

FOR INFORMATION

NAMP Technical Committee Annual Meeting 2022

Agenda Item 3.3

Last updated: 19 August 2022

Prepared by Bruce Hill and Leanne Nelson

QLD VIROLOGY AND ENTOMOLOGY REPORT**RECOMMENDATION**

1. That the NAMP Technical Committee NOTE NAMP surveillance for the 2021-2022 arbovirus season in QLD.

EPIDEMIOLOGICAL FEATURES AND SIGNIFICANCE ON KEY FINDINGS

During spring (2021) above average rainfall was received across most of the state. For the state as a whole, the temperatures were warmer than usual.

Summer 2021-22 rainfall was below average overall, but parts of the southeast received record-breaking falls in the latter part of the season. Except for the southeast most of the state experienced warmer temperatures

Autumn 2022 brought above average rainfall for most of the state. It was the wettest autumn for the state since 2012. Day-time temperatures were warmer than average for most of the state, especially in the north.

Winter 2022: For June, northern and western districts received above average rainfall. Northern districts experienced warmer daytime temperatures. During July, northern and eastern parts of the state received above average rainfall. Most of the state experienced cooler daytime temperatures except for northern areas of Cape York Peninsular.

Source: Climate summaries were derived from the Australian Bureau of Meteorology (<http://www.bom.gov.au/climate/current/month/qld/archive/>)

Drought Declarations:

As of 1 August 2022, there are a total of 17 councils and 2 part-councils drought declared. These declarations represent 44.9% of the land area of Queensland. There are also 27 Individual Droughted Properties in a further 8 Local Government Areas.

Source: <https://www.longpaddock.qld.gov.au/drought/drought-declarations/>

KEY FINDINGS AND RELEVANCE TO NAMP OBJECTIVES AND PLANNED ACTIONS

For descriptive purposes, NAMP within Queensland is divided into northern, central and southern horizontally placed biosecurity regions. Their approximate dividing latitudes are at -21.6 degrees (Cape Palmerston) and -25.8 degrees (Inskip point).

a. Bluetongue

In the north, the Cooktown sentinel site showed evidence of active infection at recruitment in April 2021 with BTV-21 associated with both Aust A and Malaysia A. Further seroconversion was discovered in October with BTV-1 and BTV-15, associated with Aust A and Aust B, respectively. In January, there was seroconversion to BTV-16 (Malaysia A2); virus neutralisation tests at this time provided evidence of further exposure to BTV-1; BTV-4; and BTV-21.

The sentinel site at Hervey Range near Townsville was recruited in September 2021. This site has a schedule of monthly sampling and it was not until July 2022 that the first seroconversions were recorded. Serotyping is being undertaken.

The sentinel herd at Normanton showed seroconversion in June 2022.

The Innisfail sentinel site showed seroconversion in January 2022 with BTV-16 (Malaysia A2). VN tests revealed further exposure to BTV-21. Further seroconversions were discovered in May.

The survey site at Dajarra was sampled in June but no seropositive animals were discovered.

In Central areas, the Springsure sentinel site showed evidence of active infection in a few animals at recruitment in October 2021 with BTV-1 (Aust A). At the next sampling in April 2022 most of the mob had seroconverted.

The sentinel herd at Yeppoon, on the central coast, showed evidence of active infection at recruitment in October 2021 with BTV-16 (Aust A). VN tests showed that there had been further exposure to BTV-1 and BTV-21. Further seroconversion was demonstrated in February 2022.

The sentinel herds at Tambo and Capella showed no evidence of seroconversion throughout the season.

The new sentinel herd near Bundaberg showed evidence of active infection at recruitment in November 2021 with BTV-16 (Aust A). VN tests revealed additional exposure to BTV-1 and BTV-21. Further seroconversions were demonstrated in January 2022.

The sentinel site near Mackay showed seroconversion in January 2022 with BTV-1 associated with the Australia A genotype. VN tests also revealed further exposure to BTV-15; BTV-16; and BTV-20.

In southern areas, the sentinel herd at Woodford showed seroconversion in December 2021 to BTV-1 and BTV-16, both associated with Aust A. In April there was seroconversion to BTV-16 (Aust A), with VN testing showing further exposure to BTV-1 and BTV-21.

The new sentinel herd at the University of Qld Gatton showed seroconversion in June 2022.

The Chinchilla sentinel herd demonstrated seroconversion in January 2022 with BTV-16.

The Allora sentinel site showed seroconversion to BTV-16 (Aust A) in June.

Sentinel herds at Bollon and Cunnamulla did not show seroconversion throughout the season.

The sentinel site located near Goondiwindi showed seroconversion in February 2022 with BTV-1 (Aust A) with VN tests revealing exposure to BTV-21. Further seroconversion was demonstrated in June 2022 with BTV-16 (Aust A).

Sampling of two survey herds located in the Thargomindah area in May and July 2022 and of another survey herd at Quilpie in June, did not reveal any seropositive animals.

b. Akabane

Seroconversion at sentinel sites and seropositive animals recorded at survey sites were broadly distributed across all regions as follows:

Sentinel sites: Cooktown (July 2021, Jan 2022); Normanton (June 2022); Hervey Range (Nov, Dec 2021; Feb, May, July 2022); Innisfail (Jan, May 2022); Mackay (Jan, June 2022); Yeppoon (Feb, June 2022); Springsure (June 2022); Tambo (Mar, June 2022); Capella (June 2022); Bundaberg (June 2022); Woodford (Apr 2022); Gatton (June 2022); Goondiwindi (Feb, June 2022); Chinchilla (Jan 2022); Bollon (Feb 2022); Cunnamulla (Apr 2022).

Survey sites: Dajarra (June 2022); Thargomindah (May, July 2022); Quilpie (June 2022).

c. Bovine Ephemeral Fever

In the north, the following sentinel sites recorded seroconversions: Cooktown (July, Oct 2021, Jan 2022); Hervey Range (May, July 2022); Normanton (June 2022). The Dajarra survey site showed seropositive animals in June 2022.

In central areas, the following sentinel sites recorded seroconversions: Bundaberg (Jan, Mar 2022); Mackay (Jan 2022); Yeppoon (Feb 2022); Springsure (Apr 2022); Tambo (June 2022); Capella (Feb, June 2022).

In southern areas, the following sentinel sites recorded seroconversions: Chinchilla (Jan 2022); Bollon (Feb 2022); Cunnamulla (Apr 2022); Allora (June 2022); Woodford (Apr 2022); Gatton (June 2022). Seropositive animals were recorded at the following survey sites: Dajarra (June 2022); Thargomindah (July 2022); Quilpie (June 2022).

Diagnostic data: BEF was diagnosed on 54 occasions through the Brisbane-based Qld Government laboratory. These cases were predominantly within local government areas of the south-east corner of the State. The number of diagnoses would not reflect the true extent of BEF in cattle as most cases are not reported unless the morbidity-mortality was extraordinary.

d. Summary of virus isolation, neutralization and PCR tests performed

A total of 321 BTV PCR tests were conducted. These tests were distributed as follows: pan BTV (283); BTV-16 (21); BTV-15 (4); and BTV-1 (13). Virus isolation and neutralisation testing was negotiated with ACDP as required.

e. Entomology

Site summary:

QDAF managed 21 entomology sites in the 2021/22 financial year including four newly established sites in the state's north-west, central-west, and south-east, and 17 from the previous financial year. The new site of Kalkie (Q417) in the Bundaberg region replaced the now redundant site of Brahmack, Maryborough (Q324) in late 2021. Camoola Park, Longreach (Q number pending) replaced Tocal (Q408) in mid-2022. Two additional new sites, Rocklands Station, Camooweal (Q420) on the mid-northern border of Queensland and the Northern Territory and Longmuir Bull, Gatton (Q418) in the

Lockyer Valley west of Brisbane, were established to provide additional enhanced surveillance of exotic *Culicoides* in the state.

Submissions:

All 21 entomology sites submitted trap samples in the 2021/22 financial year. Of the approximately 110 scheduled collections (six per year per site with adjustments for new and retired sites), the laboratory received 70 (~64%); a >10% increase from the previous financial year.

Vector summary:

Culicoides vector species were identified in collections from 14 out of 21 Queensland DAF-managed sites over the twelve-month period from July 2021 to June 2022 (Figure 1). The distribution of vector species was comparable to other years, confined to the far northern and eastern coastal sites with the exception of Emerald and Springsure in the state's central highlands region where *C. brevitarsis* was collected in low numbers. *Culicoides brevitarsis* was the most prevalent vector species across Queensland, detected in traps at Normanton, Drumduff, Cooktown, Innisfail, Townsville, Mackay, Springsure, Emerald, Bundaberg, Maryborough, Goondiwindi, Chinchilla, Allora and Gatton. *C. wadai* was picked up along the east coast at Cooktown, Innisfail, Townsville, Mackay, Bundaberg and Maryborough. The other vector species, *C. actoni* and *C. fulvus*, remained confined to the north-east of the state at the Cooktown site of Valley View. In previous years, these vectors had been identified as far south as Townsville. Valley View continues to be the stand-out site in terms of vector diversity with back-to-back "Tetravector" collections (e.g., all four vector species in the one collection) in both April and May, 2022.

Yield summary:

Vector yield was generally comparable to previous years, but total numbers decreased. Submissions in the first quarter of 2022 were especially poor. Approximately 20,113 individual *Culicoides* were collected during the financial year compared to ~31,867 the previous financial year. Historically, *C. brevitarsis* has been the most abundant vector species in Queensland traps, however, due to a few heavy collections, *C. wadai* was the most abundant vector species (13,961 individuals) this financial year. *C. brevitarsis* was the second most abundant vector species (6,034 individuals) followed by *C. actoni* (82) and *C. fulvus* (36). In some cases, total trap numbers were approximated. Counts from traps containing large numbers (e.g., >500) were generated by extrapolating subsamples where entire samples are screened by eye but not count or speciated beyond the first ~500.

Table 1. Number of *Culicoides* vector species by quarter from QDAF-managed sites in 2021/22.

	Q1	Q2	Q3	Q4	
	Jul - Sep 21	Oct - Dec 21	Jan - Mar 22	Apr - Jun 22	Total
<i>C. brevitarsis</i>	747	2,760	233	2,294	6,034
<i>C. wadai</i>	29	45		13,887	13,961
<i>C. actoni</i>		4		78	82
<i>C. fulvus</i>				36	36
Total	778	2,809	233	16,295	20,113

Culicoides species diversity:

Approximately 32 *Culicoides* species were identified this financial year, with a further six assigned to a species group (Table 1). Several *Culicoides* were donated to the NAMP Reference Entomology Collection for slide-mounting and molecular barcoding.

Table 2. Total *Culicoides* species diversity from QDAF-managed sites in 2021/22.

Species-level ID	Species-level ID	Species group
<i>C. actoni</i>	<i>C. leanderensis</i>	<i>C. antennalis</i> group
<i>C. antennalis</i> group #3	<i>C. longior</i>	<i>C. clavipalpis</i> group
<i>C. antennalis</i> group #5	<i>C. marksii</i>	<i>C. molestus</i> group
<i>C. austropalpalis</i>	<i>C. marmoratus</i>	<i>C. ornatus</i> group
<i>C. brevitarsis</i>	<i>C. melanesiae</i>	<i>C. victoriae</i> group
<i>C. bundyensis</i>	<i>C. molestus</i> group #5	<i>C. williwilli</i> group
<i>C. bunrooensis</i>	<i>C. nattaiensis</i> (species near)	
<i>C. clavipalpis</i>	<i>C. ornatus</i>	
<i>C. clavipalpis</i> group #11	<i>C. ornatus</i> group #6	
<i>C. clavipalpis</i> group #8	<i>C. oxystoma</i>	
<i>C. dycei</i>	<i>C. parviscriptus</i>	
<i>C. fulvus</i>	<i>C. shermani</i>	
<i>C. guttifer</i>	<i>C. sumatrae</i>	
<i>C. henryi</i>	<i>C. victoriae</i>	
<i>C. histrio</i>	<i>C. wadai</i>	
<i>C. jacobsoni</i>	<i>C. zentae</i>	

Exotic vector surveillance:

No exotic *Culicoides* spp. were identified this financial year. Traps continue to be monitored closely for incursions of exotics, particularly those in the far north. The *Culicoides* species from the Asia-Pacific region of greatest biosecurity concern to Australia are *C. imicola*, *C. nudipalpis*, *C. orientalis*, *C. flavipunctatus* and *C. asiatica* given their competency, or potential competency as vectors of BTV and other arboviruses such as African Horse Sickness.

Other news from the QDAF entomology team:

The NAMP entomology team welcome the permanent appointment of Dr Natalie Leo as Senior Scientist (Parasitology) at the Biosecurity Sciences Laboratory in July this year. Some of you might remember Natalie as my NAMP entomology backfill in 2020. Natalie will provide diagnostic support for the NAMP and maintain her *Culicoides* identification skills by attending the entomology training workshop later in the year.

Leanne has sent field samples preserved in 40% P. glycol to Glenn Bellis for molecular testing to determine the suitability of P. glycol to preserve DNA and the morphological integrity of specimens. P. glycol has been used in Queensland light traps as an alternative to ethanol for approximately two years to overcome IATA's strict packaging requirements for ethanol-preserved samples travelling by air. Compliance of IATA's special provision A180 (Dangerous Goods Regulations) requires ethanol-preserved specimens in zip-lock bags to be heat sealed. Heat sealers had not been provided to, or used by our submitters so there were concerns surrounding safety and compliance of NAMP insect submissions. Ralph Stutchbury (NAMP trap technician) investigated whether heat sealers could be purchased and supplied to submitters but deemed it impractical and costly. Hence, the move to P. glycol. Ethanol-preserved samples that are not heat-sealed may be sent by road mail, but submission time frames would likely blow-out given the remoteness of many co-operators.

ACTIVITIES COMPLETED AND SIGNIFICANCE TO NAMP OBJECTIVES**Under-activity**

Entomology and blood collections have been impacted by staff shortages, sites leaving the program and unfavourable weather conditions, especially in the in north-western, south-east and south-western areas.

Over-activity

No impact.

RECOMMENDATIONS TO MANAGEMENT COMMITTEE

That the Technical Committee endorse the following operational activities:

- The continuation of blood and insect collection activities at the University of Qld Veterinary School site at Gatton. This site combines the following attributes:
 - A valuable location within an agriculturally rich and active area
 - Favourable weather conditions for sustaining BTV vector species for most of the year
 - Opportunity to access and sample other BTV-susceptible farm animal species on site should the need arise
 - Opportunity to involve students in collection activities and raise awareness of the NAMP within the veterinary profession.