

Annual NAMP Entomology Report for Queensland DAF-managed Sites 2021-22

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Site summary:

QDAF managed approximately 20 entomology sites in the 2021/22 financial year including three newly established sites in the state's north-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. 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 20 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 the two new sites Q417 and Q420 and now obsolete Q324), the laboratory received 68 (~62%); a 10% increase from the previous financial year.

Vector summary:

Culicoides vector species were identified in collections from 14 out of 20 Queensland DAF-managed sites over the twelve-month period from July 2021 to June 2022 (Figure 1). The distribution of vector species was 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 and abundant 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 when in previous years 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 composition remained the same as in previous years, but total numbers decreased. *C. brevitarsis* was the most abundant vector (5,986 individuals) followed by *C. wadai* (1,785), *C. actoni* (82) and *C. fulvus* (36) (Table 1). Approximately 7,889 individual *Culicoides* were collected during the financial year compared to ~31,867 the previous financial year, probably owing to climatic factors. In some cases, total trap numbers are approximations given that counts from trap collections containing large numbers of *Culicoides* (e.g., >500) were generated by extrapolating subsamples (entire samples screened by eye but not count or speciated beyond the first ~500). Furthermore, one heavy collection from the far north submitted in June 2022 has not yet been processed. Vector yield during the first quarter of 2022 was especially poor.

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
<i>C. brevitarsis</i>	747	2,760	233	2,246
<i>C. wadai</i>	29	45		1,711
<i>C. actoni</i>		4		78
<i>C. fulvus</i>				36
Total	778	2,809	233	4,071

***Culicoides* species diversity:**

Approximately 32 *Culicoides* spp. 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 1. 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. marksi</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 of greatest biosecurity concern to Australia are *C. imicola*, *C. nudipalpis*, *C. orientalis*, *C. flavipunctatus* and *C. asiana* from the Asia-Pacific region 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 during her temporary stint in 2020. Natalie will provide diagnostic support for the NAMP and maintain her *Culicoides* identification skills by attending the NAMP 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 trap 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.