Mosquito monitoring 2025
Dr. Peter Enevoldson

Summary.
1. Monitoring was carried out along the same lines as in the last few years, with weekly adult trapping, marsh pool dipping, biting nuisance forecasting and online bite reporting.
2. The number of adult mosquitoes caught in the traps was comparable to normal years (though roughly half the record numbers caught in 2023 and far less than in 2024). Most occurred in October and November with peak numbers in week 45 (early November). The timing of the autumnal surge was rather later than usual, probably because the breeding pools were barely filled by the September high Spring tide and most were not filled till October. There was a significant mosquito biting nuisance anecdotally in October and November though the number of bite reports were less than in recent years (except 2022). Notably, mosquitoes were once again caught in the traps in late December, despite some prior mild frosts and storms.
3. Research continued, partly in collaboration with university academics.

Methods
1. Traps (which capture adult female mosquitoes attracted to carbon dioxide and octenol, and so only those species of mosquitoes that may bite humans, as well as other mammals and sometimes birds)
   a. Three or four traps weekly from 7th April (week 15), and this year continued, as last year, till end of December.
   b. 2 days a week
   c. Four traps, two very near marsh, two 1 – 2km from marsh, Little Neston and Parkgate/Neston
   d. One trap on Earle Drive was run from the end of January
2. Weekly surveillance of study pools at Quayside, similar to last 14 years
3. Wider surveillance of other marsh pools, mainly near Quayside, roughly weekly and year round
4. Wider surveillance of some known freshwater mosquito breeding sites over radius of about 3 miles.

Trap Results

1. The number of mosquitoes trapped was about the same as 2020 and 2024, more than in 2021 and 2022, fewer than 2024 and far fewer than the records set in 2023 (Fig 1a). As usual, except in Winter, *Aedes detritus* remains by far the most numerous and widespread trapped species, also occurring in more weeks than any other species. (Fig 1a & 1b)
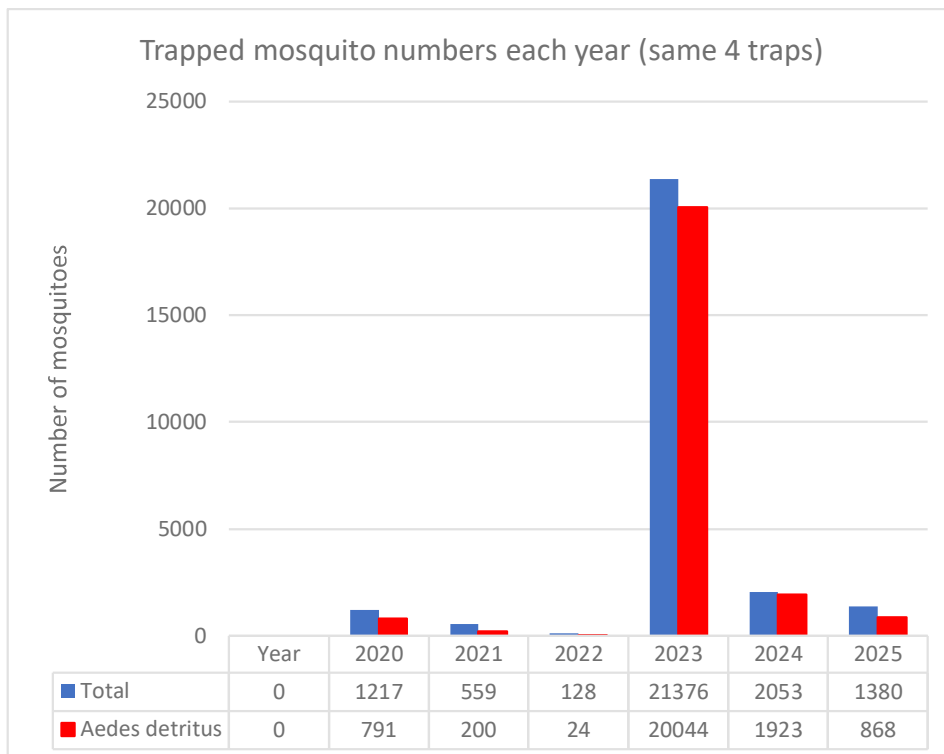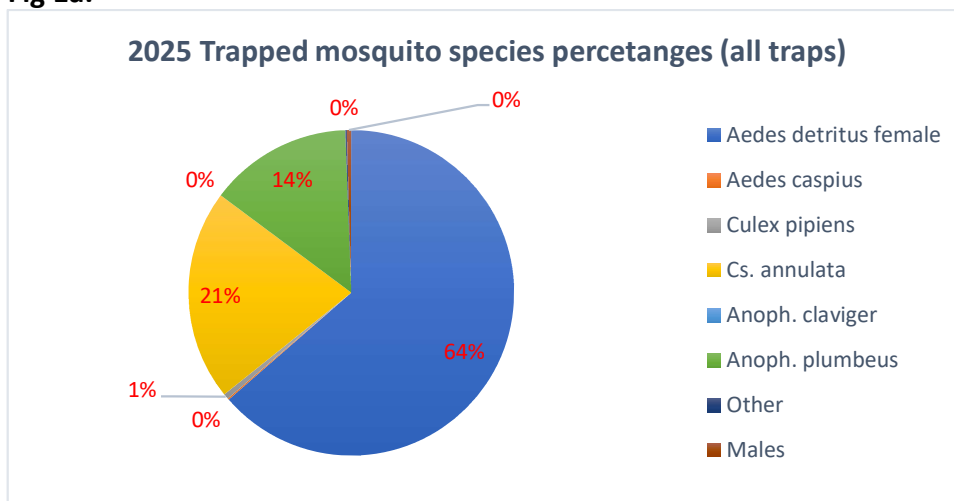
Trapped mosquito numbers each year (same 4 traps)

Year	2020	2021	2022	2023	2024	2025
Total	0	1217	559	128	21376	2053	1380
Aedes detritus	0	791	200	24	20044	1923	868

Fig 1a.

2025 Trapped mosquito species percetanges (all traps)

- Aedes detritus female — 64%
- Aedes caspius
- Culex pipiens
- Cs. annulata — 21%
- Anoph. claviger
- Anoph. plumbeus — 14%
- Other
- Males

0%   0%   0%   1%   0%

Fig 1b.

2. There was a not unexpected minor peak in numbers (very largely *Aedes detritus*, Fig 2) in May and June, the result of spring high tides in late March and April. The breeding pools then dried up during the very dry and hot summer and there were pretty well no marsh mosquitoes of any species. Refilling of the breeding pools by spring high tides in mid-September was incomplete and did not occur properly till heavy rain later in September and the spring high tide on 9/10/25 Filling of the breeding pools produced the expected mass hatching of eggs leading to the autumnal surge in adults at the beginning of October, building up to a peak in early November. There continued to be some *Aedes detritus* to some lesser degree until the week before Christmas (week 51). The mild and wet autumn probably facilitated the survival of adults. The continuation of adult *Aedes detritus* into December appears to be a relatively recent phenomenon of the last few years.
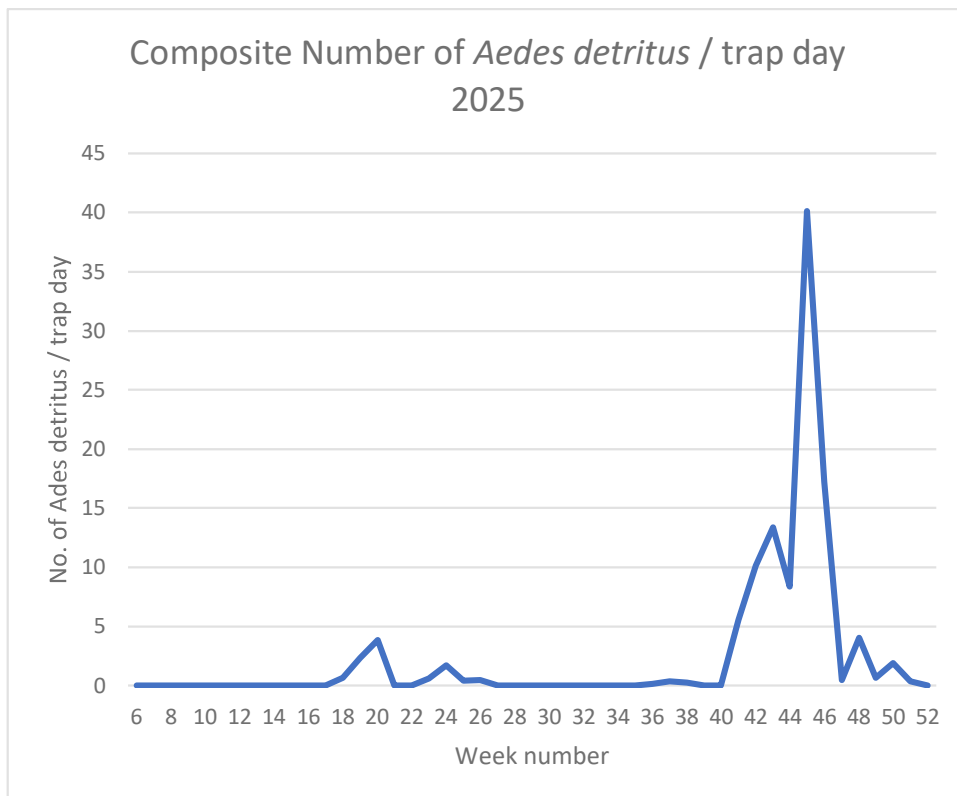
Fig 2.

3. Other species

Though the numbers were small in comparison, there was also a summer peak in another species, ***Anopheles plumbeus*** (Fig 3a). This is a mosquito that breeds in mature deciduous trees and was found in particular in a garden in Parkgate which is surrounded by such trees. Smaller numbers were trapped elsewhere. The numbers were not as high as 2024 (which was exceptional) but still sufficient to represent an important resource for researchers at the Liverpool School of Tropical Medicine.

Fig. 3a

Culiseta annulata is a widespread mosquito which can breed almost anywhere. We always trap some from Spring till mid-autumn. However, this year, which was the first time that a trap was run in one site (top of Earle Drive) weekly from late January till April, we trapped significant numbers in Winter and early Spring on bright, sunny and relatively mild days (Fig 3b.). This is a well-recognised phenomenon for this mosquito which may hibernate for periods over the winter and/or exist as pupae and can emerge as adults rapidly in spells of relative warmth in Winter.
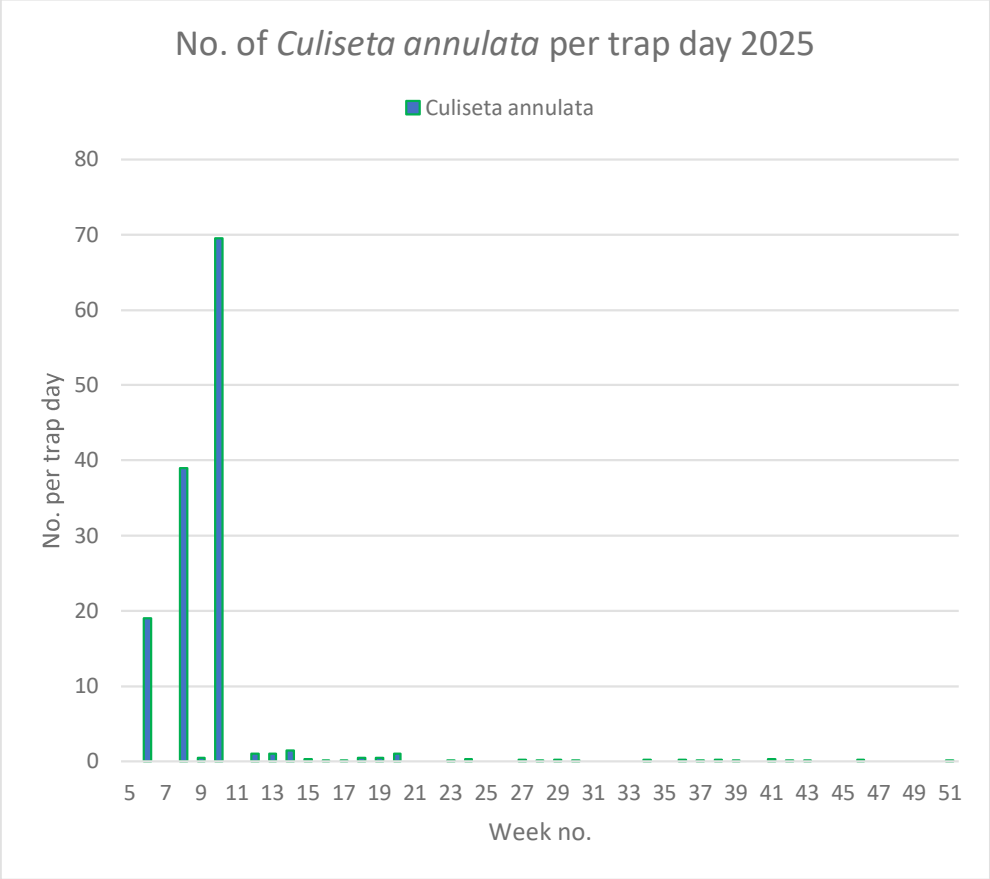

Fig. 3b

4. This year the greatest number of mosquitoes was trapped in Parkgate, in the trap at top of Earle Drive (Fig 4).

No. of trapped mosquitoes at each site 2025

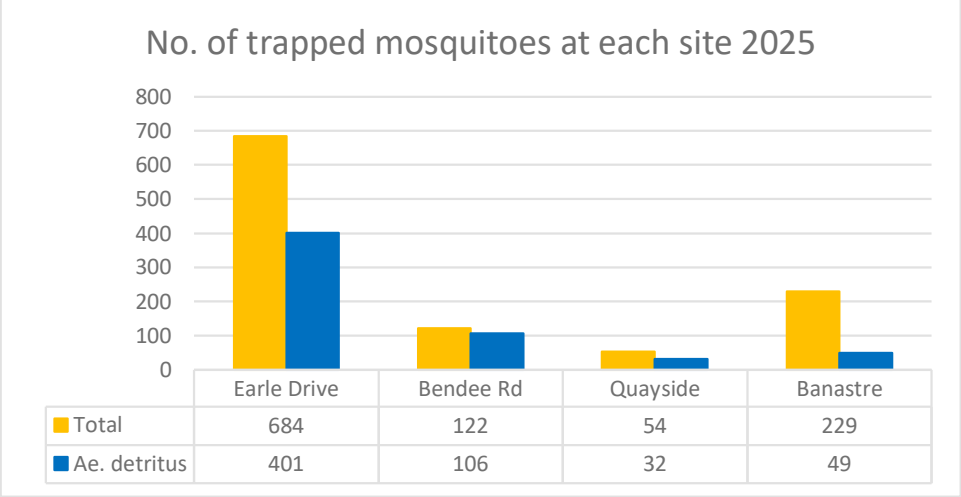|	Earle Drive	Bendee Rd	Quayside	Banastre
Total	684	122	54	229
Ae. detritus	401	106	32	49

Fig 4.

5. We can compare numbers to previous years reliably in two ways:
   a. We have data from one trap site (Bendee Road) since 2013, and the results indicate that at this site the numbers of adult *Aedes detritus* trapped in 2025 was within the normal range.
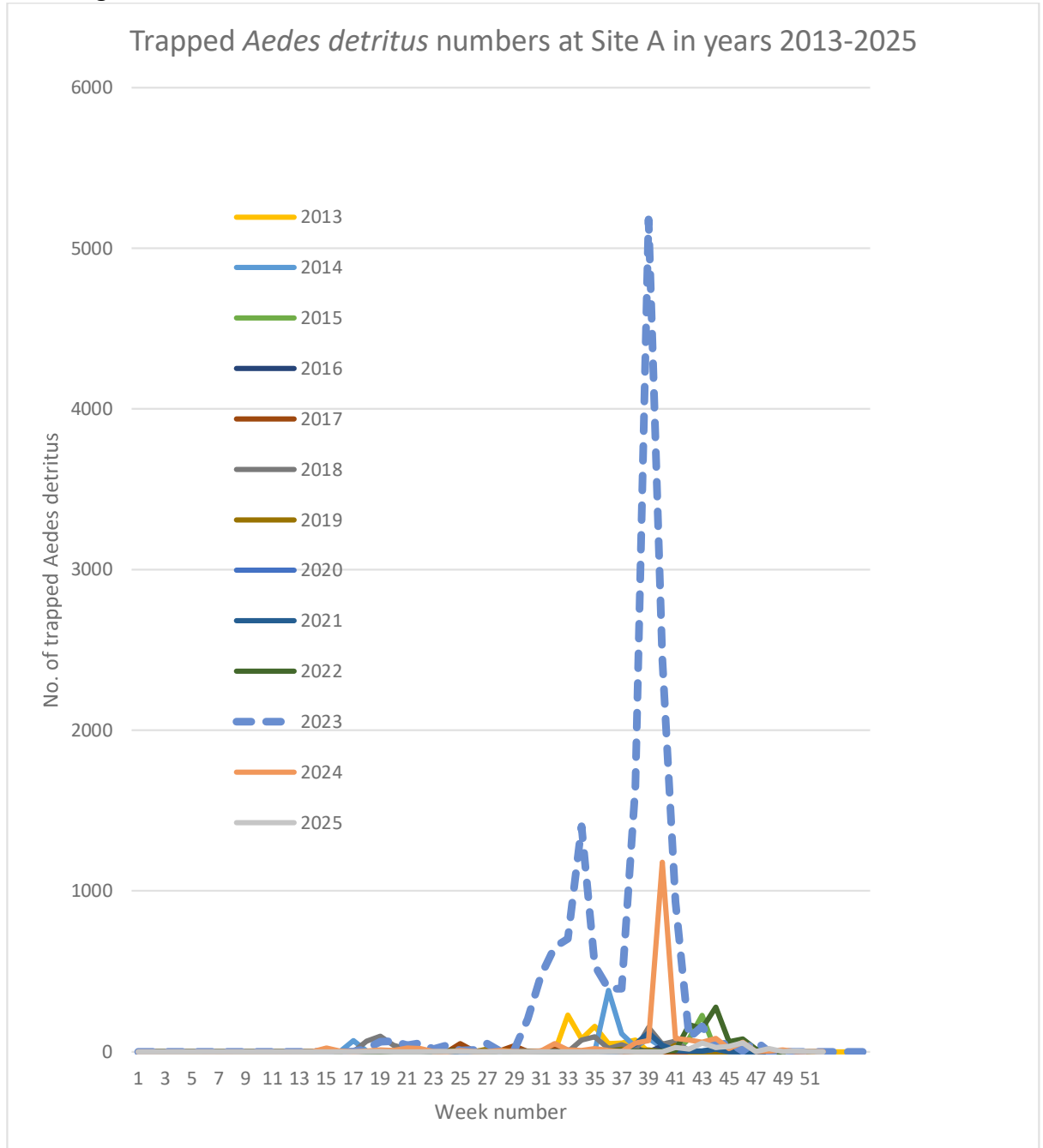

Fig. 5a

   b. The annual sum of trapped mosquitoes (all species) and *Aedes detritus* (only breeds on the marsh) are shown in Fig 1a. for all four present traps for the last 6 years.

Pool dipping results

1   Prof. Clarkson started collecting data from dipping pools at Quayside in Little Neston in about 2012. Pretty well the same pools have been surveyed ever since (the "Clarkson pools"). For the last 6 years this has been done weekly and extended to include all weeks of the year. However, over the last 6 years, pools from a much wider area have been dipped in addition to the "Clarkson pools". Generally, the results have been broadly similar and there has been no conflict in terms of using the results for the purposes of the mosquito forecast. However, some discrepancies have been noted in some weeks, and this emphasises what Prof. Clarkson and I had already realised, namely that the Clarkson pools are not completely representative of the local marsh pools (and a number of reasons may be advanced for this). Sampling of other pools revealed the presence of larvae at times when none were found in the Clarkson pools. In consequence, a wider range of pools has been surveyed each week and the results used in the weekly forecast.

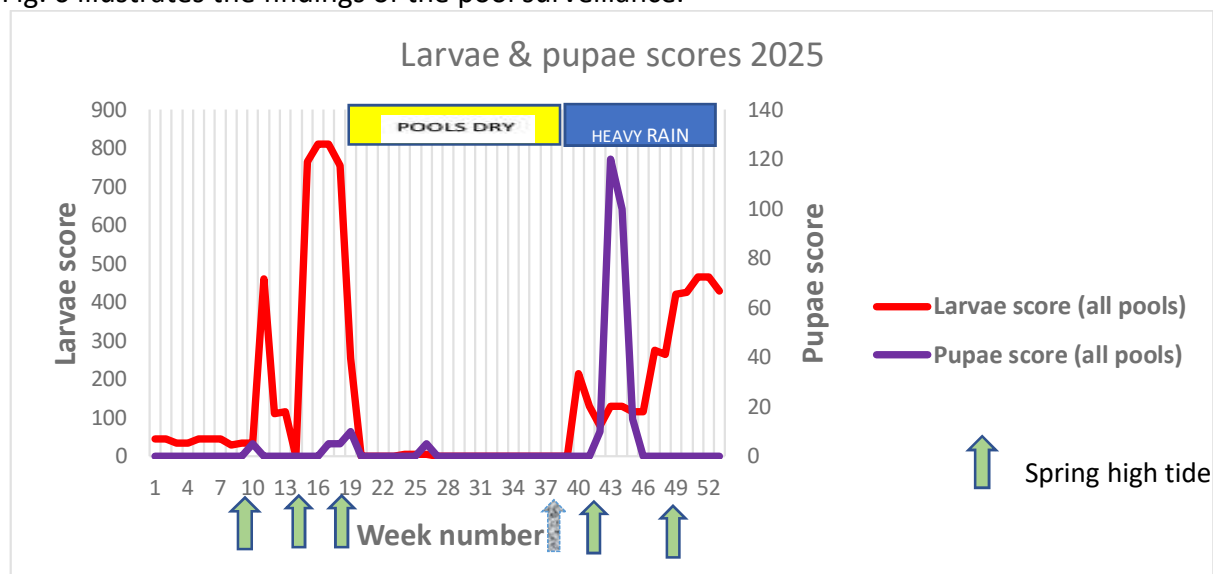2   Fig. 6 illustrates the findings of the pool surveillance:

Fig. 6

Breeding pools were wet over Winter with modest numbers of surviving larvae. The first spring high tide apparently triggered mass hatching of eggs with rapid increase in larval numbers, repeated four weeks later. Some of these larvae were beginning to pupate (the stage before emerging as adults) when the pools dried up due to the hot, rainless weather. The spring high tides of 10th and 11th September (week 37) were uncharacteristically "low" and many of the breeding pools surveyed did not fill. However, there was heavy rain later in September and the next tide (week 41) filled all the breeding pools, causing further egg hatching.

3   Other notable results from the dipping are:
    a. Over the last 6 years, larvae have been discovered which have been shown by various methods to be a species called *Culiseta litorea*. This species bites birds but importantly has never been found in the Dee estuary previously and classically was thought only to occur in southern England. More extensive dipping studies this year have identified that this species is only found in certain types of pools: small, highly vegetated and near the edge of the "marsh". Furthermore, they appear to be emerging as adults

rather earlier in the year than published data would suggest. These findings have been supplemented in 2025, with a view to publication in 2026.

b. Over the summer, some larvae of a species called *Culex pipiens* were found, as in most years. This is a very common species (elsewhere in the UK it is the commonest) which very rarely bites humans and animals (and so it is not attracted to our Mosquito Magnet traps) and typically bites birds. It most commonly breeds in freshwater (e.g. water butts, rain-filled buckets or flood puddles) but can also breed in weak brackish water (as was the case in marsh pools which had been filled by rainwater). This species will not have added to the mosquito biting nuisance locally or contributed to the reported trap results. Most importantly, **none of those reared from the marsh larval samples or the few caught in the traps were of the species *Culex modestus*** (a species that will bite humans and can convey certain viruses).

Forecast results

1   Produced weekly (Friday, looking forward to forthcoming week) from early April to mid-December. Published on NTC website and on NTC social media.
2   Traffic light report (Fig. 7)
3   The forecast is based upon trap results from preceding few days, pool dipping on the previous day, and weather forecast for forthcoming week (the most difficult element).
4   Some narrative explanation
5   Accompanying encouragement to report any bites online.
6   The site also includes advice about preventative measures and treatment of mosquito bites during red and amber forecast weeks
7   Generally accurate though error in week 45: forecast mistakeny lowered to green on basis of reduced numbers of *Aedes detritus* in preceding week and the time of year.
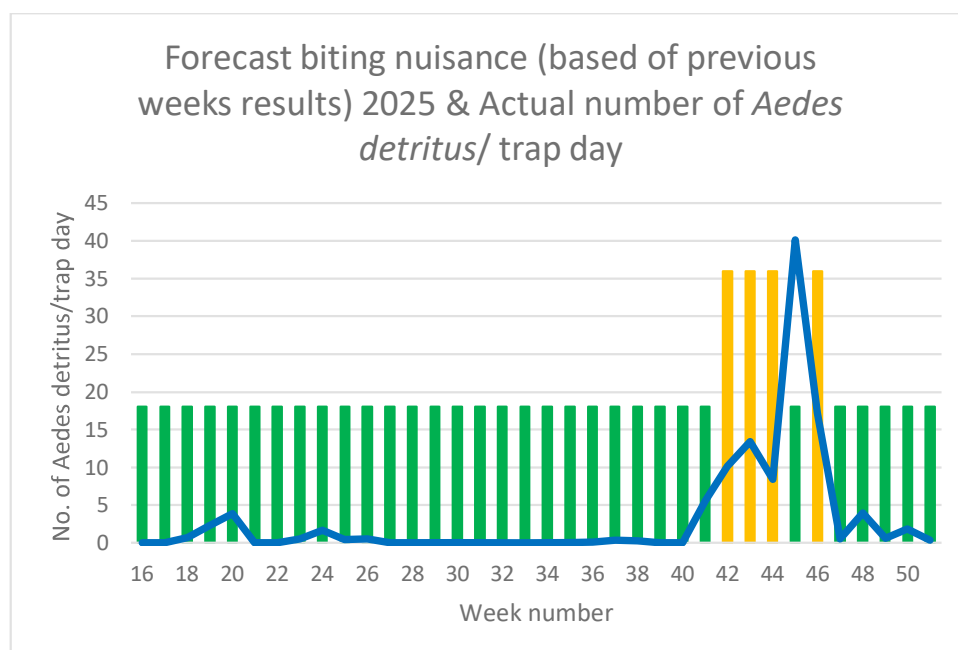

Fig. 7

Bite reports

1. Online reporting, now with a mapping facility.
2. Form deliberately kept simple
3. In 2025, 100 reports of 116 bites filed, rather fewer than in most previous years.

Year	No. of bite reports	First week	Last week	Peak number of bite reports/wk.	Week of peak bite report
2025	**100 reports (115 bites)**	**8**	**49**	**26**	**45**
2024	161 reports (197 bites)	14	48	48	38
2023	553 reports (690 bites)	19	46	134	36
2022	38	18	46	8	43
2021	169	15	46	26	23
2020	293	19	48	45	26
2019	216	16	45	66	35

4. Reasonable correlation with trap results and with forecasts (Fig. 8), considering likely daily weather variations affecting trap results and biting nuisance.

Fig.8 Weekly bite reports and numbers of mosquitoes trapped

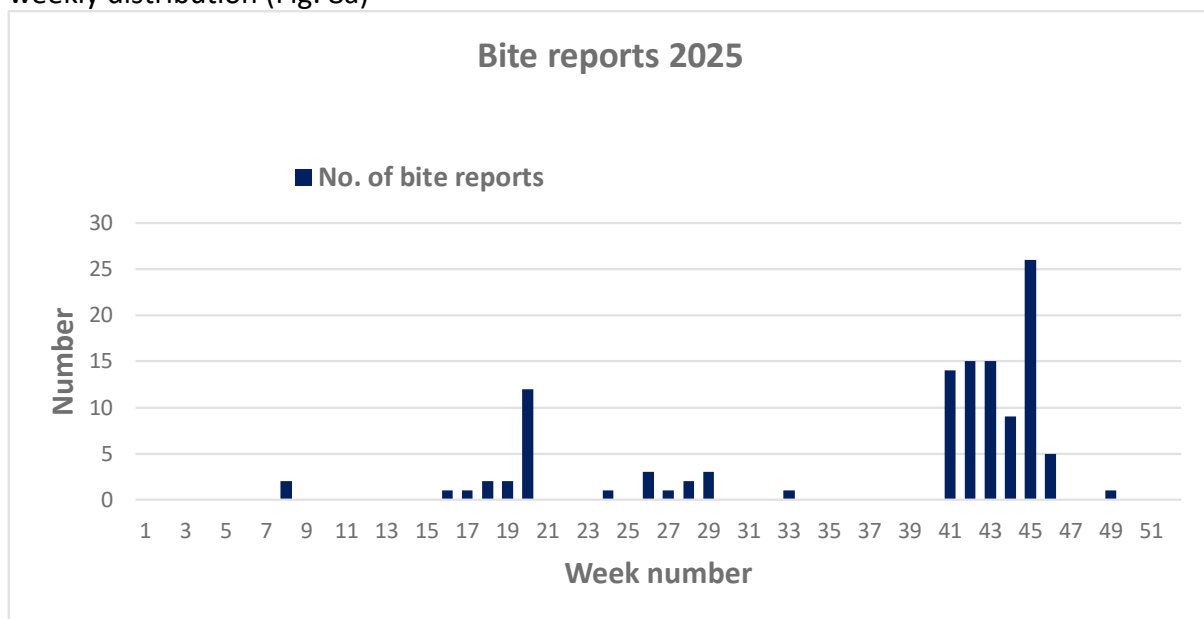5   Analysis by
a.   weekly distribution (Fig. 8a)

Fig 8a Weekly bite reports

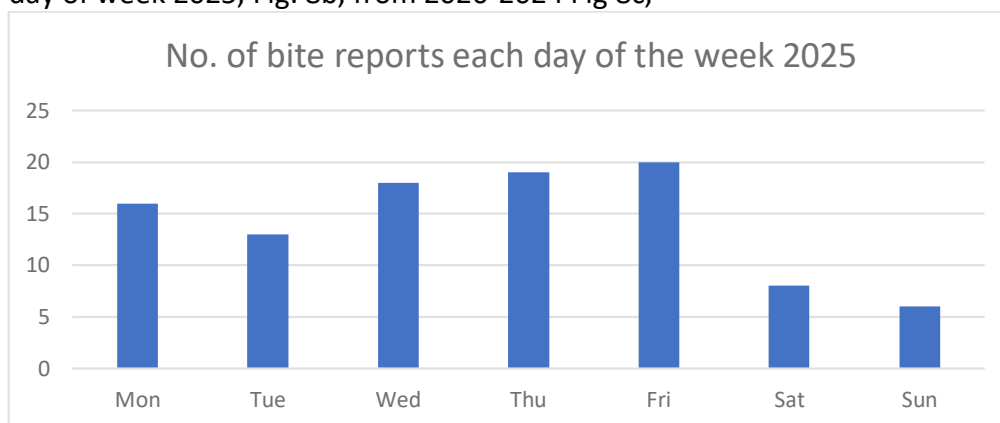b.   day of week 2025, Fig. 8b, from 2020-2024 Fig 8c,
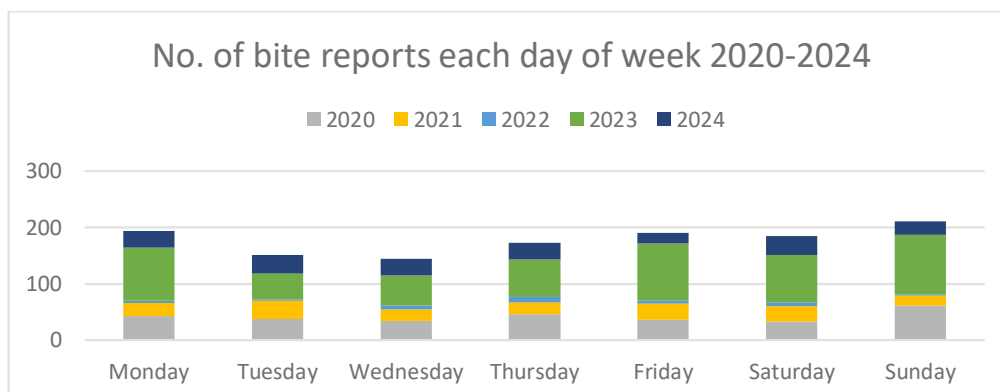

Fig. 8b

Fig. 8c

c. time of day (Fig. 8d): as usual, the most common time for bites to be reported is between noon and 6pm, followed by between 6pm and midnight. Note that this may depend upon time of the year, the time of the sunset and temperatures but seems consistent across the years (Fig. 8e)
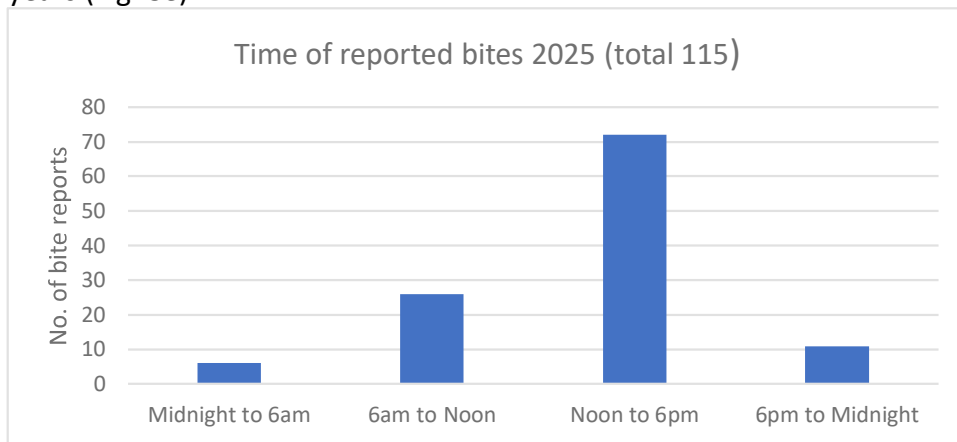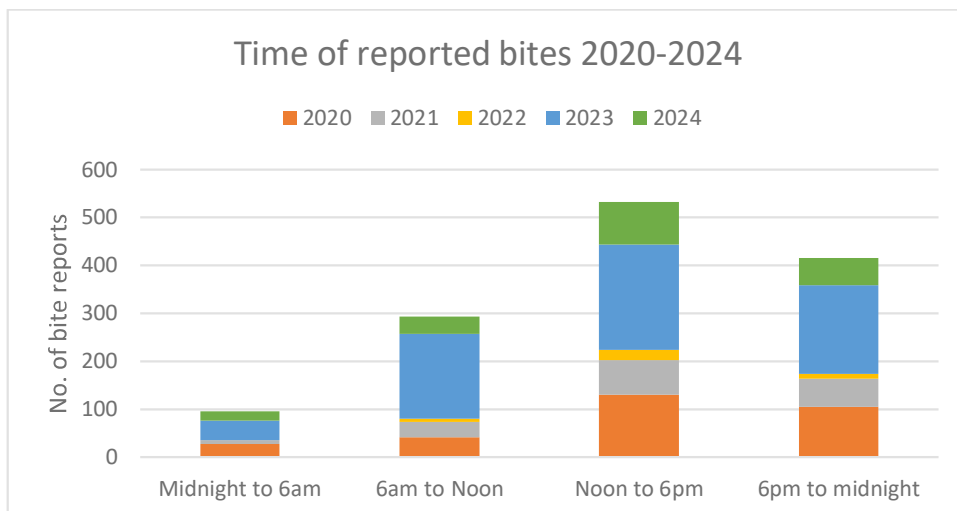

Fig 8d

Fig 8e

d. location (Fig. 8f & 8g, larger scale). Data is being stored for future analysis on temporal and spatial correlation each week as we accumulate more data over coming years.
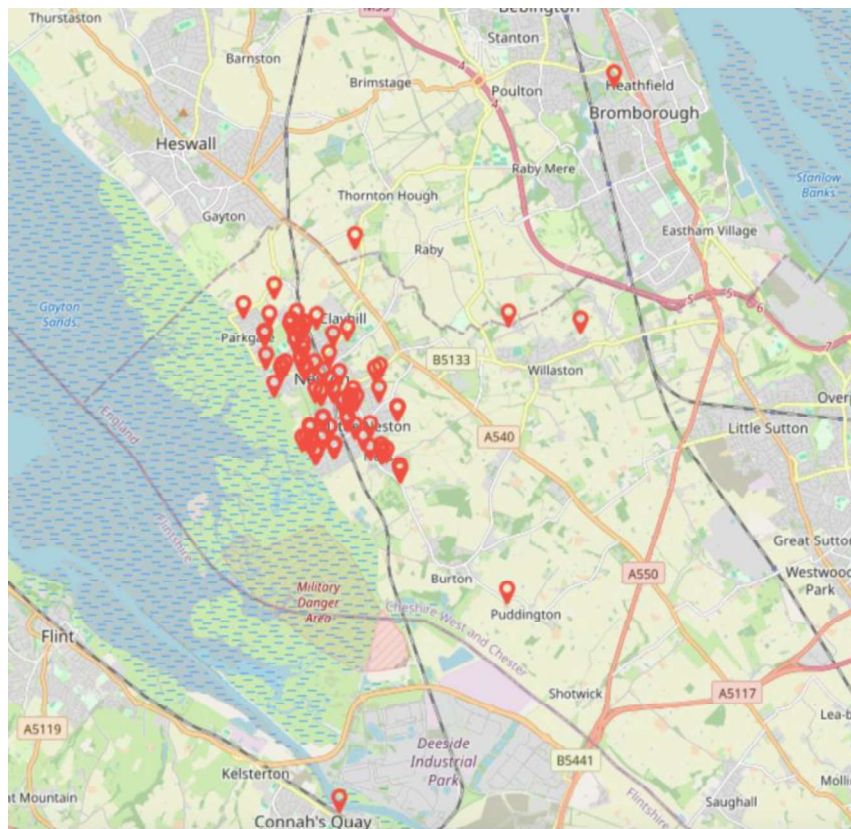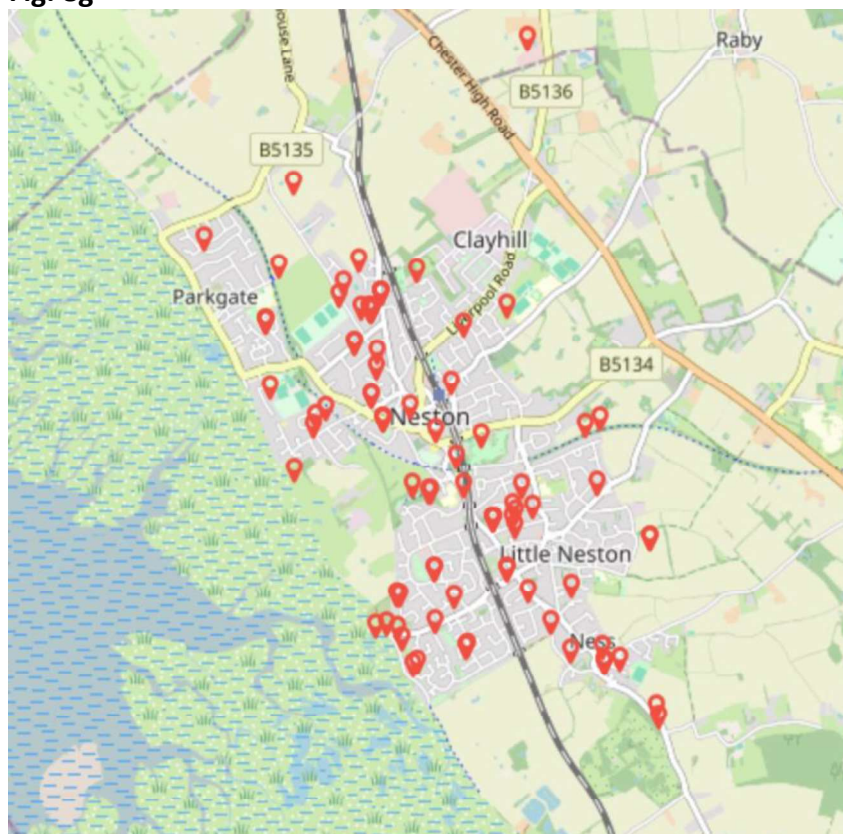
Fig. 8f Location of bite reports 2025

Fig. 8g

Research

Published
Long term viability of *Aedes detritus* (Haliday) and *Aedes caspius* (Pallas) (Diptera, Culicidae) eggs. Dipterists Digest 2025 32, 36-38. P. Enevoldson

As yet unpublished, in preparation:
Over-wintering of *Aedes detritus*, distribution of *Culiseta litorea & Culiseta morsitans*.

Ongoing collaborations: with research scientists at
- Liverpool School of Tropical Medicine
- The Museum of Wales

Results also reported to UK Health Security Agency annually