

Reference Entomology**RECOMMENDATION****1. That the NAMP Technical Committee NOTE:**

- a) The request for further technical assistance with biting midge identification from the Chinese government
- b) Problems with legacy insect data on the NAMP database

BACKGROUND**2. The functions of the NAMP reference entomology program are:**

- a) Confirm identification of *Culicoides* specimens collected by NAMP;
- b) Build and maintain a reference collection of Australian and important exotic species of *Culicoides* DNA barcodes and both slide-mounted and ethanol preserved specimens to assist with identification of specimens collected by NAMP;
- c) Provision of mounted specimens of *Culicoides* species to NAMP entomologists on request;
- d) Assisting in the preparation of identification aids for *Culicoides* species;
- e) Provide advice and reports to stakeholders and clients (particularly producers, exporters, and AG-DAFF) as required;
- f) Monitor NAMP entomology operations to ensure that they are effective and efficient in meeting the program objectives and report to the program manager;
- g) Advise the program manager of national and international entomology issues which may affect the future focus of the NAMP;
- h) Coordinate and propose to the NAMP Technical Committee, technical development of the NAMP entomology capacity as required;
- i) Contribute to the maintenance of the NAMP Business and Operational Plans including ensuring that an adequate budget is proposed for agreed reference entomology activities;
- j) Outsource slide mounting of *Culicoides* specimens to Biting Midge Laboratory Services;
- k) Monitor succession training for the role of Reference Entomologist;
- l) Facilitate the publication of technical entomology material for the NAMP as agreed by the NAMP Technical Committee.

Almost all of the NAMP reference entomology budget is used to outsource the mounting of specimens onto slides (function 10) which is required to facilitate the identification of specimens (function 1), build a reference collection (function 2), provide specimens to other entomologists (function 3), identify changes in risk posed by exotic species (function 7) and used in the production of identification aids (function 4). Where required, for example the detection of species not previously reported from Australia, confirmation of identifications is provided by DNA analysis conducted by NSW DPI which relies on data from the DNA library.

DISCUSSION**1. Detections**

The targeted species *Culicoides nudipalpis* was detected at 3 different sites in NT. The first detection was of 4 females near the Smith Point airstrip on Cobourg Peninsula on 29 November, 2019, the second of 2 females at Gunbalunya on 10 February 2020 and the third of a single female at Beatrice Hill on 2 April 2020. No further specimens were found in subsequent collections made monthly from any of these sites.

C. nudipalpis is the sister species to the Afro-Oriental species *C. imicola*, a notorious vector of BTV and African Horse Sickness viruses. Bellis et al (2005) produced some evidence that *C. nudipalpis* is a common and abundant mammal feeder in Timor-Leste and additionally reported the presence of BTV RNA in some specimens suggesting it may be a competent vector of this virus. Current geographical distribution data suggests that *C. nudipalpis* is a tropical species and is therefore not likely to survive in areas not already inhabited by vector species already present in Australia. As such, its impact on the epidemiology of arboviruses in Australia is likely to be less than an incursion of other, more cold tolerant species such as *C. imicola*, *C. obsoletus* or *C. sonorensis*.

The presence of multiple specimens in 2 of the collections and detections at three separate and geographically separated sites is suggestive of an established population. The absence of further specimens from any of these sites however, suggests that no populations have persisted. DNA analysis was conducted to ascertain if these specimens originated from a single introduction or from 3 separate incursions. Unfortunately, the DNA variation of this species in Timor-Leste, a likely source of these incursions, is very narrow and matched that of specimens from Cobourg and Gunbalunya so no conclusions can be drawn at this time. The specimen from Beatrice Hill is yet to be tested but given the narrow range of variation in the source population it is unlikely that further testing will clarify the situation.

2. Identification Service

A total of 227 specimens were received for identification from Qld and NSW. Mounting of these specimens onto slides and submission for DNA barcoding continues and the reference collection is slowly becoming more comprehensive. An analysis of species diversity and abundance on the New England Plateau by some external researchers revealed a series of questionable records in the database which we are working through. This raises an issue of a need to review data for accuracy before it is provided to external researchers.

3. New trap design

A trap designed by a manufacturer in Darwin to run on 12 AA batteries and with a significantly more robust casing was compared to the modified John Hock trap currently used by NAMP. Statistical analyses indicate that the two traps are comparable in the diversity and abundance of *Culicoides* species at several sites in NT. As such, this trap provides a realistic alternative to traps currently being imported from the USA.

4. Collaboration with China

A request to assist the Yunnan Provincial government of China with a project to identify the vectors of bluetongue virus in Yunnan was made to DAWE early last year. A decision was made for DAWE to fund a visit of Glenn Bellis to the Yunnan Tropical and Subtropical Animal Virus Disease Laboratory in Kunming, Yunnan, for a 4 week training program in November 2019. Early in 2020, the laboratory successfully applied for local funding for a follow up visit to further the collaboration. Current travel restrictions prevent this occurring this calendar year so it has been decided to defer this project until these restrictions have been eased.

5. African Horse Sickness

The outbreak of African Horse Sickness in Thailand prompted the OIE to produce a series of webinars informing local officials and researchers of the current status of this disease and its vectors and potential impacts should the disease become established in Asia. Glenn Bellis was asked to present on potential vectors of AHSV in Asia in one of these webinars on 20 April 2020, alongside international experts on vector monitoring and control.

FINANCIAL IMPLICATIONS

Nil

CONSULTATION/COMMUNICATION

NEXT STEPS/ACTIONS

Nil