

The NORTH QUEENSLAND NATURALIST CAIRNS

Journal of

NORTH QUEENSLAND NATURALISTS CLUB
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Founder President: The late Dr. HUGO FLECKER
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OBJECTS: The furtherance of the study of the various branches of Natural History and the preservation of our heritage of Indigenous fauna and flora.

MEETINGS: Second Tuesday of each month at Cairns Education Centre, Cnr. Morehead and Lazarus Sts., Bungalow, 8.00 p.m.

FIELDS DAYS: Sunday before meeting. Notice of place and time given in "Cairns Post".

SUBSCRIPTIONS: (Due September 30th)		
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Each author is responsible for the opinions and facts expressed in his or her article.

THE ASSOCIATION OF AUSTRALIAN NATURALISTS
1980

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MYOTIS ADVERSUS AT BLOOMFIELD

by Martyn Robinson.

During a recent field trip to North Queensland an adult female Myotis adversus was accidentally caught from a creek near Bloomfield (Lat. and Long. 24° 13, 151° 20) on 18 January 1979.

McKean and Hall (1965) record this species as also occurring from Mossman River, Cairns and Lake Barrine in Northern Queensland.

This specimen was subsequently weighed, measured, photographed and released unharmed. The measurements are listed below

Weight	12 grams	Hindfoot	10.5 mm
Snout - vent	51.7 mm	Ear	12.5 mm
Tail	42 mm	Wingspan	285 mm
Forearm	39.4 mm		

Later observations by torchlight revealed that this species was apparently quite common both in the Helenvale - Bloomfield area and around Mossman. In all observed cases they were associated with calmer stretches of fresh water passing through, or in close proximity to sections of steep rocky bank.

The bats were easily watched by torchlight, often flying within a metre of anyone standing quietly in suitable stretches of water. They quartered the water's surface with regular broad zig-zag patterns occasionally flying away for 5-30 minutes at a time before returning to the above activity.

The bats were often seen to touch the surface of the water and leave a thin "wake", up to 40 cm in length. Unfortunately neither the part of the bat which touched the water nor which food animals they were picking up could be identified in the torchlight. When not touching the water's surface the bats flew very close to it, i.e. between 3-12 cm, often striking the surface with a wing-tip as they turned.

Dwyer (1970) records that this species raises the tail as it strikes the surface and hence contact is made with the feet only - twin "wakes" can be seen in good light. He also records some aerial foraging above the water which possibly accounts for some of the breaks in the surface quartering witnessed here.

References: Dwyer, P.D. (1970) "Foraging Behaviour of the Large Footed Myotis (Chiroptera)", Mammalia, 34:76-80.
McKean, J.L. and Hall, L.S. (1965) "Distribution of the Large Footed Myotis (Myotis adversus) in Australia", Vic.Nat 82,(6): 164-168.

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FIELD OBSERVATIONS ON SOME NORTH QUEENSLAND MEGACHIROPTERA

by Martyn Robinson.

During the period 14-26 December, 1979, nocturnal observations were made on some wild specimens of the blossom bats (Syconycteris australis) feeding on the flowers of cultivated bananas at Gap Creek, Bloomfield (Lat and Long. approx. 24° 13, 151° 20). They were seen both to hover in front of the flowers and feed and to land on them and feed, although the latter seemed slightly more common.

During the entire period they were observed, only one of the blossom bats was associated with any one inflorescence. Furthermore should another Syconycteris approach an "occupied" inflorescence (or sometimes if a human observer approached an occupied inflorescence) the resident animal would fly out at it, hover and produce a rapid "thup-thup-thup" noise, apparently by slapping the sides of its body with half folded wings. The intruder (unless human) would promptly retreat at this display.

Mr. Rob Whiston, who first drew the author's attention to this behaviour, stated that it frequently occurred whenever the blossom bats were in his garden

(which was whenever the bananas were flowering). They were also the first Chiroptera to appear in the evening, arriving a few minutes after sunset. There appeared to be at least six individuals in the garden during our observations. Nelson (1964) suggests that this species may form small summer camps in a similar fashion to Pteropus spp. Certainly the regular appearance of the above six individuals in the banana crop at approx. the same time would tend to support this.

Breeden (1965) provides some more information on the diet and habits of this species. Le Souef and Burrell report that this species is very destructive to fruit while Ratcliffe (1931) states that he found no evidence of the above. In this study all evidence found tended to support Ratcliffe. Rob Whiston's garden grew many types of cultivated fruit, none of which was seen to be attacked although the blossoms were often visited. Examination of the teeth of preserved specimens seems to indicate that this species would have difficulty in opening most cultivated fruits unless exceptionally ripe.

Also during the night of 17 January, 1979, the spectacled flying fox (Pteropus conspicillatus) was observed to indulge in similar wing slapping behaviour at Mossman Gorge. The animals were feeding on tree blossom with only one individual per small tree or two individuals if the tree was very large. Unfortunately the species of tree was not identified.

If another P. conspicillatus flew anywhere near an occupied tree then the "resident" would utter a loud shriek and slap its sides three or four times with folded wings while suspended from a branch. If the other P. conspicillatus ignored this threat and landed in the same tree, the "resident" would promptly fly straight at the intruder. In all observed cases the intruding animal quickly flew away, being chased for a short distance by the "resident" who would then circle back to its own feeding tree.

Nelson (1965) reports similar behaviour in P. poliocephalus when defending a roost/harem territory - both with regard to the shriek and the "flapping" with folded wings. However he makes no mention of any sound made by the "wing flaps" while in the above instance P. conspicillatus was clearly audible. More research is needed in this area.

- References Breeden, K. (1964) "Dwarf among the Fruit Bats". (Animals 4:457-459.
Le Souef and Burrell "The Wild Animals of Australasia".
Gorge Harrap and Co., London.
Nelson, J.E. (1964) "Mammalia" 28: 429-432.
(Megachiroptera), Animal Behaviour, 13, 4:544-557.
Ratcliffe, F.N. (1931) "The Flying Fox (Pteropus) in Australia",
C.S.I.R. Bull. No. 53.

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When I go up to Paradise,
I mean to take with me,
Instead of prayers and weary sighs,
A magpie's melody,
A pallid cuckoo's tender call,
A thrush's merry bell;
That all above in heaven will know
How sweet the world where mortals dwell,
And if the good Lord thinks it's wrong
And frowns across his staff,
I'll loose the kookaburra's song
And make all heaven laugh.

Author Unknown.

Contributed by Mrs. A.M. Felton.

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Just a reminder that annual subscriptions were due September 30th.

SEPTEMBER DIARY.

by Dawn Magarry.

Down from the rainforest one cool September morning floats the call of the Koels heralding summer is on its way.

Rainbow Lorikeets are deep in the bright orange cups of the African Tulip tree, and later in the morning a pair of Brush Cuckoos sing a duet in their piercing monotonous calls.

Several times a day a flock of Shining Starlings whirl into the tall trees in the garden. With red eyes flashing they begin a noisy squabbling and tugging over nesting material from the pothos vines that spiral round the tree trunks.

Back from their northern sojourn I hear the slow deep boom of the pair of Torres Strait Pigeons who nest annually in the big milky pine down the gully. A Black Faced Flycatcher, in his suit of grey and rust with distinct black face and bright eye, searches the leaves for insects.

Clusters of berries on the Piper Vine are ripe and daily the Olive Backed Oriole utters his flute like notes as he competes with the bright Yellow Fig Bird for the red fruit.

Helmeted Friarbirds with their raucous voices that only another Friarbird could love, are gathering nesting material, too. The anxious shrieks of the Honeyeaters tell me that a Black Butcherbird is around. Usually he is just after a drink though he is not averse to a baby Sunbird if he can find a nest.

The Lovely Wrens are wearing their brilliant coats of blue and black with flash of chestnut and come through the garden each day for a bath. The "ee-chew, ee-chew" of a Crested Hawk has me dashing for binoculars, but I cannot spot him until a pair of Willie Wagtails scold at him sitting quietly in the tree tops.

Late in the afternoon I hear the crackle of canefires and Black Kites glide and dip after grasshoppers in the rising smoke.

After dark, down from the hill above, comes the "chop chop" of the White Tailed Nightjar. I wonder what next month will bring in our garden.

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A SEVEN YEAR PUZZLE.

by W.G. Felton. (27/8/80).

In March, 1972, a young fledgling Koel was abandoned in a tree adjacent to our caravan in the City Caravan Park, Cairns. The tree itself was heavily infested with mistletoe. Nearby there were a number of Alexandra palms which about this time of year are generally in full fruit.

Every morning the young Koel would fly into these palms and fill its crop full of the ripe red berries, then sit there and after a while regurgitate the berries minus the skins, then start feeding again. After a while it would return to the tree and perch on the same branch where it would remain for quite some time before returning to feed. It roosted on the same branch of the tree at night. This behaviour continued for between three to five weeks, then it flew further afield each day and eventually disappeared.

Now the amazing thing is, that it has happened every year for seven years without fail from 1972 to 1979, with the same pattern of behaviour. When the young Koel is abandoned each year there is a great commotion amongst the resident Helmeted Friarbirds, a pair of which I presume are the foster parents.

Question No. 1. Does the same female Koel produce the egg from which this bird is hatched.

Question No. 2. Does she deposit this egg in the same Helmeted Friarbirds' nest, and is it the same pair of Friarbirds that abandon the fledgling in the same tree every year.

This interesting puzzle has presented itself to me for seven years without fail. Last year the tree which the young Koel used to be found in died from mistletoe infestation, and was cut down. I waited for a young bird to arrive

this March (1980) but so far nothing has happened. I could not tell the sex of the young birds but some used to darken in colour in the few weeks they were under observation.

The young birds were always very tame, and were not easily scared. They could also be photographed quite easily. The non arrival of a young bird this March has me wondering - Has the female Koel passed, have the Friarbirds nested somewhere else, or passed on also? I shall never know.

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SOME GENERAL NOTES ON BUTTERFLIES.

by R. Straatman.

Butterflies are found in most parts of the world, from the Arctic region to Tierra del Fuego, south of South America.

In the Arctic region, species occur in Northern Greenland, North Alaska and Siberia and on small islands, about 14 degrees from the North Pole. In the Southern hemisphere no species are known south of Tierra del Fuego less than 60 degrees latitude south. They also occur in the high mountains, in the Himalayas, where some live at altitudes up to 6000 metres (approx. 20,000 feet).

But it is in the tropical and neo-tropical regions that species are most abundant and where the most colourful ones are found, especially so in South America. Africa has a number of quite colourful species but their number is limited compared to other tropical regions, such as South East Asia. Malaysia, Indonesia, New Guinea and adjacent islands are inhabited by the large and beautiful "birdwings" (Ornithopteras) some of which have a highcommercial value.

In Australia only a relatively small number of different kinds of butterflies is found, mainly along the east coast, their number decreasing rapidly towards the south while the western half of the continent has very few species. In New Zealand butterflies are limited to about a dozen species, Hawaii has two, and Tahiti only one species of endemic butterflies.

Some species are nearly cosmopolitan in their geographic distribution, such as the well known "wanderer" (*Danaus plexippus* and *Dag. chrysippus*), the "painted lady" (*Vanessa cardui*) and an "eggfly" (*Hypolimnas misipus*). These are found in all continents and many of the South Pacific islands.

Contrary to a popular belief that butterflies live only two to seven days, most small species have an adult life span of eight to fifteen days; the larger kinds can survive from four weeks to four months. In regions where there is a winter period, several butterfly species emerge in mid or late summer, feed as long as the season lasts, but do not reproduce. Towards the end of the season they shelter under bark of trees, in hollows or in houses from where they reappear when spring temperatures allow this and then they resume feeding, mate and reproduce, and some of these species may live almost a year. Not all butterflies feed on nectar; many use juices of rotting or decaying matter, such as fruit, faeces and urine or meat.

All butterflies undergo a complete metamorphosis. From eggs laid by the female hatch tiny larvae, which, according to species, may be spiny in appearance. Their first food consists of their own eggshell (exuvia), which provides vitamins and enough energy to last for 24 hours, during which time the larvae walk around in search of young shoots or leaves of the foodplant, which will feed them until such time that they are ready to pupate. During their feeding time, larvae shed their skin, usually four to five times, and many species change their appearance (shape and coloration) with each instar (an instar is the time between two moults or skin changes.)

Depending on the family to which they belong, the mature larva then pupates suspended by its cremaster (anal claspers) or attached with a silken girdle around the body to support it on the underside of a leaf or twig. Depending on their habitat and its local climate, from one to several generations are produced in a single year. But in cold regions, such as Arctica, the immature stages survive several years before the adult appears on the wing.

Butterflies are collected by many people all over the world. Many species fetch high prices in the trade. In some countries collecting of insects is prohibited by law. In others only a few of the most spectacular ones are on the

"protected list". However, it has been proved that any kind of butterfly is not threatened with extinction because of "over collecting". In fact it is the destruction of food plants and their natural habitat which causes real danger to the survival of the species concerned.

A good example is the island of Formosa (Taiwan), where the trade in insects is a very important source of income for the country. Literally millions of butterflies are killed yearly, many are exported and others used for decorations (ash trays, tablecloths) and their bodies used to feed pigs. While Taiwan is a relatively small island with a dense population and a highly sophisticated agriculture, the collecting of millions of butterflies has not posed any threat to the survival of even the rarest species.

Chinese dealers have been aware of the necessity to preserve natural habitats. They breed many species of butterflies in large aviaries, while in the field food plants of the rarer species are planted in areas where they were not previously found, thus offering female butterflies a chance to extend their geographical distribution.

Larvae of butterflies have often a peculiar shape, sometimes designed to scare predators visually. Some show spines, which are often quite soft and harmless when touched; others have bright colours. Another protection is the osmaterium, a fold in the neck of the larva, just behind the head. When disturbed it can produce a forked, fleshy, brightly coloured process and spreading an unpleasant odour. This is characteristic to all Papilionids (swallowtails).

Most species, especially those living gregariously, have many predators. Eggs may be parasitised moments after being laid, by tiny wasps (Chalcididae). Larvae are attacked in all instars by other parasites such as ichneumonid wasps, tachinid flies, eaten by ants, spiders, cockroaches, centipedes, birds and even rats. I once found a batch of pupae of a *Delias* sp. in New Guinea, counting 123 pupae, from which one single butterfly was obtained.

When breeding larvae in captivity one must take care that species, not normally living gregariously in the field, are not kept in numbers in a confined space, as virus diseases may develop which can kill all specimens. Food must be frequently changed and all excreta removed to prevent formation of mould. When collecting in the field, the use of a transparent net is recommended, to allow netted specimens to be examined. If they are damaged they can be released. Killed specimens can be stored in folded triangular envelopes, in a woodenbox or in a tin. A good quantity of naphthalene flakes or camphor will protect the material against mould or small parasites attacking the dried bodies.

These days an extensive range of literature is available, often published in brightly illustrated books, making it easy for anyone interested in butterflies to learn more about these beautiful creatures.

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A GOOD WEEKEND.

by John Crowhurst.

The Show long weekend, 21st to 23rd July, 1978, Dawn and Arnold Magarry and I went to the Tablelands. Our first stop was a waterlily swamp on the road to Mareeba where Black and White-eyed Ducks shunted Little Grebes. a pair of Forest Kingfishers sat and a Yellow Spoonbill flew away. Round the swamp the creamy yellow flowers of Grevillea parallela were blooming and Arnold collected seeds of a hakea, Hakea ferisearina with attractive white flowers and needle shaped leaves. In a stunted clump of Leptospernum we found Double Bar Finches. Brown Honeyeaters in dozens dashed from tree to tree.

Next stop was Nardello's Lagoon, outside Walkamin, where Black Swans glided through lily pads, Little Grebes dived under lily pads and Jacanas strode over lily pads. Out past a forest of dead trees were thousands of ducks tacking back and forth amongst swans and pelicans. A few cormorants and darters waved their heads and a Black Shouldered Kite perched high on a dead tree.

After business at the Herbarium at Atherton, we went to Hastie's Swamp. Here the lantana and lower cover had been sprayed and lay dead and withered. We were worried at finding five dead Magpie Geese. A fairly fresh one we examined had no bullet marks, so the cause must have been poison or disease. On the far side we noticed a single goose in difficulty, fluffing wings, unable to take off.

(the next day Rupert Russell collected this bird and reported it to the D.P.I. Fauna Officer, Mark Weaver, but we have not heard the result of any autopsy). Hundreds of Magpie Geese were using the swamp, their soft honks echoed over the rushes as they flew. Swamphens paced amongst the reeds, White Ibis poked about, and Tawny Grassbirds drove us mad. They "clucked" at us from heaps of dead lantana and wild tobacco until we were almost on top of them; then there was quietness till from a mound of rubbish yards away would come a loud "cluck" saying: "Hey, I'm over here". We got only brief glimpses of the birds.

At the picnic area at the Crater we went for a walk along the rainforest tracks, stopping to see how close a Yellow-throated Scrubwren would come. He scratched and dithered, turning over leaves, closer and closer until we thought he was going through our legs. At the last minute he flew off to the side. At the Crater, Mountain Thornbills twittered and a pair of Crimson Rosellas dotted us with berries. We camped there. Atherton Scrub Wrens scolded around cars, Grey Headed Robins drank at a tap, followed by Yellow-throated Scrubwrens. A pair of Tooth Billed Bowerbirds came close and Spotted Catbirds yowled. Dawn disturbed a Muskrat Kangaroo and later I had a good view of one when I went down to the creek. He came hopping along the bank and stopped until I made a noise and with a thump he was off.

Saturday morning it seemed I woke to Yellow-throated Scrubwrens chortling down my throat, they were so tame. At breakfast we had a Lewin Honeyeater eating creamed rice, a nuisance of a Brush Turkey, a Bridled Honeyeater, the Grey Headed Robins and Scrubwrens, a few Atherton Scrubwrens and the Spotted Catbird. An early morning walk got us a pair of Greenwing Pigeons, some busy Whipbirds and a lone Yellow Robin.

We drove to Herberton to look up Kay and Rupert Russell, then returned to the sportsfield at Wondecla for lunch. A highlight was the Square Tailed Kite which glided over the trees, circling awhile before disappearing. After lunch we drove to Mr. & Mrs. Bourke's property where Dawn and I walked through the trees, down past a paddock of young pecan nut trees and through a fence to a swampy area. In the eucalypts Yellow-faced, White Throated, White Naped and Scarlet Honeyeaters attacked the blossoms, and Northern Yellow Robins flew from trunk to trunk. We came to a spring gushing out of the ground and further along birds were drinking at a hole - Brown Flycatchers and Bee-eaters, parties of Red Browed Finches and Peaceful Doves, Yellow Tinted Honeyeaters, a pair of Chestnut Breasted Finches, then Spotted Pardalotes, a White Naped Honeyeater and a gem of a Scarlet Honeyeater. If we had sat there long enough we could have got anything.

That evening we returned to Rupert Russell's place as he was going to show us where a colony of Yellow-bellied Gliders were. These gliders were re-discovered at the end of 1976, near Herberton, by John Winter and Rupert Russell. (See "North Queensland Naturalist" Vol. 45 No. 176.) Out in the open forest we followed Rupert down a slope, his red light (the red doesn't worry nocturnal animals as an ordinary light would) swept up and down trunks silhouetting the branches and fretwork of leaves above.... Sugar Gliders, those quicksilver acrobats, soon made their presence known, dashing madly in, a flick of the tail and gone. Some left the trunk, swooped out and in again. Others lost control, almost falling to the ground. Suddenly there in the beam were three Yellow-bellied Gliders clinging to the bark of the mountain stringybark, Eucalyptus resinifera, one of the food trees of the glider. I was impressed by their long thick furry tails, large ears and pink noses. Returning, Rupert showed us a Leaf-tailed Gecko on the trunk of a tree, a perfect view, the large eyes glowing, the lichen patch-worked body showing clearly - a bonus for the evening.

We camped at Wondecla and woke next morning to a fog. By 8 a.m. it had cleared and we once more went out to the Russell's. Rupert and a friend came with us to Stewart's Head, known locally as Mt. Lavery. We drove a little way, then walked. Immediately we came upon ground orchids - the pink Caladenia carnea, the blue sun orchid, Thelymitra, yellow double tailed orchid, Hareysia, and another pink orchid, Dipodium sp. with darker pink centres and white stamens. Proceeding along the track we came on a vine Pandorea doratoxylon, with long thin leaves and ivory cream bell flowers with brown specks inside; a hakea. Hakea plurianervia was blooming, white flowers clustered along the branches. Along the track range bloodwoods, E. abergiana, flowered profusely, their creamy blossoms attracting Yellow-faced Honeyeaters. Nearby a Grey Thrush called. We discovered a small plant which Rupert called the Purple Flag, thin leaves like a trigger plant, with pink pea flowers; a bright yellow daisy, Spilanthus grandiflora, and a Hibbertia with yellow buttercup flowers.

Different eucalypts appeared - Gympie Messmate, E. cloeyana, a bloodwood E. intermedia, stringy bark E. phaeotricha, the beautiful E. grandis and the turpentine Syncarpia gomulifera. We came to a clump of white papery yellow-centred daisies Helichrysum sp. and the yellow button daisies Helichrysum rapicola. Panting up a ridge we saw small birds foraging. I thought they were Weebills but instead they turned out to be Varied Thornbills, a northern race of the Buff-tailed Thornbill, very yellow on the underparts and rump. We collapsed and watched Fantailed Cuckoos watching us. We admired a legume vine Kennedia rubicunda with red pea flowers and another small species of Kennedyia with minute pink pea flowers close to the stem. Along the path was a bush, prickly to the touch with bright light green leaves, Melichrus urcolatus. Another prickly clumpy bush with bluish green small acute-ended leaves was called the Prickly Broom Heath Monotoca reofaria.

Almost at the top of the peak Arnold and Rupert found a mint bush, Plectranthus perviflorus, greyish furry leaves, purple flowers like a hollyhock. On the peak the flora was extremely interesting. First Rupert showed us a half dead Darwinia forteri, found only in this spot. Fortunately three young plants were growing underneath. Rupert has recorded it flowering in December and February. The plant resembles a heath and has small pink upright flowers in pairs. Then he showed us an undescribed callistemon growing on the rocky side of the bluff and another prickly bush with cones of pinkish new growth, Acrotiche aggregata. The Queensland Herbarium has shown great interest in these three plants. Another attractive bush, Alyscia ruscifolia, had very shiny pointed green leaves in rosettes, tiny white flowers unopened, yellow when open.

We clambered along another ridge leaving Dawn behind. We came on a group of banksias, Bankia integrifolia, their creamy yellow flowers attracting White Cheeked Honeyeaters, a female Scarlet Honeyeater and an active Mistletoe Bird. Rupert and Arnold found a Blue Lillypilly, Eugenia cyanocarpa, very stunted, growing amongst rocks. Arnold picked a couple of bluish fruit. Before returning we watched a Wedge-tailed Eagle soaring up and down the valley. We got mislaid on the way back which was fortunate for, at one spot, we disturbed a Rufous Rat Kangaroo that broke all records in bounding away and then we had another view of the Varied Thornbills. Altogether it was a wonderfully interesting weekend.

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BITING MIDGES *

Notes by ERIC REYE, Research Officer, Entomology, University of Queensland.

The biting midges are tiny flies of the family Ceratopogonidae, the order Nematocera. There are many genera, most of which contain only species which suck sap or capture insects of about their own size, or suck from the larvae or adults of much larger insects such as Lepidoptera.

A small number of genera contain species which feed on warm blooded animals. Many of their species specialize in feeding from particular groups such as birds, marsupials or livestock; it is only the relatively few species with a generalised appetite (the opportunists) which are pests of man and the subject of this talk.

Like the mosquito, it is only the female which sucks blood (to set her eggs) and has a similar proboscis but, even for her size, relatively much shorter. After feeding it will be some three to five days before she is ready to lay and then to feed again. According to species she may range from 50 m to 1500 m or more from her breeding place in search of blood. The males which fertilize the females soon after emergence from the pupa do not range far.

The larval stage is worm-like, moves by wriggling, and obtains its oxygen from the water of the wet soil in which it lives. This is the longest part of

* These are the "sandflies" of our coastal areas. True sandflies belong to the family Psychodidae - they occur in Australia but are not known to bite man here. The other "sandfly" of our western plains after floods is a black fly of the family Simuliidae.

the cycle in our pest species, being from six weeks to six months according to species. The air breathing pupal stage is short - two days to two weeks. The adults tend to emerge from the pupae over a period of a few days at a definite phase of the lunar tide cycle; probably most of the males and about half the females are dead within a week of emergence though some females may survive for a month or more.

When the female bites she injects saliva to aid her feeding; it is this which causes the discomfort and the degree of severity depends upon one's degree of immunity to the species of midge biting, and that immunity depends on how much one has been exposed to bites by that species in the past. If it has been heavy and prolonged (e.g. over a year) reaction can be slight and transient but if only a few bites, one may be sensitized so that reaction is delayed, severe and long lasting. One sees all grades of reaction between these two extremes. Those most at risk are the people who have had little or no exposure to bites, either because they have over-protected themselves or because they have had little time in the area of that species of midge. For these people Vitamin B1 in adequate doses may reduce reaction to a tolerable level so that they can be bitten enough to gain a degree of immunity.

Most of our pest species breed in the intertidal zone. One notable exception is Lasichelea townsvillensis which breeds normally in rainforest and bites by day; we do not know exactly where it breeds but some domestic gardens apparently give it the right conditions.

The intertidal species are confined to the zone above Mean Tide Level and within that zone each has its own special requirements of soil, tidal cover, water movement, vegetation or other biota. The result is that breeding areas tend to be relatively quite small parts of the intertidal zone as a whole. The midges make up for this by high larval population density (6,000 to the square metre is not uncommon) and their ability to fly. Though one may have the impression that they are breeding throughout a mangrove forest, more often it is because the trees give them the moist calm shelter which improves their chance of survival - those biting you may have travelled 1500 m for the privilege.

Midges become new pests of man under natural conditions only when new breeding areas establish or old ones extend; otherwise the problem is due either to man intruding within pest range or to his creating breeding areas within range of his residences or recreational areas.

We have many instances of resorts or industrial areas being set up without due regard for the midges already there. Towns have been established in midge-free areas but find later that expansion can go only into midge territory.

Before 1970 we could not have foretold that canal estate development would generate a midge problem for we did not know where Culicoides molestus bred, nor that it would find the sandy canal banks so much to its liking. Despite warnings in 1971 construction of similar canals has continued apace and, despite requests then for adequate funds to find a permanent solution, these have not been forthcoming.

Culicoides subimmaculatus cannot breed where dense mangroves hold a layer of silt over a sandy floor because the Mictyrid crab, whose burrows the larvae use, cannot establish there. If, for one reason or another, the mangroves are felled and the silt layer washes off, the crab may be able to establish and, with it, the midge. Some caravan parks have been abandoned after doing this.

In Fiji is a species, Culicoides belkini, which cannot tolerate fully saline conditions. But it thrives where the salinity ranges from about half that of seawater down to nearly quite fresh. Bulldozing of mangrove swamps (which were too saline) or reclamation of sago swamp (too fresh) with sand in seawater have led to problems there.

Investigation of a pest problem involves the following:-

- (1) Definition of the infested area(s) and the degrees of infestation in different parts - this may give a good lead to the source.
- (2) Collection by residents (at suitable points) of midges attacking over a period of five weeks to determine the pest spectrum and the

relative importance of each species.

- (3) Finding the general area in which breeding places lie.
- (4) Mapping those parts of the area which fit the habitat requirements of the pest species (if these details are known).
- (5) Proving the presence of breeding by finding a high male/female ratio.
- (6) Defining the extent by finding larvae (quantitatively), by the use of emergence traps, or by using small light traps.

Prevention of pest problems lies in intelligent appreciation of the biology and ecology of an area proposed for exploitation. The exploitation should not proceed unless adequate control can be included in the design or can be achieved in some other ecologically and economically acceptable manner.

Control methods vary with the situation from temporary personal, household or area protection to reversible or irreversible modification (at present rather crudely) of breeding areas. The former includes clothing, repellents, * air movement or conditioning, exploitation of wind, control of vegetation providing midge shelter, and the use of strategic insecticidal fog to reduce an emerging population before it can disperse. The latter includes filling over breeding places with soil or water or exclusion of tides with or without drainage.

Temporary control does nothing to modify the breeding place - which continues in production. Physical modification will involve, inevitably, the destruction of other life besides that of midges but is economically attractive to a community because it is complete and permanent.

However, when we consider that neither eggs, larvae, pupae nor adult males can bite us, and that of the females probably less than half will have the chance to do so, these permanent solutions are over-kill.

The ideal control would be one which traps the females which disperse in our direction, and these alone. Hopefully, one day this will be available; if it is we will be able to leave the breeding areas alone to go their biologically complicated ways of which we understand so little and at the same time give relief to those whose midge sources lie in areas where modification would be undesirable, uneconomic or illegal.

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CAPE YORK TRIP.

By Arnold Magarry.

On July 21st 1980 at midday we left Cairns in a four wheel drive Toyota Land Cruiser, on a journey to the top of Cape York and back. This was our first introduction to the Overland Telegraph Line which travels almost the length of Cape York Peninsula. For most of the way the road follows this line.

Associated with this line is the never ending vista of huge termite mounds that are so much a part of the Peninsula. There are three types of these ant hills. One is the well known magnetic ant hill which is of cathedral design, grey in colour, four to six feet high, narrowly buttressed laterally, many pinnacled on top and orientated with the axis about north-south. A second species had taller mounds, deeply fluted and tapered upwards, pinnacled more coarsely and without any particular orientation. The third type formed smoothly symmetrical, slenderly tapered and sharp pointed structures, not unlike a witch's hat.

The magnetic mounds were all of a grey colour whilst the other two were

* Good air circulation and slow moving ceiling fans are effective deterrents. Airy, high-set houses provide better midge control than low-set. If there is a breeze, shut the leeward side of the house and open the windward. Midges shelter on the leeward side and the positive pressure inside the house prevents their entering through any openings. A coil burning to windward also helps keep them out, as the smoke blows out through any small openings on the leeward side. A sure way to see if midges are about is to start hosing and/or digging the garden towards dusk. That lovely cool, damp air is just what they have been waiting for.