Notes on Mosquitoes, Sand Flies and March Flies in the Carnarvon Gorge area. Qd. Nat. 16:106-111

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In a nest in a tree in a neighbour's garden, peewees reared young as late as late in the season as May, most probably in the same nest as an earlier brood. Seven days elapsed between the hatching of the first and the fifth chick. The first one was becoming feathered and active by the time the last, one broke out of its protective shell.

How the dove manages to prevent its eggs from rolling out of the poorly constructed flat platform it makes for a nest is a mystery to me. A few years ago a young bird fell out of a nest in the Queensland nut, and when found could not, or would not, move. A warm nest of shredded wool was formed round and under it, and it was fed a tiny drop of water but refused food. It sat there motionless for some hours, but before dusk managed to muster sufficient strength to fly to a low branch of the nearby custard apple. In the morning there was no sign of it. Some time later, a dove with a deformed leg was seen on several occasions round the garden, and we wondered if it were the victim of the fall. The deformed leg did not impair its flight.

The mistletoe on the flowering peaches is visited by the mistletoe bird, which feeds on the berries, rejecting seeds, which it wipes off its beak on to the bark of a branch. Being provided with a sticky covering, the seed adheres to the bark and remains in position till it germinates. The root penetrates the bark of the host tree and fuses with its growing tissues, thereafter drawing its necessary requirements of water and dissolved minerals from the host plant.

Orange blossom time in August brings an occasional scarlet honeysuckle to feed on the nectar in the flowers. It is a shy bird in comparison with its cousin, the white-plumed honeysuckle, which frequents my garden in numbers every winter when the echeverias bloom from May to August. The five-foot-high echeveria stems scarcely bend under the weight of this tiny olive green fellow with the small white patches on the sides of its head. Often it takes its sip of nectar hovering upside down. It also has a fancy for the purple velvety flowers of Salvia leucanthus which flowers in May and June.

And so I could go on and on, but have said enough to prove that a Naturalist finds very much of interest in a garden besides the plants. The relationships which exist between plant and animal life are illustrated in great variety. So, use your garden, Naturalists, and find delight in what you discover.

NOTES ON MOSQUITOES, SAND FLIES & MARCH FLIES IN THE CARNARVON GORGE AREA

By ELIZABETH N. MARKS

Carnarvon Gorge, on the upper reaches of Carnarvon Creek, lies 250 miles W.N.W. of Brisbane. It seems far west to dwellers in this city, but a glance at the map shows that it is on the eastern slope of the Great Dividing Range, and due south of the coastal town of Bowen. The gorge is in the southern part of the 66,480 acre Carnarvon National Park. Although this area is commonly spoken of as the Carnarvon Range, the latter is a spur running eastwards from the Dividing Range about 8 miles S.E. of the southern tip of the Park.

In the vicinity of the gorge, the range consists of sandstone, capped with basalt, rising to a height of about 3000 ft. above sealevel.
It is deeply dissected by many streams flowing through gorges, some of them extremely narrow, with vertical or over-hanging cliffs several hundred feet high. In these gorges there grow cabbage-palms, macarazamias and figs, as well as eucalypts and casuarinas, providing quite a different habitat from that of the open eucalyptus forest country to the east.

The rocky sandstone hills and cliffs provide many shallow caves and shelters from overhanging rock faces. Evidence of their occupation by aborigines remains on their walls in ochre outlines of hands and, in some cases (notably the Art Gallery and Cathedral Caves in Carnarvon Gorge), more elaborate paintings and carvings. This country must have been a happy home for the natives with its good shelter, permanent water, and plentiful fish and goannas.

Biologists are interested in the affinities shown by the flora and fauna of this area with those of other parts of Australia. These may perhaps give indications of present or recent continuity of habitat with areas further north or south, or, if distinctive species are found only in this place, may indicate isolation from similar habitats at some period. Visitors to the Carnarvon National Park may have a more personal interest in the blood-sucking Diptera that occur there. The present list can only be regarded as a sample, and further collections would be of interest.

The following notes are based on mosquito collections made by Mr. J. L. Wassell in May, 1948, in the Moolayember and Rougemont Gorges, and by Mr. F. A. Perkins in May, 1954, at Carnarvon Gorge, and on mosquitoes, sand flies and March flies that I collected in January-February, 1962, as a member of the University of Queensland Carnarvon Scientific Expedition, which spent 4 days at Carnarvon Gorge. I am indebted to the organisers of this expedition for the opportunity to collect there. Dr. I. M. Mackerras has kindly provided identifications and notes on Tabanidae and Simuliidae.

Except where stated, the specimens listed are from Carnarvon Gorge. In 1962 two traps were used in insect collecting, a battery-operated New Jersey light trap with light and suction fan, and a Malaise trap, a large stationary net slung between two trees; both were set up on the creek bank near the C.W.A. hut, at the mouth of the gorge.

**Species collected.**

**MOSQUITOES - CULICIDAE.**

**Anopheles pseudostigmaticus** Dobrotworsky. Larvae in shaded side pools and amongst dense algal growth in main creek, and in rock pool in gully (Perkins). As larvae of the typical form and form **corethroides** Theo. cannot be distinguished it is uncertain which occurs here. Very rarely bites man.

**Anopheles annulipes** (Walker). Larvae in grassy spring near Moolayember Dip (Wassell); side pools and margin of main creek with weeds and algae, pools in tributary creeks, some with iron bacteria (Perkins, Marks). Adults resting in crevices at foot of cliff, near small spring, Moolayember Gorge (Wassell); biting outdoors 7.30-8.00 p.m., in light trap, and resting in fire-blackened hollow tree by stream (Marks).

**An. annulipes** prefers to feed on cattle but it is likely that campers at the gorge usually will find some biting at night.

**Anopheles amictus amictus** Edwards. Larvae in sunlit grassy roadside pools about 4 miles east of gorge; adults in light trap (Marks). Bites man, but may not penetrate far into the gorse, as its breeding places are outside, where there are plentiful blood-sources.

**Uranotaenia sp.** Larvae in pool with iron bacteria in a tributary
stream; adults resting under banks and rocks close by and in light trap (Marks). Larvae always associated with iron bacteria. Not known to bite man.

_Aedes rubeithorax_ (Maequart). Larvae in rocky side-pools, and in rock holes in boulders (Perkins, Marks). Adults resting in crevices, Mooyalymber Gorge (Wassell), biting in Art Gallery cave 9.45 a.m. and in small cave 4.00 p.m. (Marks).

_Aedes mullisoni_ (Taylor). Larvae not certainly distinguishable from _Aedes rubeithorax_ in early instars, probably in the same breeding places. Adults biting in Art Gallery cave 9.45 a.m. and in small cave 4.00 p.m. (Marks). Previous Queensland records only from the south-eastern corner of the state, between Glasshouse Mts. and Stanthorpe, also occurs in N.S.W. and Vic.

_Aedes notoscriptus_ (Skuse). Larvae in cavity in bottle-tree (Brachychiton sp.), Mooyalymber Gorge (Wassell); in rock holes in boulders, and in roof-gutter of hut (Marks). Adults in Malaise trap, biting in hut 8.00 a.m., outdoors 11.00 a.m. and 7.30-8.00 p.m., and in Art Gallery cave 9.45 a.m.


_Aedes purpureus_ (Theobald). Adults in light trap and Malaise trap (Marks). Breeds in tree holes, rarely bites man.

_Culex cyrtodenticus_ Theobald. Larvae in rocky side pool of main creek (Perkins) and in small leafy pools in bed of tributary (Marks). Adults resting in crevices, Mooyalymber Gorge (Wassell), under rocks (Perkins), under creek bank and in light trap (Marks). Some times bites man.

_Culex_ (Lophoceratomyia) sp. Larvae in deep water-worn rock pool, sunlit for very short period daily, Rougemont Gorge, Mt. Carnarvon (Wassell). The single bred adult shows this to be very distinct from other known species of the subgenus. No other specimens known.

_Culex pseudomelanconia_ (Theobald). Larvae in rocky side pool of main creek, adults resting under rocks (Perkins). Not known to bite man.

_Culex amnirostris_ (Skuse). Larvae in weedy margins and side pools of main creek, and in grassy roadside pools. Adults biting in hut 8.00 a.m., amongst thick casuarinas beside creek 3.40 p.m., outdoors 7.30-8.00 p.m., and in light trap (Marks). This was the commonest biting species near the mouth of the gorge and is likely always to be present along the main creek.

_Culex stargene_ Stone & Knight. Larvae in main creek with heavy growth of algae, and in small side creek (Perkins). Bites man but not a troublesome species.

_Culex pipiens australiensis_ Dobrotworsky and Drummond. Larvae in grassy spring near Mooyalymber Dip; adults resting in crevices, Mooyalymber Gorge (Wassell). Rarely bites man.

_SAND FLIES -- SIMULIIDAE._

_Austrosimulium pestilens_ M. and M. A single female biting amongst thick vegetation on creek bank at dusk (Marks). This species, the Dawson River Sandfly, is a great pest in western Queensland after the floods, and was biting fiercely on the banks of the Condamine R., west of Dalby, on the trip out.

_Simulium_ sp. of _clathrium_ group. Larvae attached to _Myriophyllum_ in very fast running water in main creek (identified from reared male). Species of this group apparently seldom bite man.
SAND FLIES—CERATOPOGONIDAE (Adults only).

Culicoides bunrooensis Lee and Reye. In light trap. The only published records for this species are from the area between Texas, Q., and Moree, N.S.W.


Atrichopogon 2 spp. Resting under creek bank and boulders.

Lasioheca townsvillianensis (Taylor). Biting in sun on creek bank, midday, and in small cave 4.00 p.m. Common biting in the bush in Queensland coastal districts and south to Sydney; Chinchilla is the nearest published record.

SAND FLIES—PSYCHODIDAE (ADULT ONLY).

Phlebotomus sp. In light trap. Phlebotomus are rarely collected in Queensland and nothing is known of their habits.

MARCH FLIES—TABANIDAE (Adults only—all these species are known to bite man).

Scaptia subappendiculata (Macq.). In Malaise trap. Previous known range was Mt. Tamborine, Q., to Cole Vale, N.S.W.

Scaptia subdana (Walk.). Attracted to man near Cathedral Cave, 11.30 a.m. Widespread from Canberra to Herberton and on the coast.

Cylidomyia cyanea (Wied.). Attracted to man, dusk. Known from central coastal Queensland to northern rivers of N.S.W. Its nearest Australian relative breeds in rot-holes in casuarinas.

Dasypasis moretonensis (Ferg. and Hill). Biting in small cave 4.00 p.m. A new record of a rare species found in south-eastern Queensland.

Discussion

Apart from the unique Culex sp., all the mosquitoes listed occur in or near Brisbane, and all except A. nilsoni, A. auridorsum, and perhaps C. pseudomelanocoma (a northern record of which needs confirmation) occur on the Atherton Tableland, or in other parts of north Queensland. Species such as A. rubrithorax, which breeds mainly in rock pools, or An. pseudostigmaticus, which requires cool, clean water, give a better indication of faunal relationships than such species as An. annulipes, A. notoscriptus, or C. annulirostris, which can inhabit a variety of breeding places. One can say that the mosquito fauna of the Carnarvon Gorge indicates that there is a continuity of distribution of species through the inland parts of the Great Dividing Range between the more coastal sections to the north and south. A. nilsoni and the Tabanidae S. subappendiculata and D. moretonensis suggest that this area is near the northern limits of distribution of some species, but there is no indication from the records examined here that it is the southern limit of any species.

It is tempting to theorise about the isolation of Culex sp., so different from its nearest relatives, but more evidence than a single collection is needed. I would urge naturalists to look in rocky, shaded creeks for pools similar to that described by Mr. Wassell, particularly those away from coastal rain-forest, and to collect any mosquito larve, pupae, or adults that they find there.

The 1962 collections were made during a very wet summer, when mosquito and sand fly infestation might be expected to be at its height, yet these insects were no more than a slight nuisance at the Gorge. This suggests that they are unlikely to occur there in plague proportions at any time. It is probable, however, that those species that were taken biting will always be present, and may at times be sufficiently troublesome for nets or repellent to be needed by campers at night.
Since the area is still in its natural state, it is safe to conclude that the same species were present and fed on the aborigines. In a small cave on the knoll behind the hut, there were ochre paintings of children's hands. Sitting in it, I was bitten by A. rubrithorax, A. milsoni, L. townsvillensis and D. moretonensis, and visualised those dark children, as they painted, being bitten by the same species. Numerous A. rubrithorax, A. milsoni, and A. notoscriptus were biting, flying, or resting in the Art Gallery Cave. It is interesting that these three species breed in rock pools. Breeding places are of course selected by the ovipositing female, and adults perhaps have a general preference for resting on rock surfaces.

Among the mosquitoes collected, An. annulipes can carry malaria, but it is unlikely that this occurred in the aboriginals. C. annulirostris can carry Murray Valley encephalitis, and is thought to be the species chiefly involved in spreading it during occasional epidemics; this is probably the only way in which blood-sucking flies of the Carnarvon Gorge might seriously have influenced the life of the natives there.

**OBITUARY**

James Cossar Smith

The Queensland Naturalists' Club had always been a friendly group of people interested in natural history, and though some of them were distinguished in special branches of science, their common bond was their enjoyment of the bush and of the monthly gatherings where their finds on excursions were discussed, and where those with more specialized knowledge gave lectures, often of a very informal type. Into this circle in 1918 came our friend, Cossar Smith. He was a tall, quietly spoken young man who thoroughly enjoyed the Club's outings and meetings. He found himself in congenial company, and though not delving deeply into any one branch of natural science, was a welcome member of any group whether its interests were specialized or based only on a love of the bush. It was at one of the Club's weekend camps, at Cedar Creek near Samford in May, 1920, that he met his future wife, Louisa Wilkie, who was attending her first excursion. They were married four years later.

In 1921 he became Honorary Secretary and held the position for two years. In 1924 he was appointed Vice-President, but being of a quiet and retiring disposition, he did not proceed to the chair. Instead he became Excursion Secretary for two years and subsequently gave sterling service on the Council of the Club until 1929 and in 1946-48.

In private life he was a process engraver. He had joined the firm of Murray Fraser in 1902 as an apprentice, but owing to ill-health spent some time in the country. After a holiday on his uncle's pineapple farm, he bought one of his own at Woombya. In 1918, at the age of 30, he returned to Brisbane and rejoined Murray Fraser's as a junior partner. Here he stayed until 1922, and this is the period during which he was most actively associated with the Club. Then he returned to pineapple farming for six years at Rochedale. He was made a life member of the Queensland Naturalists' Club in 1933. From then to 1954, when he retired to Maroochydore, he continued to work as a process engraver.

Until ill-health in the last two years prevented him, he often attended excursions and Easter camps, earning there the affectionate regard of a younger generation of naturalists as well as his own. At one of these camps he took the photograph of his friends that appears in this journal.