

CALIFORNIA STATE COMMISSION OF HORTICULTURE

Injurious and Beneficial Insects



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of
California

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SUPPLEMENT
THE MONTHLY BULLETIN
CALIFORNIA STATE COMMISSION OF HORTICULTURE

INJURIOUS AND BENEFICIAL

Insects of California

(SECOND EDITION)

BY
E. O. ESSIG

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Distribution.—This species occurs to a limited extent in the more desert parts east of the Sierras in the State.

Food Plants.—The larvæ feed principally upon decayed plants and carrion, but also attack living plants, including beets (mangels and sugar), marigolds and grasses.

Control.—Clean culture and thorough cultivation will usually suffice to prevent any serious attacks from this beetle. Fall plowing and the application of poison sprays are also recommended. Control measures, however, are doubtfully profitable for this insect.

THE GARDEN CARRION BEETLE

Silpha ramosa Say¹²¹

(Fig. 195)

Description.—The beetles are rather broad and decidedly flat, dull black with a velvety sheen. The prothorax, head and body are smooth while the elytra or wing covers are very rough. The eyes are yellow. The length is slightly more than $\frac{1}{2}$ inch and the width about $\frac{5}{16}$ inch. The antennæ are short with the apical joints noticeably enlarged (Fig. 195). The larvæ are shiny black, flat and distinctly segmented, the body appearing as if covered with closely joined plates. They are from $\frac{1}{4}$ to $\frac{1}{2}$ inch long.

Life History.—The life history is practically the same as that of the beet carrion beetle (*Silpha opaca* Linn.).

Nature of Work.—The larvæ feed principally upon decomposed vegetable and animal matter, but are thought to attack the roots and foliage of plants, though this is very uncertain. The adults feed almost entirely upon carrion.

Distribution.—This is a very common beetle throughout the State, especially in damp localities.

Food Plants.—Various grasses, garden and field crops are said to be attacked by the larvæ and adults.

Control.—Control measures are not at all necessary for this insect.



Fig. 195. — The garden carrion beetle, *Silpha ramosa* Say. Female slightly enlarged. (Original)

COCCINELLIDÆ (Family)

LADYBIRD BEETLES

This family of beetles is generally considered one of the most important and beneficial of all the insects. Only one injurious plant-feeding species, *Epilachna corrupta* Muls., is said to have been found in California, while many other species are particularly noted for their predaceous habits in feeding upon scale insects (*Coccidæ*) and the plant lice (*Aphididæ*).

Eggs.—The eggs vary considerably with the different members of the family and are seldom if ever observed. Those most conspicuous

¹²¹Another carrion beetle, *Silpha lapponica* Hbst., is very common in the southern part of the State. It is much smaller than *Silpha ramosa* and is easily distinguished by the fine yellow hair which completely hides the dorsum of the prothorax.

are the salmon-colored egg masses of the *Hippodamia* spp., which are laid on ends, not unlike bunches of cigars. Others are deposited singly upon or underneath individual scale insects, in the egg-masses of mealy bugs or among plant lice.

Larva.—The young larvæ are exceedingly active and begin to feed soon after hatching. As the period of growth is short, their ability to consume food must be great, and we find them unexcelled as predators. They have rather long, pointed and flattened bodies, well developed mouth-parts and six legs. The colors are exceedingly variable, the



Fig. 196.—The signet ladybird beetle, *Hippodamia 5-signata* Kirby. Greatly enlarged. (Drawing by Birdnekoﬀ, Mo. Bul. Cal. Hort. Com.)



Fig. 197.—Leconte's ladybird beetle, *Hippodamia lecontei* Muls. Greatly enlarged. (Drawing by Birdnekoﬀ, Mo. Bul. Cal. Hort. Com.)



Fig. 198.—*Hippodamia ambigua* Lec., the unspotted form of *Hippodamia convergens* Guer. Greatly enlarged. (Drawing by Birdnekoﬀ, Mo. Bul. Cal. Hort. Com.)

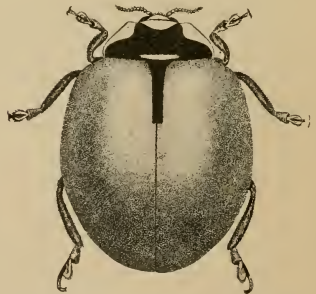


Fig. 199.—The California red ladybird beetle, *Coccinella californica* Mann. Greatly enlarged. (Drawing by Birdnekoﬀ, Mo. Bul. Cal. Hort. Com.)

bodies are hairy, some being covered with long threads of white wax. Besides the covering, they are protected by offensive secretions and are not generally preyed upon by insectivorous animals. During their growth they moult four times and when fully matured seek shelter to pupate.

Pupa.—The larvæ, not having a waxy or exceedingly hairy or spiny covering, usually hang by the tail and pupate with the head downward,

while many of the covered ones pupate within the larval skins, which give ample protection. Offensive liquids are also secreted by the pupae for protective purposes. Nearly all have the ability to move the body very rapidly when disturbed.

Adults.—The beetles emerge through slits in the pupal skins and are exceedingly active, feeding throughout their existence. In size they vary in this State from $\frac{1}{16}$ to nearly $\frac{3}{8}$ inch in length. The color of



Fig. 200.—*Exochomus californicus* Casey. Greatly enlarged. (Drawing by Birdnekoﬀ, Mo. Bul. Cal. Hort. Com.)



Fig. 201.—*Hyperaspis undulata* Say. Greatly enlarged. (Drawing by Birdnekoﬀ, Mo. Bul. Cal. Hort. Com.)

the larger species is usually showy and of many shades and combinations, but the majority are dull and inconspicuous. The males are somewhat smaller than the females and sometimes with slightly different colorations. The

winter is passed in hibernation. In some species thousands of individuals collect in the mountains in great numbers, where the winter is spent among the leaves, rocks and pine needles, under the snow. With the first warm spring weather these



Fig. 202.—The mourning *Hyperaspis*, *Hyperaspis macrens* Lec. Greatly enlarged. (Author's illustration, Mo. Bul. Cal. Hort. Com.)



Fig. 203.—*Hyperaspis spiculicola* Fall. Greatly enlarged. (Author's illustration, Mo. Bul. Cal. Hort. Com.)

emerge from the winter quarters and migrate to the lower valleys and disperse to give rise to succeeding summer generations.

The coccinellids differ from the closely related chrysomelids by having three instead of four tarsal joints and the antennae enlarged at the tips.

THE TWO-STABBED LADYBIRD BEETLE

Chilocorus bivulnerus Mulsant

(Fig. 204)

Description.—The adults are broadly oval and about $\frac{3}{16}$ inch long. The color is shiny black with two round, blood-red spots upon the elytra. The extreme margins of the prothorax are pale. The underside of the abdomen is red. The larvæ are very spiny, dark in color, with a yellow transverse band across the middle.

Distribution.—This is one of the commoner native ladybird beetles and is to be found in almost every part of the State.

Hosts.—The larvæ and adults are voracious feeders upon the pernicious or San Jose scale, *Aspidiotus perniciosus* Comst., the young of the black scale, *Saissetia oleæ* (Bern.), mealy bugs, oyster-shell scale, *Lepidosaphes ulmi* (Linn.), European or Italian pear scale, *Epidiaspis piricola* (Del Guercio), the European elm scale, *Gossyparia ulmi* (Linn.) and other scale insects.

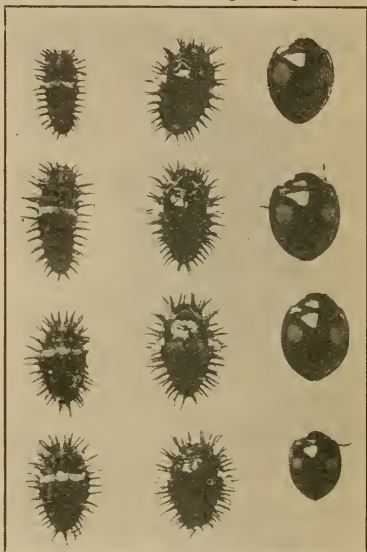


Fig. 204.—The two-stabbed ladybird beetle, *Chilocorus bivulnerus* Muls. Larvæ, pupæ and adults, enlarged slightly more than twice. (Original)



Fig. 205.—Adult of the mealy bug destroyer, *Cryptolamus montrouzieri* Muls. Greatly enlarged. (Author's illustration, P. C. Jr. Ent.)

THE MEALY BUG DESTROYER

Cryptolamus montrouzieri Mulsant

(Figs. 205, 206 A)

Description.—The adults are as large as the ordinary red ladybird beetle, but decidedly pointed posteriorly. They are black, with the head, prothorax and posterior ends of the elytra cinnamon red, and the entire body is covered with fine, light hair. The larvæ are yellow and covered with long filaments of white flocculence (Fig. 206 A). The eggs are regularly oval, very small and lemon yellow. They are deposited singly among the eggs of the

mealy bugs and are therefore very difficult to find.

Distribution.—This species was introduced into California by Albert Kœbele and is redistributed from time to time by the State

Insectary. It now occurs throughout the mealy-bug infested districts of the State.

Hosts.—This is by far the most important natural enemy preying upon the various species of mealy bugs, including *Pseudococcus citri*, *P. longispinus* and *P. bakeri*. In not a few cases it has done excellent work in controlling the citrus mealy bug.

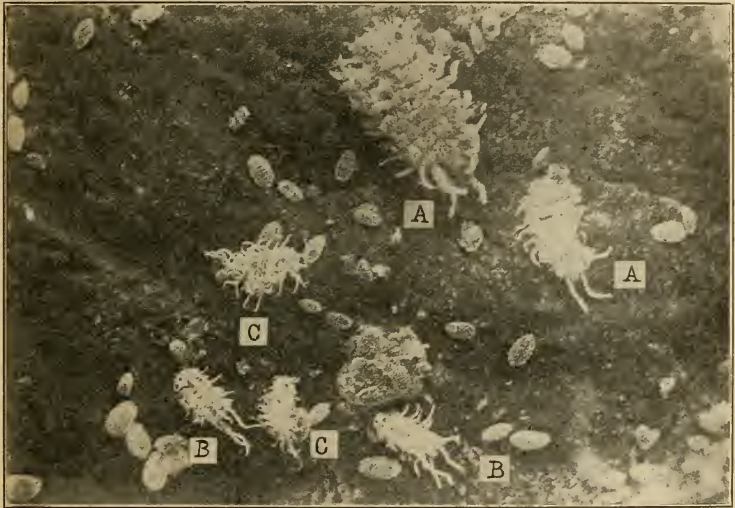


Fig. 206.—Larvæ of ladybird beetles. A, *Cryptolamus montrouzieri* Muls.; B, *Scymnus bipunctatus* Kugel.; C, *Scymnus guttulatus* Lec. (Author's illustration, P. C. Jr. Ent.)

THE COMMON BLACK-SPOTTED RED LADYBIRD BEETLE¹²²

Hippodamia convergens Guerin

(Figs. 198, 207)

Description.—This is the most common of all ladybird beetles in California and is easily distinguished by the red color and the twelve black spots on the elytra. The head and thorax are black, the latter with two narrow lateral white margins and a very small median white spot at the base. The eggs are salmon-colored and deposited in clusters not unlike bunches of cigars stood on end. The young larvæ are nearly black and exceedingly small with rather long legs. Full-grown larvæ are nearly $\frac{1}{2}$ inch long and have several reddish or salmon-colored spots on the dorsum. The pupæ vary from yellow to reddish with black markings. All stages of the beetle exist throughout the summer months and may be found almost anywhere.

¹²²The common red ladybird beetle formerly known as *Hippodamia ambigua* Leconte, is a varietal form of the above species. There are no black spots upon the wing covers, but the size, shape and other markings are identical with the spotted form. See Fig. 198.

Distribution.—This is the common ladybird beetle throughout the entire State. The adults hibernate in great colonies in the high Sierras, from whence they descend into the lowlands as soon as warm weather melts the snow in the spring.

Hosts.—All stages feed upon soft-bodied insects, such as plant lice and scale insects. The larvæ are also, at times, cannibalistic. The principal food consists of plant lice, chief of which are the melon aphid, *Aphis gossypii* Glover, the destructive pea aphid, *Macrosiphum pisi* (Kalt.), the bean aphid, *Aphis rumicis* Linn., and the woolly apple aphid, *Eriosoma lanigera* (Hausm.).

THE VEDALIA

Novius cardinalis (Mulsant)

(*Vedalia cardinalis* Mulsant)

(Fig. 208)

Description.—The beetles are slightly less than $\frac{1}{4}$ inch in length and oval in shape. The color pattern is very pronounced and striking, being



Fig. 208.—Adult female of the Vedalia, *Novius cardinalis* (Muls.). Drawing, showing the color pattern. (After U. S. Dept. Agric.)

red and black, as shown in Fig. 208. In the females red predominates, while in the males there is more black. Both sexes are covered with

fine, light-colored hair. The larvæ are often over $\frac{1}{2}$ inch long and lead-gray in color with reddish sides. They are usually covered with whitish powder from the egg-sacs of the cottony cushion scale. The eggs are a little larger than those of *Novius kœbele*, but are the same color and laid in similar places. The young feed upon the eggs and young scales and do great execution. The pupal stage is passed in the larval skin upon the leaves and limbs of the trees.

Distribution.—The Vedalia is quite common throughout the citrus-growing sections of the State. It disappears with the host and is constantly being sent out by the State Insectary. It was introduced into California by Albert Kœbele of the United States Department of Agriculture.

Hosts.—It feeds entirely upon the eggs and young of the cottony cushion scale (*Icerya purchasi*). To this beetle is accredited the salvation of the citrus industry in California, which was threatened with destruction by the above scale.

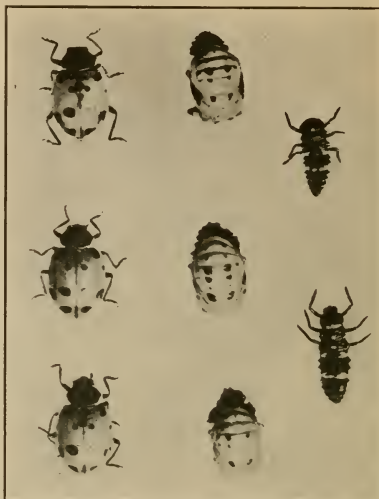


Fig. 207.—The common black-spotted red ladybird beetle, *Hippodamia convergens* Guer. Adults, pupæ and larvæ. Enlarged twice. (Original)

KÆBELE'S LADYBIRD BEETLE

Novius kabelei (Olliff)(*Vedalia kabelei* Olliff)

(Fig. 209)

Description.—The adults are smaller than those of the *Vedalia*, being not longer than $\frac{1}{8}$ inch; the males are bright red with dark markings, as shown in Fig. 209; the females are red with dark head, prothorax, and marginal spot near the middle of each wing cover. Both sexes are covered with fine,

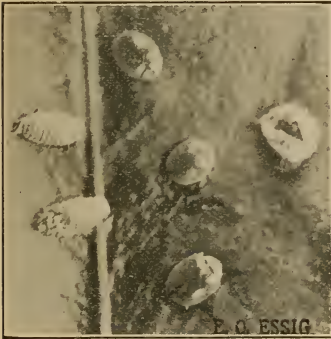


Fig. 209.—Kæbele's ladybird beetle, *Novius kabelei* Olliff. Larvæ, pupa and adults at left. Enlarged twice. (Author's illustration, P. C. Jr. Ent.). Drawing of adult male at right, greatly enlarged. (Drawing by Birdnekoﬀ, Mo. Bul. Cal. Hort. Com.)

short hairs. The larvæ are dark red and about $\frac{1}{4}$ inch long. The small, oblong, red eggs are deposited by the females on the egg-sacs of the host and hatch within a few days. The young immediately enter the egg-sac and begin feeding upon the eggs and young hatched scales. They pupate within their larval skins on the trees.

Distribution.—This beetle is found throughout the citrus-growing sections of the State. It was first introduced by Albert Kæbele.

Hosts.—This species feeds on the cottony cushion scale (*Icerya purchasi*) and is often more numerous and does greater execution than the *Vedalia*, for which it is commonly mistaken.

Lindorus lophanthus (Blaisdell)(*Rhizobius lophanthæ* Blaisdell)(*Rhizobius toowoombæ* Blackburn)

(Fig. 210)

Description.—The beetles are rather broadly-oval in shape and about $\frac{1}{8}$ inch long. The color is bright metallic black or bronze. The head and thorax are reddish-brown with a dark spot at the middle base of the latter. This species is very often confused with *Scymnus marginicollis*, but may readily be distinguished from it by the lustrous bronze color and the erect hair on the dorsum. The larvæ are light-brown in color with an elongated yellow spot on the middle of the back.

Distribution.—This species was introduced into California by Albert Kæbele and has become generally established in the central and southern parts of the State.

Hosts.—The larvæ and adults of this beetle feed upon red scale (*Chrysomphalus aurantii*), yellow scale (*Chrysomphalus citrinus*), ivy scale (*Aspidiotus hederae*), pernicious or San Jose scale (*Aspidiotus perniciosus*), purple scale (*Lepidosaphes beckii*), the citrus mealy bug (*Pseudococcus citri*) and black scale (*Saissetia oleæ*).

THE ASHY-GRAY LADYBIRD BEETLE¹²³

Olla abdominalis (Say)
(*Cycloneda abdominalis* Say)
(Fig. 211)

Description.—The beetles have a yellowish-gray ground color with many small dark spots on the dorsum. The body is of average size, being about $\frac{1}{4}$ inch long and distinctly broad



Fig. 210.—*Lindorus lophanthus* Blaisd. Greatly enlarged. Drawing by Birdnekoﬀ, Mo. Bul. Cal. Hort. Com.)

or almost hemispherical in shape. The eggs are light orange-yellow and laid on end in clusters much the same as those of the *Hippodamia convergens* Guer. The larvæ vary from $\frac{1}{2}$ to $\frac{3}{4}$ inch in length, are dark with yellow spots on the sides and dorsum. The pupæ are gray with dark spots on the back and large dark blotches on the sides and ventral surface.

Distribution.—This species occurs throughout the State, but is more abundant in the central and southern parts, especially in the coast counties from Santa Barbara south.



Fig. 211.—The ashy-gray ladybird beetle, *Olla abdominalis* (Say). Male and female. Enlarged nearly three times. (Original)

Hosts.—The walnut plant louse is a favorite host of this beetle and is often almost entirely subdued by it. Other lice are also attacked.

THE STEEL-BLUE LADYBIRD BEETLE

Orcus chalybeus (Boisduval)

(Fig. 212)

Description.—The adult is metallic, steel-blue or green in color, almost hemispherical in shape and between $\frac{1}{4}$ and $\frac{3}{16}$ inch in diameter.

¹²³The eyed ladybird beetle, *Olla (Cycloneda) oculata* Fab., is a dark form of this species. The adults are broadly rounded, 3-16 inch long and three fourths as wide. The head is pale; the pronotum black with pale margins; the wing covers are black with a large, irregular red or orange-colored spot near the middle of each. The ventral surface of the head and thorax and the bases of the legs are black, while the tips of the legs and the posterior end of the abdomen are pale. *Olla plagiata* Casey is also a synonym of *Olla abdominalis* Say.

In the male the front tip of the pronotum is yellow. The posterior half of the abdomen in both sexes is dull red. The larva is light yellow or amber with dark head and dark markings on the dorsum of the thorax and abdomen, as shown in Fig. 212. The spines are long, forked and black. The length when full-grown is nearly $\frac{3}{8}$ inch. The pupa greatly resembles the larva in color, but is distinctly wider. The eggs are elongate with pointed ends and with a noticeable projection of secretion on the apical end. They are light yellow and laid in loose clusters, attached by one end.



Fig. 212.—The steel-blue ladybird beetle, *Orcus chalybeus* (Boisd.). Larvæ, pupæ and adults, enlarged three times. Specimens collected at Carpinteria by C. W. Beers. (Original)

almost entirely confined to the districts around Barbara County, where it is well established. It was introduced into California by Albert Kæbele.

Hosts.—This beetle feeds upon many armored coccids, including red scale (*Chrysomphalus aurantii*), yellow scale (*Chrysomphalus citrinus*), *Chrysomphalus rossi*, purple scale (*Lepidosaphes beckii*), pernicious or San Jose scale (*Aspidiotus perniciosus*) and black scale (*Saissetia oleæ*).

THE STRIPED LADYBIRD BEETLE

Paranemia vittigera (Mannerheim)
(*Megilla vittigera* Mannerheim)

(Fig. 213)

Description.—The beetles vary from straw or light pink to almost bronze and have black heads, legs, two black irregular blotches on the prothorax and three black longitudinal stripes on the wing covers. They are about $\frac{1}{4}$ inch long.

Distribution.—The adults hibernate in quite large colonies and are found in most sections of the State, especially in the southern part.



Fig. 213.—The striped ladybird beetle, *Paranemia vittigera* (Mann.). Enlarged three times. (Original)

Distribution.— This species was originally distributed throughout the entire southern part of the State, but is now around Carpinteria, in Santa

They seem to prefer damp places and are usually common in sugar beet fields. At Oxnard, California, the writer found this beetle in great numbers.

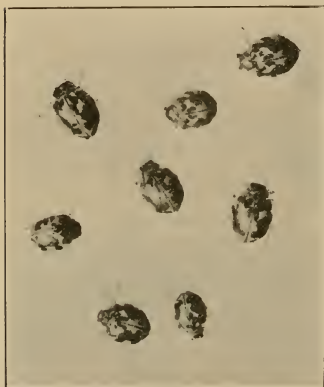
Hosts.—This species feeds upon root lice, like the beet root aphid (*Pemphigus betæ*) and other soft-bodied insects.

THE SMALL GRAY LADYBIRD BEETLE

Psyllobora tadata Leconte

(Fig. 214)

Description.—The adults vary from light cream-color to gray and are mottled with fine irregular brown spots, giving a salt and pepper effect. They are oblong and very small, scarcely exceeding $\frac{1}{8}$ inch in length. The larvæ are light gray or straw-colored and about $\frac{3}{8}$ inch long. All stages are exceedingly active.



Distribution.—This is a native species common throughout the entire State.

Hosts.—The young and adults feed upon young coccids and especially upon mites, and may be found in great numbers in the citrus orchards in the southern part of the State. Mr. Geo. P. Weldon observed the beetles devouring the red spider in the apple orchards of Humboldt County.

Fig. 214.—The small gray ladybird beetle, *Psyllobora tadata* Lec. Enlarged three times. Specimens collected at Ventura by S. H. Essig. (Original)

THE BLACK LADYBIRD BEETLE

Rhizobius ventralis Erickson

(Fig. 215)

Description.—The adults are smaller than those of the common red ladybird beetle, rather oval in shape, black and covered with fine, erect hairs which give them a grayish appearance. They are about $\frac{1}{4}$ inch long. The abdomen is salmon-colored. The larvæ are dark brown or black and covered with many spines.

Distribution.—This beetle occurs throughout the entire State where the black scale is at all common. It was imported by Albert Kæbele, especially as an enemy of black scale (*Saissetia oleæ*).

Hosts.—The larvæ and adults feed upon the young and eggs of the black scale (*Saissetia oleæ*), the hemispherical scale (*Saissetia hemispharica*), various mealy bugs (*Pseudococcus* spp.) and many of the armored scales.

Scymnus guttulatus Leconte

(Fig. 216)

Description.—The adults are oval-elongate in shape and scarcely $\frac{1}{8}$ inch in length.

The general color is black, mottled with reddish-brown, as shown in Fig. 216. The body is covered with fine, short hair. The larvæ are about $\frac{1}{4}$ inch long with yellow bodies, which are entirely covered with long, white, cottony filaments. The nymphs remain in the old

larval skins in secluded quarters throughout the pupal stage.

Distribution.—This is a native species, occurring throughout the entire State, especially upon oak trees. It has often been distributed by the State Insectary.

Hosts.—The larvæ and adults work upon various native mealy bugs as well as upon the citrus mealy bug (*Pseudococcus citri*) and the long-tailed mealy bug (*Pseudococcus longispinus*).

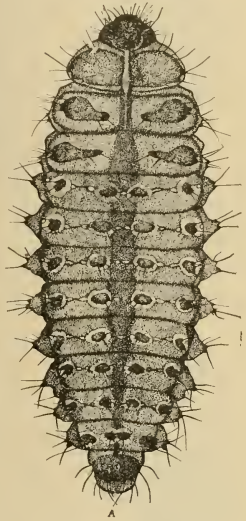


Fig. 215.—The black ladybird beetle, *Rhizobius ventralis* Er. Larva and adult, greatly enlarged. (Author's illustration, P. C. Jr. Ent.)



Fig. 216.—*Scymnus guttulatus* Lec. Adult female, enlarged five times. (Author's illustration, P. C. Jr. Ent.)

THE MARGINED SCYMNUS

Scymnus marginicollis Mannerheim

(Fig. 217)

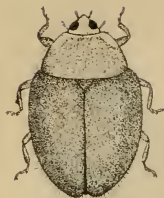


Fig. 217.—The margined Scymnus, *Scymnus marginicollis* Mann. Adult female, enlarged ten times. (Author's illustration, P. C. Jr. Ent.)

Description.—The adults are small dull-black beetles with reddish prothorax and head. On the prothorax there is a black spot at the base in the males and which occupies nearly the entire base in the females. It is less than $\frac{1}{8}$ inch long and distinguished from *Lindorus lophanthus* by its dull color, the latter being shiny.

Distribution.—This is a native species common throughout the entire State, especially along the coast.

Hosts.—The beetle feeds upon many species of aphids and coccids, and is especially destructive to the perniciosus or San Jose scale in the north and to the red scale and purple scale in the south.

THE CLOUDY SCYMNUS

Scymnus nebulosus Lecoute

(Fig. 218)

Description.—The beetles are exceedingly small, being less than $\frac{1}{8}$ inch in length. They are somewhat elongated in shape and vary from light to dark brown in color, with indistinct dark markings. The larvæ are covered with long, white, cottony filaments.

Distribution.—The cloudy Scymnus occurs throughout the central and southern parts of the State.

Hosts.—The writer has collected the larvæ of this species in large numbers in the canyons of Ventura County, where they were feeding upon a small native plant louse (*Eichochaitophorus populifolii* Essig). Quayle reports it as feeding upon red and purple scale. It also preys upon various species of mealy bugs, doing effectual work upon the citrus species (*Pseudococcus citri*).



Fig. 218.—The cloudy Scymnus, *Scymnus nebulosus* Lec. Adult, enlarged five times. (After Quayle, Cal. Agrcl. Exp. Sta.)

THE SMALL BROWN LADYBIRD BEETLE

Scymnus sordidus Horn

(Fig. 219)

Description.—This is a very small light brown beetle, scarcely more than $\frac{1}{8}$ inch long and covered with light-colored pubescence. The eggs are very minute and deposited in suitable feeding grounds. The larvæ cover themselves with a thick coat of long, white, waxy flocculence and greatly resemble mealy bugs. Though small they are voracious feeders, especially upon the smaller species of plant lice and upon young scale insects. The pupæ are formed within the old larval skins.

Distribution.—The beetle occurs throughout the entire State, but is more abundant in the south.

Hosts.—This species preys upon mealy bugs, the young of the armored scales, plant lice, including *Aphis gossypii* Glover and other

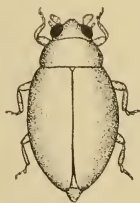
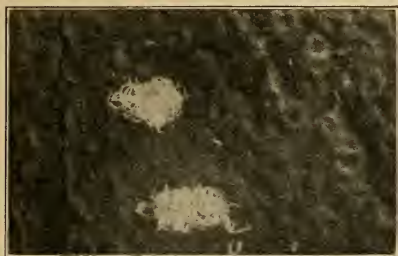


Fig. 219.—The small brown ladybird beetle, *Scymnus sordidus* Horn. Larvæ at left, enlarged twice; adult female at the right, enlarged ten times. (Author's illustration, P. C. Jr. Ent.)

soft-bodied insects. Large numbers of these ladybird beetles are to be found in the citrus groves of the southern coast counties.

THE MINUTE BLACK LADYBIRD BEETLE

Stethorus vagans (Blackburn)

(*Scymnus vagans* Blackburn)

(Fig. 220)

Description.—This is one of the smallest species and is seldom observed by the average orchardist, though often quite abundant upon the trees. The adults are shiny black, oblong and scarcely $\frac{1}{16}$ inch long.

Distribution.—This beetle was imported from Australia by Geo. Compere and is quite generally distributed throughout the southern part of the State.

Hosts.—The minute black adults may be easily observed feeding upon small mites and red spiders. They are often abundant in citrus orchards, devouring the citrus red spider (*Tetranychus mytilaspidis* Riley), the two-spotted mite (*Tetranychus telarius* Linn.) and the red spider (*Bryobia pratensis* Garman).



Fig. 220.—The minute black ladybird beetle, *Stethorus vagans* (Blackb.). Adult, enlarged fourteen times. (Author's illustration, Mo. Bul. Cal. Hort. Com.)