

FOR INFORMATION

NAMP Technical Committee Annual Meeting 2023

Agenda Item 5.2b

Last updated: 10 August 2024

Prepared by A.Genge

NORTHERN TERRITORY ENTOMOLOGY REPORT

RECOMMENDATION

1. That the NAMP Technical Committee:

NOTE: For the financial year 2023/24 there were no identification of vector species outside the bluetongue virus transmission zone.

NOTE: The detection of exotic vector species *Culicoides nudipalpis* in the Northern Territory

BACKGROUND

1. Monitoring for biting midges in Northern Territory (NT) is conducted jointly by NT Government (NTG) and North Australian Quarantine Strategy (NAQS).
 - NTG manages the collection of specimens at 9 official NAMP sites
 - NAQS manages collection at 2 NT sites, which also serve as the NAQS sentinel heard sites.
2. Northern Territory Department of Industry Tourism and Trade (DITT) Berrimah Veterinary Lab sorts *Culicoides* from by catch from all samples from NT
3. NAQS Darwin entomology lab provides species identification for all specimens from NT
4. This report includes the 11 official NAMP entomology sites in the Northern Territory, inclusive of the NAQS managed sites

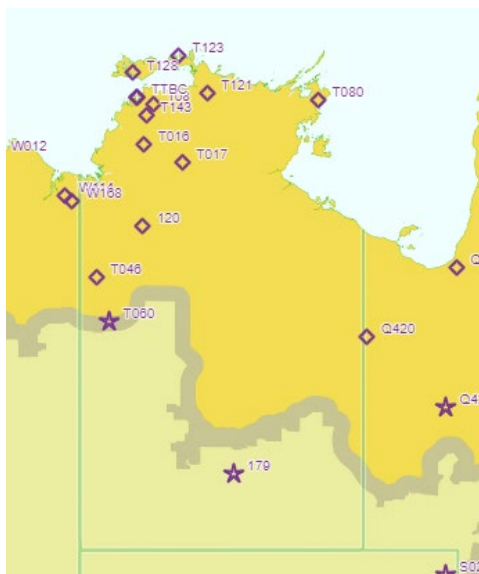


Image 1: NAMP entomology sites in the Northern Territory

DISCUSSION

1. No vector species were found outside the BTV zone in the Northern Territory. For the 23/24 FY, 8 out of 11 sites reported vector species. In comparison to 22/23 FY, we had 14 sites, 11 of those sites recorded vector species (Figure 1). This trend is demonstrated by a downward trend in all vector species over the last 4 years, except for *C. wadai* which displayed increased numbers last year, but has subsequently decreased this year (Figure 2). However, this could be due to a decrease in individual sites this year. Figure 3, further demonstrates the decline in vector species over the last 4 years (2020-2024). The monthly trend for this year has shown that all vectors were present for the month of September only. *C. wadai* was found from July-September, *C. fulvus* was found from September-November, and *C. actoni* and *C. brevitarisus* from July-December 2023. The absence of any vector species from January-June is surprising, as all vector species peaked during the wet season of previous years. Our data shows we ID 8940 culicoides during the January-June 2023 period, which is approximately 30% of all identifications for that year, it would indicate that other non-vector species of *Culicoides* did not follow this same trend.
2. For the 2023/2024 financial year a total of 32129 midges were ID and counted, this was from 88 trapping events (134 budgeted – 67% of total budgeted collections). Conversely, last year a total of 15070 midges were ID and counted from 74 traps. This indicates that although we have found a higher number of midges overall, we are observing fewer vector species (Figure 3).
3. With the ongoing taxonomy and diagnostic key work we have seen a slight increase in the species recorded from the NT compared to last financial year, with most of the extra species detected being human and bird feeders. The increase in diversity shows the importance of the taxonomic work and providing up to date keys to the diagnosticians to enable accurate and timely identifications (Table 1).
4. Following the sporadic detection of the exotic vector species *Culicoides nudipalpis* on 01/07/2022 (2 specimens) and 29/08/2022 (1 specimen) at Black Point on Cobourg Peninsula, and detections of equally low numbers in northwestern parts of the Northern Territory in 2019 and 2020, NAQS entomologists conducted an intensive survey (i.e. trapping) of Cobourg Peninsula (Figure 4 & 5) in June 2023 to investigate if *C. nudipalpis* was established in the area. This is of interest as *Culicoides nudipalpis* is a sister species to *Culicoides imicola*, which is the primary vector of Bluetongue and African Horse Sickness viruses (AHSV) throughout its range. Evidence linking the transmission of BTV or AHSV to *C. nudipalpis* is lacking although BTV has been detected in field specimens of *C. nudipalpis* from Timor. Nevertheless, the close relationship with *C. imicola* suggests that *C. nudipalpis* may be a competent vector that may impact the ecology of BTV in Australia and alter our susceptibility to AHSV. Trapping also occurred on nearby Croker Island (Figure 4) in September 2023, facilitated by the Garngi Rangers. Results from this survey can be found in Attachment B.

FINANCIAL IMPLICATIONS

5. NIL

CONSULTATION/COMMUNICATION

6. NIL

NEXT STEPS/ACTIONS

1. Further investigation (trapping on Croker Island) and diagnosis (sorting and ID of traps) of *Culicoides* in response to the *Culicoides nudipalpis* detection will be completed in the coming months by the Garngi Rangers. Any further samples of *C. nudipalpis* will be reported to NAMP

Attachment A: *Entomology report details NT*

Attachment B: *Detection and investigation of Culicoides nudipalpis in the Cobourg Peninsula and Croker Island, Northern Territory*

Attachment A:

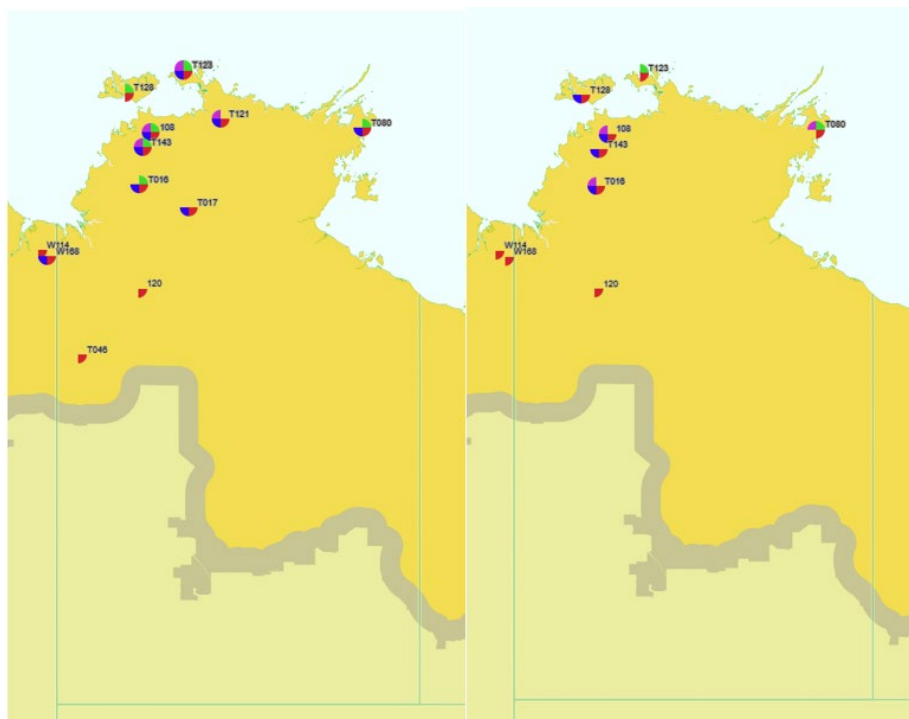


Figure 1 Significant vector species recorded in the NT for 22/23 & 23/24 FY

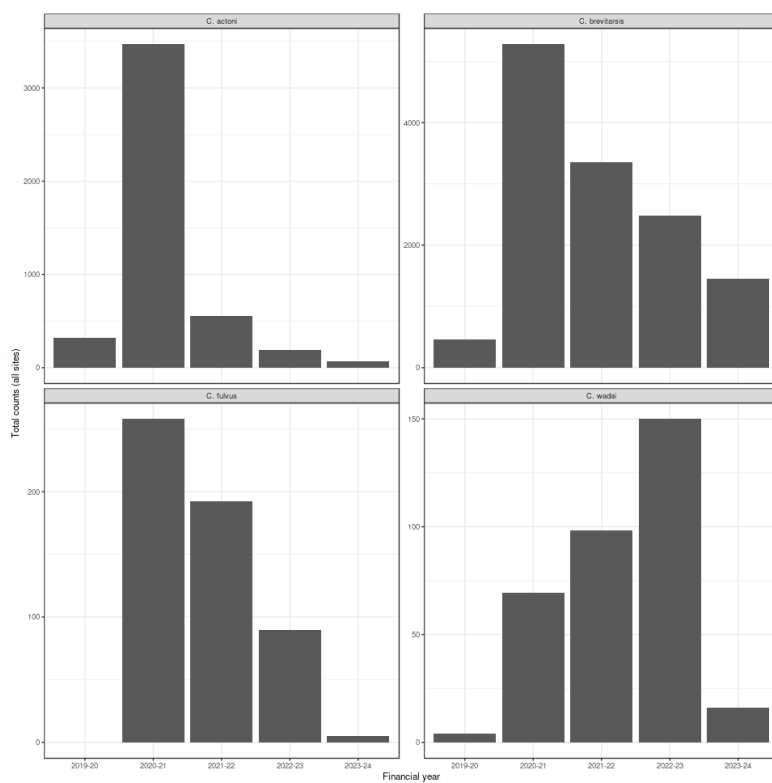


Figure 2 Abundance of vector species by year - 2020-2024 – Northern Territory

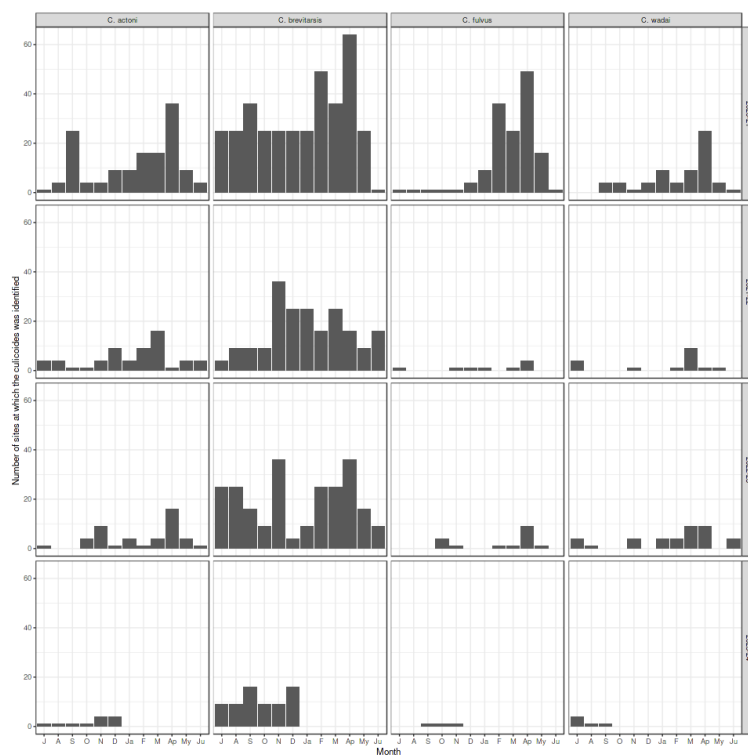


Figure 3 Abundance of vector species by month - 2020-2024 – Northern Territory

Table 1: Culicoides species diversity: Northern Territory - 2023/24. Species highlighted in yellow were not observed during 22/23

C. actoni	C. nattaiensis
C. austropalpalis	C. nattaiensis (species near)
C. brevipalpis	C. nudipalpis
C. brevitarsis	C. ornatus #6
C. bundyensis	C. ornatus
C. bunrooensis	C. oxystoma
C. clavipalpis	C. pallidothorax
C. dycei	C. pangkorensis
C. fulvus	C. peregrinus
C. histrio	C. victoriae group #6
C. immaculatus group	C. wadai
C. marksi	C. williwilli group #2
C. narrabeenensis	C. williwilli group #3

Attachment B:



Figure 4 Cobourg Peninsula showing light trap sites in Garig Gunak Barlu National Park (green triangles) and on Croker Island (yellow points).



Figure 5. Light trap sites at Black point (green triangles) showing previous detections of *C. nudipalpis* (red triangles). Note that the Nov 2019 collection did not have accompanying lat/long and is positioned at the ranger station. It is likely that it was set at the wetlands near the Jul and Aug 2022 detections.

Light traps were set at sites selected in collaboration with local ranger, Michelle Kmon. Michelle is contracted for routine setting of NAMP light trap at Black Point – Coburg Peninsula. Michelle's husband is one of the Garig

Gunak Barlu park rangers. Sites were selected for overnighing large mammals. Animals seen in the vicinity included Banteng, Buffalo and Donkeys. Sites were selected based on geographic spread, suitable sites, and accessibility by vehicle. Figures 4 and 5 show the sites where traps were set. Both blue and green LED Bo traps were employed.

Traps were sorted and *Culicoides* species were all identified visually by Anna Genge and Luke Watson. Data was not retained on all species present as this area is sampled monthly. To expedite examination only samples of the exotic species *C. nudipalpis* were sought, although some general comments were recorded (Table 2). Results indicate that there exists a large and reproducing population of *Culicoides nudipalpis* on Croker Island. Interestingly no males were noted in the hundreds of specimens extracted. Dyce (1989) stated that “It [*Culicoides imicola*] is replaced in the Southeast Asian archipelago by *C. nudipalpis*, the problem species seen more likely than any other to cross the Arafura Sea” and these data indicate that this appears to have occurred (Table 3). This population has not, however, spread to nearby Cobourg Peninsula.

Many aspects (i.e. vector capacity, host association, breeding sites, biology) about *Culicoides nudipalpis* are not well known, although its close relationship to *Culicoides imicola*, a proven vector of African Horse Sickness Virus (AHSV) and Bluetongue virus (BTV), suggests that the capacity of *C. nudipalpis* as a potential vector needs to be investigated. Bovids are not abundant on Croker Island so are probably not acting as the major host of *C. nudipalpis*. Horses and feral pigs are common however; indeed, a single bloodfed specimen was tested and found to contain pig blood. Other bloodfed specimens in the collections are currently being tested to determine their hosts.

Table 2 locations of light traps on Coburg survey

Trap	Site	Latitude	Longitude	Duration	Collected
Trap 1	Coburg Peninsula -Communication tower	-11.145167	132.170528	1 night	14/6/23
Trap 1a	Coburg Peninsula -Communication tower	-11.145167	132.170528	2 nights	16/6/23
Trap 2	Coburg Peninsula - Black point wetland	-11.132639	132.145056	1 night	14/6/23
Trap 2a	Coburg Peninsula - Black point wetland	-11.132639	132.145056	2 nights	16/6/23
Trap 3	Coburg Peninsula - meteor waterhole	-11.397583	132.342528	2 nights	16/6/23
Trap 4	Coburg Peninsula - Danger point road	-11.161361	132.341278	2 nights	15/6/23
Trap 5	Coburg Peninsula - Danger point wetland	-11.172806	132.322639	2 nights	15/6/23
Trap 6	Coburg Peninsula - nr Kuper Point	-11.195667	132.227889	1 night	16/6/23
Trap 7	Coburg Peninsula - wetland near campsite	-11.145167	132.170528	1 night	16/6/23
Trap A	Croker Island - Light trap A	-11.204867	132.54175	2 nights	8/11/23
Trap B	Croker Island - Light trap B	-11.178957	132.53465	2 nights	10/11/23

Table 3 results from raw catch of light traps on Coburg survey

Trap #	Site	Comments
Trap 1	Coburg Peninsula - Communication tower	1 night. Nil <i>C. nudipalpis</i> . A Genge (Oct 23)
Trap 1a	Coburg Peninsula - Communication tower	2 nights. Nil <i>Culicoides nudipalpis</i> . Dominant <i>C. (Avaritia)</i> were <i>C. brevitarsis</i> (hundreds of specimens), followed by <i>C. wadai</i> (tens of specimens). L. Watson (2/2/24)
Trap 2	Coburg Peninsula - Black point wetland	1 night. Nil <i>C. nudipalpis</i> . <i>C. wadai</i> and <i>C. brevitarsis</i> both present. (L. Watson 20/6/23)
Trap 2a	Coburg Peninsula - Black point wetland	2 nights. Nil <i>Culicoides nudipalpis</i> . (A. Genge 20/11/23)
Trap 3	Coburg Peninsula - meteor waterhole	2 nights. Nil <i>Culicoides nudipalpis</i> . <i>C. wadai</i> , <i>C. fulvus</i> and <i>C. brevitarsis</i> all present. (L. Watson 9/11/23)

Trap 4	Coburg Peninsula - Danger point road	1 night. Nil <i>Culicoides nudipalpis</i> .
Trap 5	Coburg Peninsula - Danger point wetland	1 night. Nil <i>Culicoides nudipalpis</i> .
Trap 6	Coburg Peninsula - nr Kuper Point	2 nights. Nil <i>Culicoides nudipalpis</i> . L. Watson (6/11/23)
Trap 7	Coburg Peninsula - wetland near campsite	Nil <i>C. nudipalpis</i> . More than 75% of trap catch were <i>C. wadai</i> (circa 200 specimens). Also present were a few <i>C. brevitarsis</i> .
Trap A	Croker Island - Light trap A	Approximately 25% of the raw trap contents were sorted. The dominant <i>Culicoides (Avaritia)</i> were <i>C. nudipalpis</i> . 123 specimens counted (33 parous, 53 nulliparous, 35 gravid, 2 blood fed) equating to an estimated total of 492 specimens.
Trap B	Croker Island - Light trap B	Approximately 10% of the raw trap contents were sorted. The dominant <i>Culicoides (Avaritia)</i> were <i>C. nudipalpis</i> . 1584 specimens were counted (567 parous, 979 nulliparous, 26 gravid, 12 blood fed) equating to estimated total 15,840 specimens.

References:

Dyce, A.L., 1989. Bluetongue vectors in Australia-present and future. In *Arbovirus research in Australia. Proceedings Fifth Symposium, August 28-September 1, 1989, Brisbane, Australia*. (pp. 315-319). CSIRO Division of Tropical Animal Production.