Biting Midge Investigation
Archer Sporting Complex
Palmerston
August 2003

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DHCS Darwin 5 Sept 2003

Northern Territory Government

Department of Health and Community Services

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Introduction

Mr David King, recreation development officer of the Department of Community Services Palmerston City Council, contacted the Medical Entomology Branch (MEB) in mid July 2003 in regards to reported pest problems from biting midges at the Archer Sporting Complex. Two officers from the Medical Entomology Branch, Peter Whelan and Allan Warchot, met with David King and Tony Shearer of the Palmerston City Council at the Archer sporting complex on 16 July to discuss the problem on site and conduct a site inspection.

The MEB decided to conduct biting midge trapping around the sports complex to investigate the current level of biting midges and determine if there was an actual pest problem. This paper details the results of the investigation and makes some conclusions in regards to biting midges around the sports complex.

Method

Biting midge trapping was carried out one night before the full moon and on the night of the full moon, to account for variations in numbers caused by the active dispersal characteristics of *Culicoides ornatus* from mangrove areas. Traps were carbon dioxide baited EVS traps operated all night from 2 hours before sundown to one hour after sunrise. Trap sites were selected close to the clubhouse and oval, and between the ovals and the nearby mangrove margins. Trapping was also conducted near the University grounds on University Avenue to determine if there was a problem in an area remote from the mangroves, and which was a possible location for alternative sporting facilities.

The trap sites are shown in Fig 1. Mosquitoes and midges were separated by sieve. All biting midges were stored in 70% alcohol. Subsamples of 50 individual biting midges were taken from each trap collection, and were identified by wing photos according to Dyce & Wellings (1998), and Wirth & Hubert (1989). For biting midge trap collections under 500 individuals, the remaining bulk was examined for additional species. For biting midge trap collections over 500 individuals, a further subsample of approximately 500 individuals was taken and examined for any additional species. Total numbers of biting midges were estimated by volume comparison method.

Results

The results of the trapping are shown on Table 1 and Table 2. The *Culicoides ornatus* trap results are shown in Fig 2. There were 6 species of midges trapped. The most individuals were *C. ornatus*, the mangrove biting midge.

Collection of *C. ornatus* near the oval ranged from 220 near the barbecue at the club house, 3,290 near the baseball nets, to 10,560, about 200m from the club house at the western fence of the sporting grounds.

The highest biting midge numbers nearer the mangroves varied from 15,180 *C. ornatus* about 850m SW of the club house to 10,320 about 750 m NW of the club house (Fig2).

Numbers of *C. ornatus* near the University grounds were 63 and 95 on the two different nights (Fig 2).

Discussion

Previous investigations in Palmerston outlined extreme numbers of the mangrove biting midge, *C. ornatus* near Site 7 in the current investigation (Liehne 1985). *Culicoides ornatus* is the major human pest biting midges species around coastal areas of the NT, due to the dispersal characteristics of this species from their breeding sites in the mangroves. Some of the earlier investigations on biting midges, particularly the ones relating to Palmerston, were outlined in a report for the Dept Lands Housing and Local Government (Whelan 1994). This report noted that collections of over 1000 *C. ornatus* per trap represent a nearby pest problem for most people and that there is usually little reduction in midge numbers within 1 km of the mangrove margin from very productive mangrove breeding sites.

Culicoides ornatus can be a serious pest up to 1.5 km from mangrove margins. Pest problems in Darwin near Stuart Park have been reported with catches under 1000 per night. Catches of over 10,000 *C. ornatus* per night represent severe pest problems in the vicinity. The present investigations were carried out on nights around the full moon, when these insects are most numerous. However they reach a seasonal peak around September to October (Whelan et al 1998), so the current catches can still be an underestimate of the seasonal pest problem.

From the high catch of 10,560 at the fence of the grounds, it is clear that there has been and will continue to be severe pest problems on the oval and near oval facilities. The reduced numbers near the barbecue area and near the baseball nets could be due to disruption caused by light and other attracting sources such as people. Lights from the caretaker's caravan may have provided a distraction from the trap at the barbecue area on August 12. Football training on August 13 could have provided a distraction from the trap located near the baseball nets.

The current results confirm other investigations near Durack that these midges actively disperse out of mangrove breeding ground and disperse landward up to at least 1 km from the mangrove margin. (Shivas and Whelan 2001).

The oval complex is within one km of the mangrove margin and there are no effective barriers to their dispersion from the mangrove margin to the oval complex. One of the high trap collections was placed in a burnt area between the mangrove margin and the ovals (Site 3). High trap collections in this trap indicate that burning of the land between the mangroves and the oval is not likely to significantly reduce the pest numbers. During investigations at Durack in 2000-2001, it was found that street lights and the nature of the vegetation in the intervening ground between mangroves and residential areas did not effectively reduce midge numbers (Shivas and Whelan 2001).

There appears little evidence for effective treatments to reduce the pest problems on the oval, apart from personal protection measures. There are however insecticide measures that may be partially effective around the club house, where recent investigations in Queensland have shown a reduction in midge numbers around residential areas by spraying insecticide on screening vegetation and walls (Standfast et al 2003). It is possible that barrier treatments with insecticide on artificial barriers, vegetation barriers, or on the oval itself, could provide some relief on the oval, but measures for open areas such as ovals have not yet been demonstrated, and have not been trialed under local conditions. However even a 90%

reduction of midge numbers from catches of 10,000 to 1,000 per trap night would still represent a pest problem to most people.

The trap catches near the University represent a very minor pest problem (Fig 2) and certainly are very much less than in the 1km zone between the Palmerston urban areas and the mangrove margin. It is likely that all areas harbour-side of the Palmerston urban area, including the Palmerston semi rural area, will face a pest problem with biting midges. Outdoor recreation facilities within this border zone will face seasonal unacceptable pest problems and the relocation of the present oval and outdoor recreation facilities appears to be warranted. It is recommended that outdoor recreation facility sites should be at least 1.5 km from the harbour landward mangrove margin in the Palmerston area. Locations on the Stuart highway side of the University are suitable.

References

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Figure 1:

BITING MIDGE INVESTIGATION ARCHER SPORTING COMPLEX AND PALMERSTON UNIVERSITY. LOCATION OF C02 BAITED EVS TRAPS, 12 & 13 AUGUST 2003,

F:/Ento/Deskscan/Temp/Palmerston

Figure 2:

Biting Midge Assessment of Archer Sporting Complex and Palmerston University.
Total number of female *Culicoides ornatus* (mangrove biting midge) per trap per trap night. Trap locations sorted in increasing distance from Archer Sporting Complex clubhouse

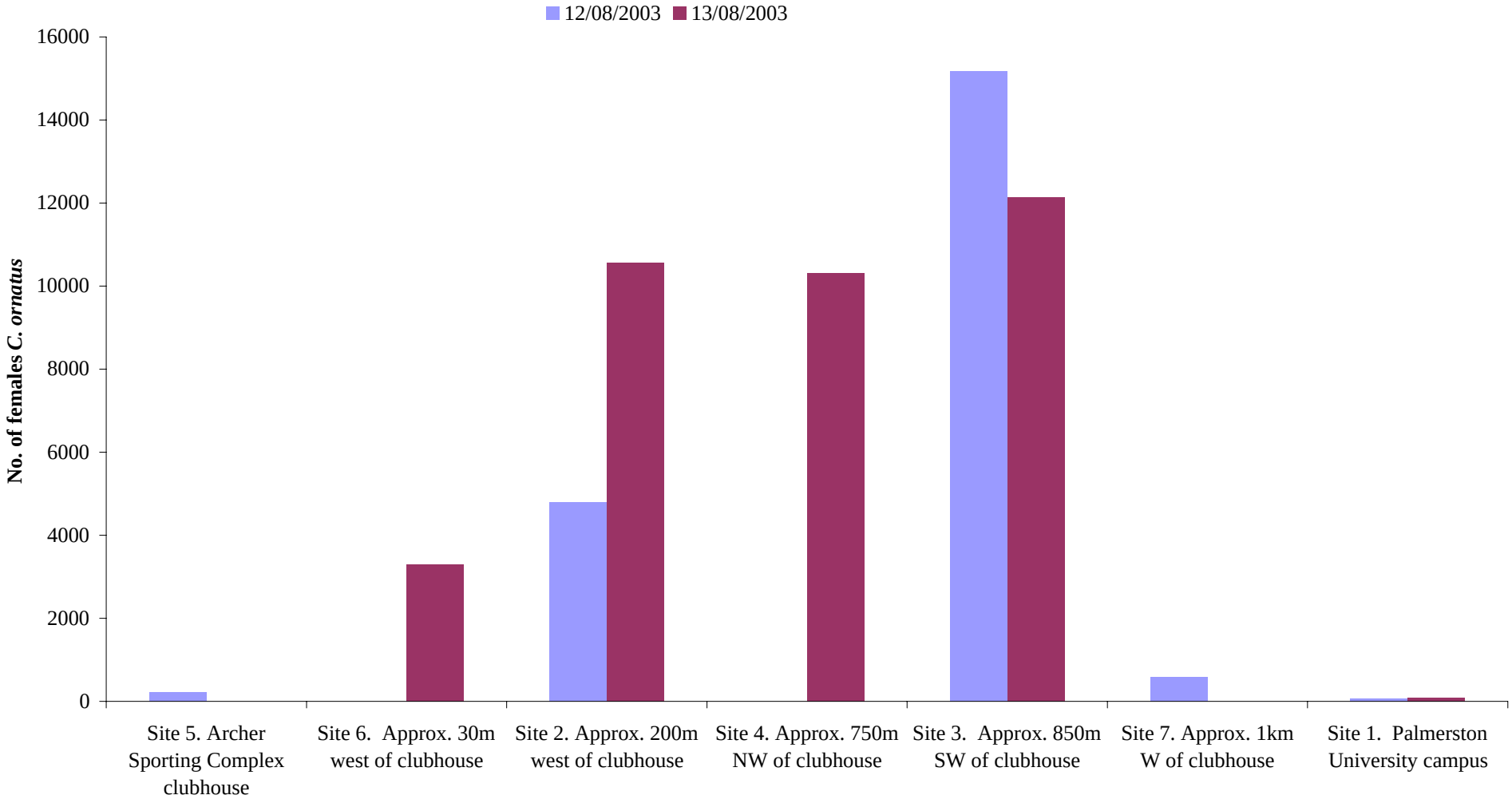

Table 1:

BITING MIDGE ASESSMENT OF ARCHER OVAL AND PALMERSTON UNIVERSITY, **13 AUGUST 2003** TRAPPING CONDUCTED AT SITES 1, 2, 3, 4 & 6 **ON THE DAY OF THE FULL MOON**						
Site No.	**Site location**	*C. (Ava) brevitarsis*	*C. (Mar grp) marksi*	*C. (Orn grp) ornatus*	*C. (Orn grp) undescribed sp No 6*	*C. (Wil grp) austropalpalis*
4	Approx. 750m NW of Archer Sporting Complex clubhouse. Approx. 150m E of Adrail embankment	480	0	10320	720	480
3	Approx. 850m SW of Archer Sporting Complex clubhouse. Approx. 200m E of mangroves, on slight ridge	0	270	12150	1080	0
1	At top of ridge, east of Palmerston University campus, and 50m west of satellite station fence.	25	30	95	15	85
2	Approx. 200m west of Archer Sporting Complex clubhouse, at western fence of Archer Sporting Complex. Opposite baseball field	0	1	10560	1440	0
6	Opposite baseball nets, Archer Sporting Complex. Approximately 30m west of clubhouse	0	0	3290	210	0

Table 2:

BITING MIDGE ASESSMENT OF ARCHER OVAL AND PALMERSTON UNIVERSITY, **12 AUGUST 2003** TRAPPING CONDUCTED AT SITES 1, 2, 3, 5 & 7 **ONE DAY BEFORE THE FULL MOON**							
Site No.	**Site location**	*C. (Ava) brevitarsis*	*C. (Mar grp) marksi*	*C. (Mei) histrio*	*C. (Orn grp) ornatus*	*C. (Orn grp) undescribed sp No 6*	*C. (Wil grp) austropalpalis*
7	Approx. 1km W of Archer Sporting Complex clubhouse. 30m N of endpoint of low flow drain, at mangrove margin	0	0	75	585	60	30
3	Approx. 850m SW of Archer Sporting Complex clubhouse. Approx. 200m E of mangroves, on slight ridge	0	0	0	15180	1320	0
1	At top of ridge, east of Palmerston University campus, and 50m west of satellite station fence.	42	18	0	63	21	6
2	Approx. 20m West of Archer Sporting Complex clubhouse, at Western fence of Archer Sporting Complex. Opposite baseball field	0	120	0	4800	1080	0
5	Next to BBQ at Archer Sporting Complex clubhouse	0	0	0	220	25	0