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Culicoides chiopterus a potential vector of bluetongue virus in Europe

In August 2006 bluetongue (BT) appeared for the 1st time in northern Europe and by December [2006] had affected more than 2000 sheep and cattle holdings in the 5 Member States (MSs) Belgium, France, Luxembourg, Germany, and The Netherlands. Following upon a mild winter BT recrudesced explosively in 2007 and by the end of the year 10 MSs had reported more than 55 000 outbreaks in total. While outbreaks in The Netherlands continued to occur in the previously affected southern regions, ever-increasing numbers of infections were being reported also from the central and more northerly parts of the country. To establish which species of *Culicoides* were involved in this northward movement of BTV, an entomological field study was conducted in the central district of Apeldoorn.

Between 3-17 Oct 2007, 45 912 *Culicoides* were captured in 65 light trap collections made on one sheep and 4 cattle farms; after morphological identification and age-grading at the Plant Protection Service in Wageningen 3138 non-engorged, parous, and gravid female midges were selected and divided amongst 81 species-specific pools, and represented by 1899 *C. chiopterus* (44 pools), 738 *C. obsoletus/scoticus* (18), 433 *C. dewulfi* (14), and 68 *C. punctatus* (5); each pool contained 1-65 individual midges. The pools were code-numbered and then screened by the Central Veterinary Institute, Lelystad, for the presence of BTV-8 using an in-house developed, and extensively validated, RT-PCR [reverse transcriptase polymerase chain reaction] test.

Amongst the 44 pools of *C. chiopterus*, one pool of 50 parous midges was found reproducibly PCR-positive in the RT-PCR assay to BTV. The field infection rate for *C. chiopterus* thus approximates 0.05 percent based on the assumption that only one midge contained detectable levels of BTV. This finding is original in that *C. chiopterus* has never before been linked to the transmission of BTV in Europe.

Aspects of the behavioural ecology of *C. chiopterus* are known, the most pertinent from a veterinary point of view being that it attacks cattle and horses and breeds exclusively in their dung. For these reasons *C. chiopterus* can be aligned with another coprophilic species, that is, *C. dewulfi*, which is considered also a potential vector for BTV and based on similar RT-PCR-positive results obtained during the 2006 phase of the outbreak.

Within the Palaearctic biting midge fauna, *C. chiopterus* is a monophyletic taxon of the subgenus *Avaritia*, but like *C. dewulfi* is mostly erroneously placed within the so-called *C. obsoletus* group or *Obsoletus* Complex.

In 2006 a "snapshot" survey revealed both *C. chiopterus* and *C. dewulfi* to be widely distributed across The Netherlands, occurring on approximately 70 percent of 106 farms sampled; during the same survey the *Obsoletus* Complex, another potential vector for BTV, and represented by 2 species (*C. obsoletus* and *C. scoticus*) was found on 94 percent of the farms. This ubiquity of multiple vectors of BTV holds true for large parts of northern Europe and helps explain the dramatic spread of BT across the region. Of particular concern is that some proven world vectors of BTV are competent at transmitting another -- and more devastating -- pathogen, namely African horse sickness virus (AHSV). Given the existence of some 400 000 horses in The Netherlands it is essential that the veterinary authorities now ascertain the population levels and biting behaviour of *C. chiopterus* in the vicinity of stables. This recommendation applies to all MSs and to other potential vectors, principally *C. dewulfi* and the *Obsoletus* Complex.

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