, Финляндии, Гренландии и Исландии.

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