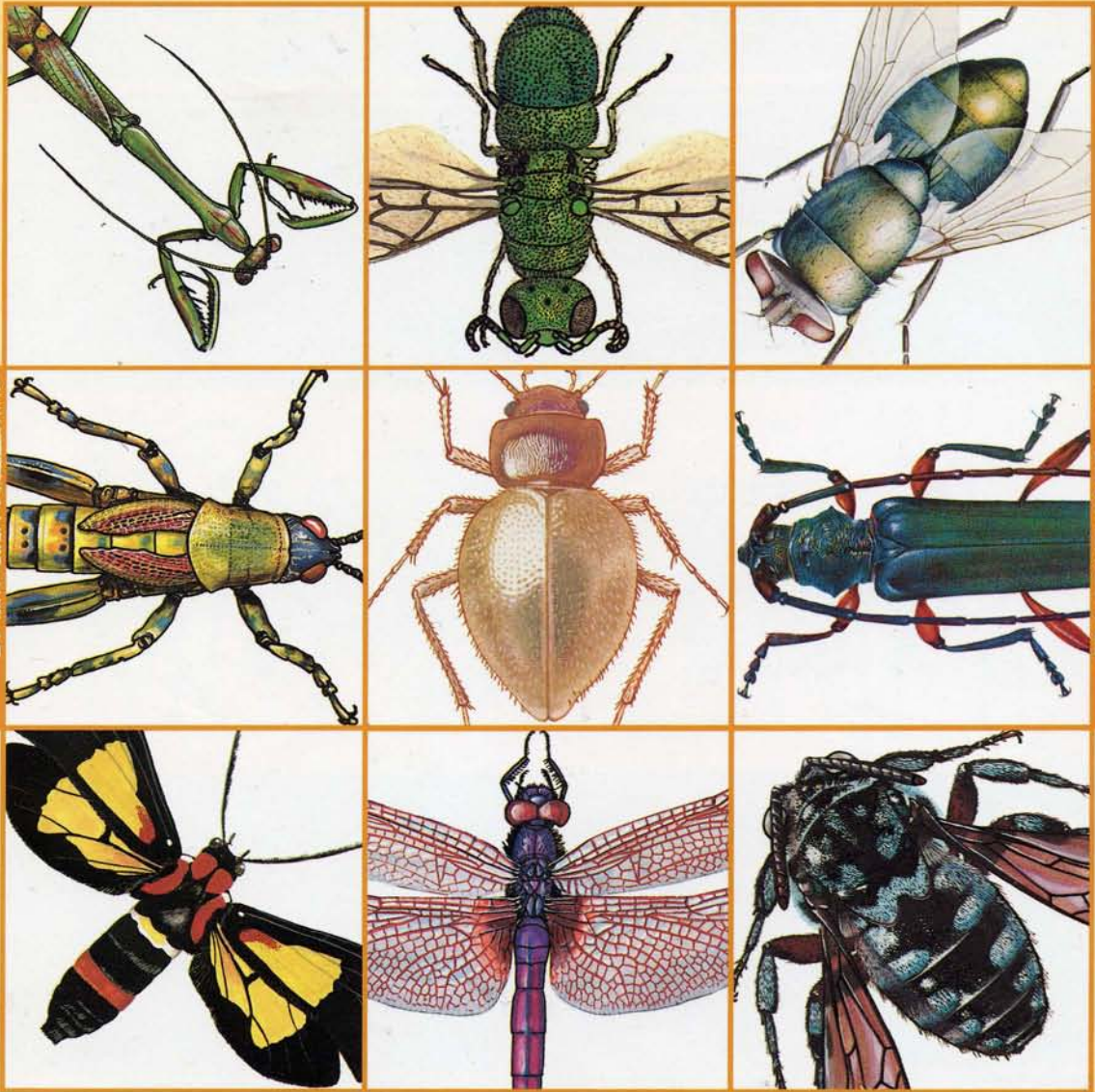


# INSECTS

## of Southern Africa



Clarke H Scholtz • Erik Holm

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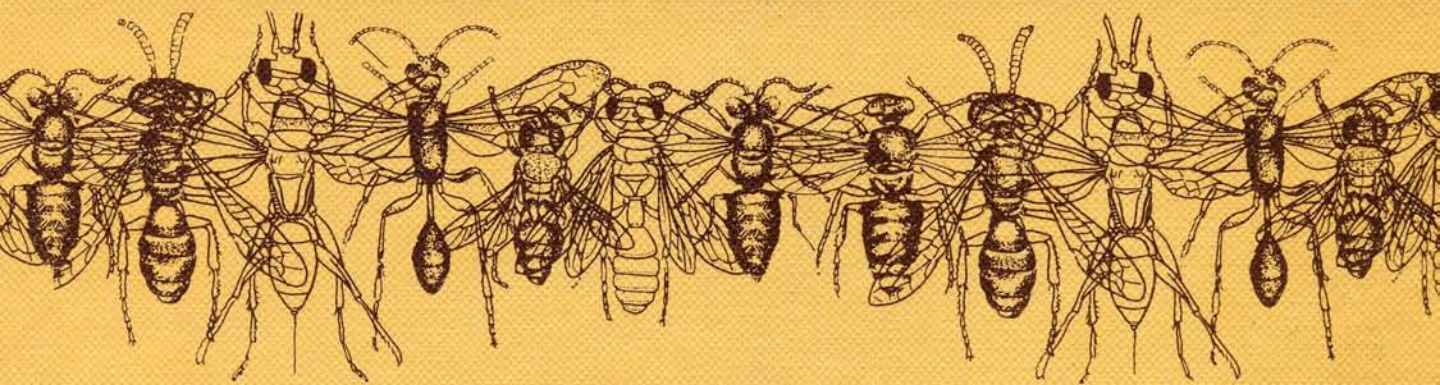
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# Insects of Southern Africa

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# Foreword

As is the case with the vertebrate fauna and flora, southern Africa is blessed with an exceedingly rich insect fauna. Despite considerable taxonomic inputs on the part of the Department of Agriculture (National Collection of Insects, Plant Protection Research Institute and its predecessor, the Division of Entomology), the various museums and university entomology departments, as well as amateur entomologists and overseas experts during the past eight decades, a recent estimate indicates that no more than five per cent of the southern African insect fauna is known to science. While the wealth and diversity of our insect life provides a neverending fascination for the entomologist, this situation is at the same time frustrating in the extreme not only to the taxonomist, who is forever engaged in revising groups in the light of new material becoming available, but also to the economic entomologist involved in pest management programmes when he is confronted with hitherto undescribed insects occupying niches in a pest situation.

The need for continued and even greater inputs into classical insect taxonomy are therefore urgently called for. Regrettably the opposite seems to be the case: not

only has taxonomy lost its appeal for the younger student, but many organisations hitherto actively involved in taxonomic research are shifting their entomological emphasis to more glamorous aspects of the discipline.

The need for a comprehensive and authoritative publication on the classification of the insect fauna of southern Africa has long been felt, but because of the enormous scope of the task no single entomologist has dared take on this challenge. The editors of this fine publication are to be complimented on rallying the support of local taxonomic expertise as well as that of overseas researchers with an interest in the southern African fauna. The publication is as comprehensive as can be expected and as such can be recommended to every serious student of southern African entomology.

I. H. WIESE DSc

Director: Plant Protection Research Institute  
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Republic of South Africa

Pretoria  
April 1985

# Preface

The initiation, in January 1983, of the project which ultimately resulted in this book, was prompted by the need for a reference work on southern African insects by entomology students at the University of Pretoria. We initially intended to produce a work in which only the major groups were superficially dealt with but after approaching several authorities for contributions on various groups, the overall consensus reached was that there was a greater need for a larger and considerably more detailed work for the layman, student, amateur and professional entomologist alike. Most contributors responded enthusiastically, although some initially expressed misgivings about the feasibility of such a project because a similar attempt elsewhere some years previously had failed. However, we trust we have done justice to the contributions, the results of which are here produced.

The desire to provide a work which is useful to the layman and entomologist alike may impose some hardship on both, but we trust there is sufficient explanation of terms and discussion of morphological structures in the text and glossary to help in the general understanding of the group for those not too familiar with insects. We suspect that some authorities will probably find the relevant chapters on their groups inadequate, but to provide adequate information on every group of such a large and diverse class of animals as the insects, in a book of this nature, would be impossible.

The main objective of the book was to present a systematic account of all the major insect groups in southern Africa with as much information on their biologies as was feasible. Much of this information is unpublished or is inaccessible to the average reader, and consequently we believe the book will be of use to anyone with an interest in entomology.

The royalties which accrue from the proceeds of the book will be paid into a bursary fund for post graduate study in insect systematics at the University of Pretoria.

The successful completion of this book would not have been possible without the co-operation and assistance of many people, least of all the contributors whose names are listed below. Unfortunately, it would be impossible to mention all others by name.

We would, however, like to thank the following people most sincerely:

Dean of the Faculty of Science, University of Pretoria, professor P. J. Zietsman, who supported the project from its inception.

For

- technical assistance: Maria Lucas who very ably handled all the routine work; also Elsabie de Wet and George Tau.
- typing: Lilian Scholtz typed the major part of the final manuscript; sections were also typed by Martie Walzi, Michele Edwards and Chuck Bellamy; At Schoeman typed the index.
- illustrations: Beth Grobbelaar, Marita Johnson, Elbie de Meillon, Susan Schwartz and Louise Walles; the contributors who provided their own illustrations; also for permission from various sources to publish from the works of P. Basilewsky, W. G. H. Coaton, J. A. Slater, J-M. Vrydagh and A. Villiers; the Reverend A. Watsham who kindly permitted the reproduction of his original colour illustrations of parasitic Hymenoptera; students in the Department of Entomology, University of Pretoria from whose theses and projects illustrations were reproduced.
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Dr R. A. Crowson of Glasgow University read and commented on the Coleoptera chapter – his comments are greatly appreciated.

The University of Pretoria contributed towards the publication costs of the colour plates.

Sarie Moolman, formerly of Butterworths, very competently handled the publication of the book.

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March 1985

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Besides the phytophagous, stem-boring Languriinae members of other subfamilies are found in forest litter, or have been recorded as pests of stored products (*Cryptophilus*).

The subfamily Languriinae is not as common in southern Africa as it is in the tropical regions of Africa. Only six genera and 21 species belonging to this subfamily have been recorded, whereas members of other subfamilies are known to occur there but have not been described. Arrow (1929) and Villiers (1962) last dealt with this family

### **Erotylidae**

Erotylids are small to large beetles (3–28 mm) but are usually between 5 and 8 mm long. They are evenly ovate (fig. 20.220) and are usually glabrous, often with patterns of black and red or yellow. The head is deeply set into the transverse pronotum. The antennae are rather short, 11-segmented with a broad compact and flattened three-segmented club. The last segment of the maxillary or labial palpi or both is enlarged and often securiform (hatchet-shaped). The elytra cover the abdomen. The tibiae are usually expanded and truncate apically. The tarsal formula is 5-5-5.

Erotylids are associated with fruiting bodies of higher fungi, most frequently with those growing on tree trunks and logs. Some of the larvae are external feeders and are spinose, others tunnel in the fungi and are lightly pigmented and only tuberculate. The adults of some species are often attracted to light.

The family is represented by 900 species in the world. In southern Africa 11 genera and 32 species have been recorded.

### **Phalacridae**

Members of this family are small beetles (1.5–4 mm) with very uniform appearance. They are evenly ovate or slightly elongate ovate (fig. 20.206) and evenly convex. They are usually black with a dark metallic sheen, sometimes with inconspicuous red or, rarely, yellow markings. The head is small and the clypeus rounded, forming an even arch with the sides of the pronotum. The posterior angles of the pronotum join to the humeral angles of the elytra. The antennae are 11-segmented with a three-segmented, elongate club. The palpi are short and slender. The tarsal formula is 5-5-5, the fourth segment being strongly reduced.

Adults are usually found on vegetation and in flowers, sometimes in large numbers. The larvae (fig. 20.207), however, feed on spores of lower fungi.

The family is poorly known in southern Africa. Of the 600 species known worldwide only 32 species belonging to seven genera have been recorded in southern Africa. Champion (1925) last dealt with the family.

### **Cerylonidae**

Cerylonids are very small (c. 2 mm long), oblong or ovate to broadly ovate, more or less flattened, reddish brown or black, usually glabrous beetles. The head is small and the antennae and club consist of various numbers of segments but the club is always compact, broad and usually flattened (1–3 segments). The elytra are punctate-striate. The first abdominal sternite is long and bears a pair of femoral lines. The tarsi are short with the usual formula of 4-4-4.

Cerylonids can be found in leaf litter in forests and in decaying wood.

This family, which comprises about 650 species worldwide, is currently being studied for the first time in southern Africa. Sen Gupta and Crowson (1973) have treated this family on a world wide basis.

### **Corylophidae**

These are minute beetles (mostly about 1 mm long, very exceptionally reaching 2 mm). They are broadly ovate (fig. 20.203) and moderately convex to flattened. The head is small and in some genera covered by the anterior portion of the semicircular pronotum. The antennae are 8- to 11-segmented with characteristically small segments between the two enlarged basal and three club segments. The tarsal formula is 4-4-4. The posterior angle of the pronotum is square or acute and the elytra are usually truncate (all species with covered head); punctuation is irregular.

Corylophids are regularly found in association with decaying plant material such as forest litter, where they feed on fungi.

This family is much neglected worldwide. Of the about 400 species described in the world eight genera and 22 species are known from southern Africa. Since Matthews' monograph (1899) only Paulian (1950) has dealt with the family.

### **Coccinellidae**

#### **H. FÜRSCH**

Ladybirds (figs 20.227–20.237) are oval, highly convex, very small to small (0.5–10 mm) beetles. The colour varies from yellow to black and the beetles are often bicoloured or spotted (e.g. fig. 20.232). Males and females of some species are coloured differently. The head is deeply deflexed and sunk into the prothorax and the antennae are eight-, ten- or 11-segmented with a three-segmented club. The terminal segment of the maxillary palpi is large. The abdomen has five or six visible sternites, the basal one of which has a curved femoral line extending backwards from the inner end of the coxa. The tarsi are often apparently three-segmented but actually four-segmented, the third segment being minute and hidden. Most species are capable of flight but a few rare

genera are wingless. The larvae have a tuberculate or spinose dark grey body which is commonly spotted with paler colours (e.g. fig. 20.235).

Adults and larvae of most species are carnivorous, preying on various homopterans or other small insects and mites. The Epilachninae (fig. 20.237), however, are leaf eaters and some species are pests of cultivated crops. Many predatory species are important in the control of homopteran pests and some have been used successfully in biological control programmes.

The adults of many species of Coccinellidae form aggregations during winter. At the end of the summer they migrate towards the highest point on their horizon, where they aggregate. The beetles mate before dispersing in spring.

Eggs are laid singly or in groups (figs 20.228, 20.233) and development is rapid, being completed in 5–10 days. Larval development takes 10–14 days and pupation takes place on the plant where the larvae fed. Pupae are often brightly coloured, without cocoons (figs 20.230, 20.236). Adults emerge in 4–10 days.

When disturbed, adult ladybirds drop to the ground and discharge drops of yellow blood from the articulations between the tibiae and femora. The blood is toxic to vertebrates and the behaviour is assumed to be defensive.

Eight subfamilies of Coccinellidae occur in southern Africa. The Sticholotidinae, with six genera and 15 species, are small to very small beetles characterized by a conical or elongate terminal segment of the maxillary palpi.

Scymninae (fig. 20.231) are small and pubescent, with short antennae. Species of *Scymnus* (fig. 20.231) feed on coccids and aphids and those of *Stethorus* on spider mites. *Nephus reunioni* (a predator of *Planococcus citri*) and *Cryptolaemus montrouzieri* (predatory on various mealy bug pests of citrus) were introduced into South Africa and bred artificially for use in biological control programmes. Larvae of *Ortalia* species feed on *Pheidole* ants. Six genera and about 50 species have been recorded from southern Africa.

Hyperaspinae are shiny black beetles with bright yellow spots. They feed on coccids. The single genus *Hyperaspis* and about 15 species have been recorded from southern Africa. *H. senegalensis hottentotta* and *H. felixi* are common and widespread species.

The Chilocorinae are easy to distinguish from other groups by the broad and laterally expanded clypeus. The larvae of *Platynaspis* are broad, elliptical and extremely flattened. *Chilocorus distigma* is a common species of economical importance as it feeds on red scale (*Aonidiella aurantii*) on citrus. *Exochomus flavipes* larvae prey on various pest species (e.g. the thrip *Selenothrips* and the aphid *Toxoptera*). In total five genera and 30 species belonging to this subfamily have been recorded in southern Africa.

Members of the Coccinellinae (figs 20.227–20.230, 20.232–20.236) are large typical ladybirds which are always shiny and often have bright spots. Common species are *Cheilomenes lunata* (which feeds on *Toxoptera*) and *C. propingua* (figs 20.227–20.230). *Psyllobora* species feed on fungi. *Micraspis* species are often found on grass in large numbers and it is thought that they prey on small insects such as thrips. Sixteen genera and 60 species have been recorded from southern Africa.

Coccidulinae are elongate, pubescent beetles of small or medium size. Most prey on aphids. *Rhyzobius lophanthae* and *R. satelles* were introduced from Australia in an attempt to control certain aphid and scale pests. *Mimolithophilus* and *Tetrabrachys* are of interest as they are primitive, wingless and terrestrial forms. In total seven genera and 35 species belonging to this subfamily have been recorded in southern Africa.

Members of the Noviinae are of medium size and are broad, rather flattened and densely pubescent. The pronotum is always much narrower than the elytral base. The introduced Australian species, *Rodolia cardinalis*, is an important controlling agent of the cottony cushion scale (*Icerya purchasi*) on citrus. One indigenous genus and five species have been recorded in southern Africa.

The Epilachninae (fig. 20.237) are large, pubescent beetles with 11-segmented antennae. All species are phytophagous and several are pests of cultivated crops. *Epilachna tibialis* and *E. dregei* are sporadic pests of various solanaceous plants. They migrate in late summer to high points such as hill tops where they congregate in large numbers. *Chnootriba similis* is a pest of various poaceous crops. Both adults and larvae are phytophagous – the adults usually feeding on the upper surface of the leaves whereas the larvae feed mainly on the under-surface. The larvae can be distinguished from other coccinellids by the presence of long branched spines on the dorsal and lateral surface. Four genera and about 35 species of Epilachninae have been recorded from southern Africa.

Mader (1941, 1950, 1954) published synopses of African species and more recently Pope (1957) and Fürsch (e.g. 1972) have dealt with the various groups.

## Endomychidae

Endomychids (figs 20.184, 20.185) are very small to small (1–8 mm), ovate or elongate ovate, convex or moderately flattened beetles. They may be glabrous or clothed with decumbent or erect hairs. Some species, particularly the larger ones, are colourful.

The head has a distinct frontoclypeal suture. The antennae are usually 11-segmented with a prominent three-segmented club, or may be rather robust but with a less prominent club. The pronotum has paired basal impressions (fig. 20.184). Punctuation of the elytra is confused and usually fine. The tarsal formula is 4-4-4 with the penultimate segment minute, or it is 3-3-3.

usually have grooves or carinae (fig. 20.183) or deep, seriate punctation. The antennae are ten- or 11-segmented with a 1–3-segmented club, or may gradually thicken towards the apex. The tarsal formula is 4-4-4 or rarely 3-3-3. The first three to five abdominal sternites are connate (united).

Most colydiids occur under bark, in dead wood or in plant litter. Some of them are predators of other insects.

The southern African fauna is little known but is being studied at present. Of the 1 300 species described worldwide only 23 species belonging to 11 genera are known from southern Africa.

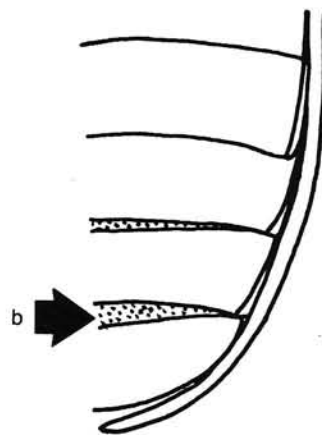
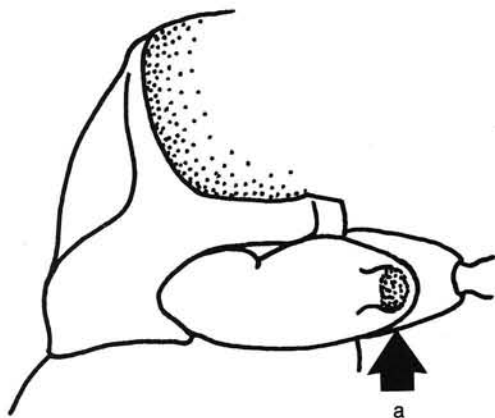
## Tenebrionidae

This is the largest family in the superfamily (figs 20.225,

20.226, 20.238–20.248; plate V: 3,4,7,8) and its members exhibit an unusually broad range of morphological diversity in all characters. However, a character combination of the 5-5-4 tarsal formula and the posteriorly closed front coxal cavity applies generally to the family, though rare exceptions occur even in these characters.

The higher classification within the family is very far from being finalized. Whilst it has long been realized that the traditional classification of Lacordaire (1857) is outdated, the results of recent investigations still cannot provide a generally accepted re-classification. Nevertheless, most authors agree upon the inclusion of the former families Alleculidae and Lagriidae in the family Tenebrionidae.

### KEY TO THE SUBFAMILIES OF TENEBRIONIDAE

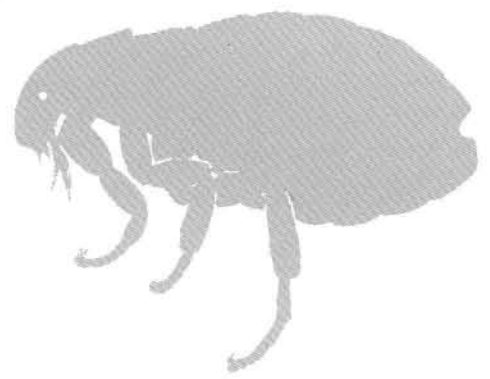
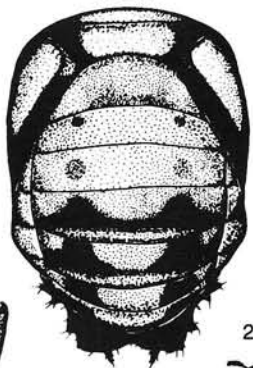


- 1 Tarsal claws comb-like, denticulate..... Alleculinae  
Tarsal claws simple ..... 2
- 2 Front coxae projecting and almost touching each other (fig. a); pronotum never margined, and dorsal surface always with erect bristles ..... Lagriinae  
Front coxae not projecting and well separated by prosternal apophysis; pronotum usually margined, and dorsal surface only rarely with erect bristles ..... 3

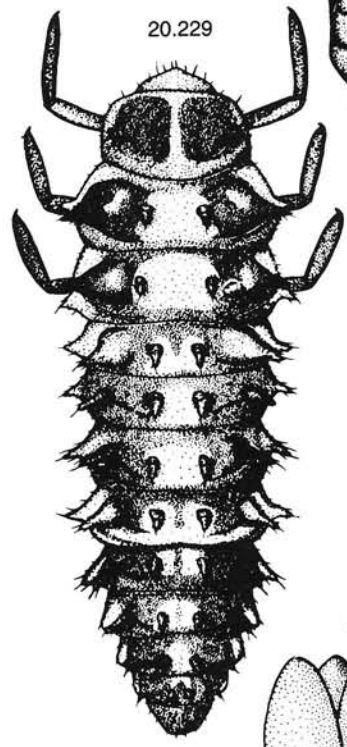
- 3 Between abdominal sternites 4 and 5 or also between 5 and 6 a soft and usually more lightly pigmented intersegmental membrane is visible (fig. b); only two small tribes, Caenocrypticini and Cossyphini, lack this membrane; aedeagus in normal position in body ..... Tenebrioninae  
No visible intersegmental membrane between sternites; aedeagus in inverted (upside down) position in the body ..... Tentyriinae

**Figures 20.227–20.237 Order Coleoptera: Cucujoidea.** Coccinellidae 20.227 *Cheilomenes propinqua* 20.228 same, eggs 20.229 same, larva 20.230 same, pupa 20.231 *Scymnus levillanti* 20.232 *Hippodamia variegata* 20.233 same, eggs 20.234 same, first-instar larva 20.235 same, mature larva 20.236 same, pupa 20.237 *Henosepilachna bifasciata* (figs 20.227–20.230 from van Rensburg 1969; figs 20.232–20.236 from van Rensburg 1976; other figs del. E. Holm)

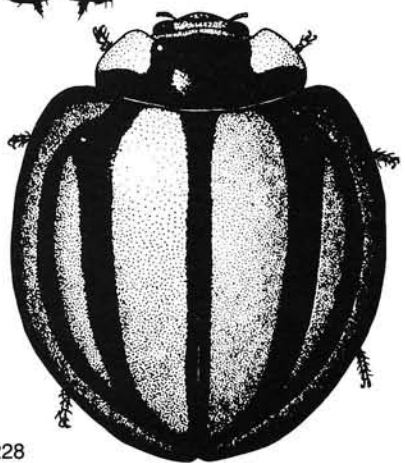
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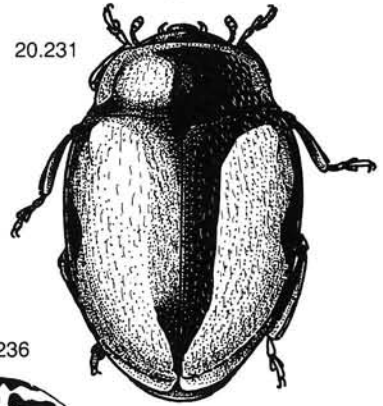
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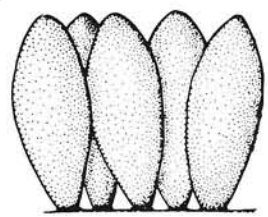
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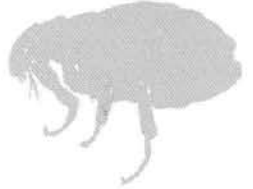
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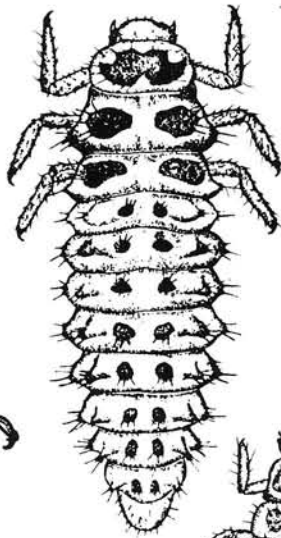
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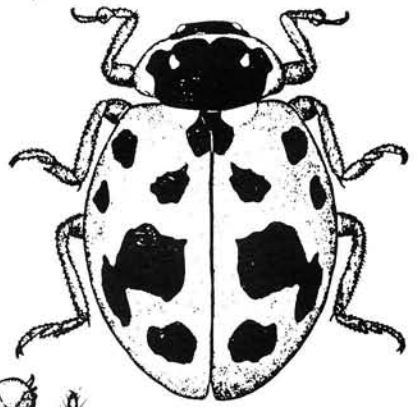
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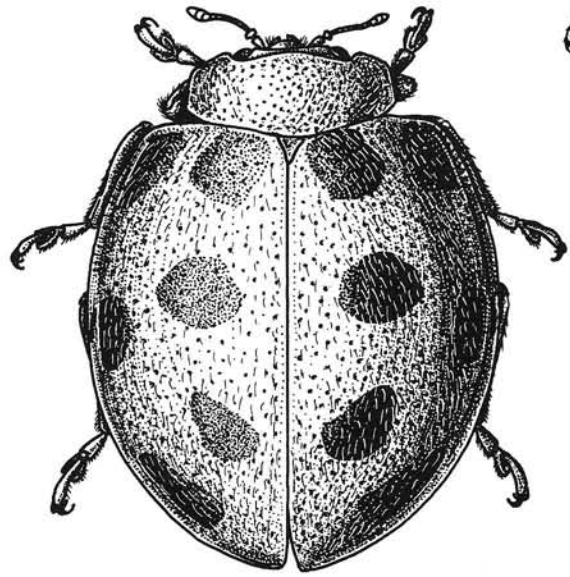
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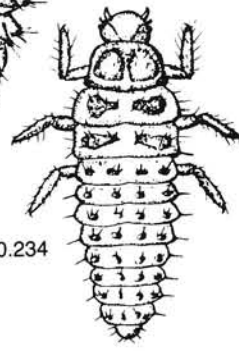
20.232



20.237



20.234



20.233

