NOTES ON SOME COCCINELLIDAE (COL.) FROM ISLANDS IN THE INDIAN OCEAN.

By DESMOND VESEY-FITZGERALD.

Rodolia chermesina, Muls.

This species is found on most of the islands of the Seychelles archipelago including the sand cays of the Amirantes group. It is said to have been introduced about sixty years ago to prey on the Coccid pest *Icerya seychellarum,* which is reported to have been the most serious pest of coconuts in the Colony at that time. The *Icerya* is the only prey of *R. chermesina,* and the latter has evidently kept the former in check on coconut but is unable to prevent occasional damage being done to fruit and other trees. The plants most frequently damaged by *Icerya* are:—Jak fruit, bread fruit, banana, avocado, citrus and forest tree seedlings, notably *Eucalyptus, Albizzia* and *Casuarina.* On certain islands where *Rodolia* is not present *Icerya* still occasionally damages coconut. *Vedalia cardinalis,* the famous predator of *Icerya purchasi,* also feeds on *Icerya seychellarum* in captivity, but, to date, liberations have failed to establish this species in Seychelles. Hence *R. chermesina* remains the most effective known predator of *I. seychellarum* under Seychelles conditions. No parasites are known from *R. chermesina* in Seychelles, but the black ant, *Technomyrmex albipes,* which constantly attends *Icerya* in large numbers, drives away the Coccinellid.

Life-history.

The egg.—Elongate oval, rather less than 1 mm. greatest length ; colour reddish orange. The chorion is evenly covered with regular fine impressions. The eggs are laid singly or in pairs, or in irregularly arranged groups of larger numbers. They usually lie on one side, and may be exposed on a leaf, hidden under the host, or placed inside empty skins ; or they may be actually laid on the body or in the waxen tail-tuft of the living *Icerya.* The egg hatches four days after oviposition. The newly hatched larva is very active, but the fourth-stage larva is sedentary and remains anchored amongst its prey by the suction-pad situated at the tip of the abdomen. The larva feeds by sucking the body-juices of its host. A large *Icerya* attacked by a small *Rodolia* larva may recover, the wound becoming closed by a yellow scab. The first change of skin takes place after 2–3 days, the second in a further 3–4 days and the third in another 2–3 days. The fourth-stage larva is of a dark purple colour, but the whole of the body, except the centre of the ventral surface of the abdomen, is thickly covered with a glaucus " bloom " so that the living larva appears greyish. Length 6·5 mm. The body is soft and obese, the back strongly arched. Dorsal prothoracic sclerites feebly chitinised, pigmented along their inner edges and together forming a flattish shield. The meso- and metathoracic sclerites are represented by lateral, flat, lightly pigmented and slightly chitinised, thumb-mark-shaped areas. On each side of the meso- and metathoracic segments are a pair of rather short finger-like tubercles. The dorsal tubercles of these segments are vestigial. On each of the first eight abdominal segments are six tubercules arranged in a paired median, lateral and an intermediate series. Those of the median and intermediate series are simply small knobs ; those of the lateral series are finger-like, becoming progressively shorter towards the tip of the abdomen. The ninth segment, which is the last one visible, is unarmed.

When the larva is full-fed it becomes quiescent. This prepupal stage lasts two to three days and then the larva changes into a pupa. The pupae occur scattered

about over the food-plant of the prey, there is never any clustering of the larvae prior to pupation.

The pupa is pinkish coloured. This colour is actually located in the body of the insect within the pupa, since the perfect insect emerges from the pupa fully pigmented, while the actual skin of the pupa is of a semi-transparent dirty yellow colour. The pupa is enclosed in the grey larval skin, which splits down the centre of the back exposing the back of the pupa. The pupal period lasts one week.

The male and female are similar in appearance, they are ready to copulate within two days after emerging from the pupa. The first eggs are laid four days after the female has emerged from the pupa. The adult life lasts at least five to eight weeks. In the case of one pair kept under observation the male lived 35 days and the female 43 days. During a period of 16 days the female laid 150 eggs, the greatest number recorded for any one day being 28. A second pair survived captivity for 57 days, after which they were lost. During a 27 day period 311 eggs were laid, which gives an average of 11·5 a day. The greatest number actually noted for one day was 22.

Feeding Habits of Exochomus flavipes.

This species was last year introduced into the Seychelles proper, but it already occurred in some of the southern coral islands of the Aldabra Group. *E. flavipes*, Th., preys on soft scales and mealybugs, such as *Lecanium* spp., *Pulvinaria* spp., and species of *Pseudococcus*. In this connection it is worth recalling that in an earlier publication (Bull. Ent. Res., **29,** p. 186) it was forecasted that *E. flavipes* was a predator of this group on " colour pattern " grounds, although at that time the species had only been found associated with APHIDAE.

Under stress of circumstances this species shows particular aptitude for feeding and even breeding on a wide range of prey, and it seems likely that this habit has some bearing on its survival on small oceanic islands. *E. flavipes* was found to be abundant, for example, on Wizard Island, Cosmoledo, in 1937. This island is a narrow wind-swept strip of land situated on an atoll reef. Among the few trees present were several *Pisonia grandis*, which is a common host-plant of a Coccid, *Pulvinaria* sp. The *Exochomus* had lately been feeding on this scale but had apparently completely finished it up. At the time the island was visited, therefore, a fairly big population of adult beetles was present, but none of their normal host scales were in evidence. The beetles were, however, found feeding on an undetermined scale on *Tournefortia* and on *Chionaspis inday* on leaves of coconut. Both these scales belong to the subfamily DIASPIDINAE, a group normally neglected by *Exochomus*. No larvae were found associated in either case with these scales. Of greater interest was the fact that several of these beetles were attracted to light at night, and these began to feed on the corpses of numerous small Diptera which had fallen exhausted on a white table-cloth. This rather aberrant feeding habit has recently been encountered again in very different circumstances. At Tananarive, the capital of Madagascar, there is a small islet in the middle of an ornamental lake. A low hedge surrounds the islet and upon the foliage of this large number of CHIRONOMIDAE were resting during the daytime. Large numbers of both adult and larval *E. flavipes* were present on the hedge and both forms were taken feeding on the adult CHIRONOMIDAE. Moreover, a careful search failed to reveal any sign of COCCIDAE, so it is certain that the beetles were entirely dependent on this source of food and probably had been for some time past. The larva feeds by sucking-up the body juices of its prey. Thus if a gnat was crushed, the Coccinellid larva was content to drink the exuding juices and it did not consume the corpse.