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The surveillance programme for bluetongue in Norway 2025

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The surveillance programme for bluetongue in Norway 2025

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Summary

Bluetongue re-emerged in Norway in September 2024, marking the first outbreak since 2009. There were only a few new cases of bluetongue in 2025, a significant reduction compared with the previous year. Within the surveillance programme, bulk milk sampling in high-risk areas did not reveal any seropositive herds considered to have been infected in 2025. Testing of individual animals in these areas identified bluetongue virus in one adult animal, possibly infected during the 2025 vector season. Through passive surveillance, bluetongue virus was detected in 32 herds; however, 31 cases involved calves most likely infected *in utero* during 2024, while only one case involved an adult animal likely infected during the 2025 season. Vector activity was recorded mainly from traps in Southern Norway during spring (from mid-March to mid-June) and autumn (early September to end of November). The estimated vector active period in 2025 in Southern Norway was mid-May to mid-November.

Introduction

Bluetongue is a vector-borne disease caused by bluetongue virus (BTV), a member of the genus *Orbivirus*. At least 27 serotypes (BTV 1-27) have been identified. The virus is primarily transmitted by biting midges of the genus *Culicoides*, and affects domestic and wild ruminants, including cattle, sheep, goats, camelids, and deer. Clinical manifestations vary between species; cattle typically show mild or no symptoms, while sheep may develop severe, sometimes fatal disease. Clinical signs include fever, lethargy, oedema of the head and ears, oral and nasal ulcerations, and coronary band inflammation causing lameness. Abortions or foetal malformations may occur (1).

Transmission of BTV occurs when biting midges feed on viraemic animals, allowing virus replication in the midge's salivary glands and transmission to new hosts during subsequent blood meals. This process is strongly influenced by ambient temperature, resulting in the seasonal occurrence of bluetongue disease (1). In Norway, the vector-active season typically spans from May to November, peaking in late summer (2). Bluetongue is classified as a List 1 disease in Norway, and falls under disease categories C, D, and E within the EU throughout the reporting period covered by this report (2025). Subsequent amendments to the disease categorisation, effective from 2026, are outside the scope of the present report. The disease is also listed by the World Organisation for Animal Health (WOAH).

Bluetongue surveillance has been conducted in Norway since 2008, following the emergence of BTV 8 in the Netherlands in 2006 and its spread in Northern Europe. In connection with this outbreak, four cattle herds in Southern Norway were found to be seropositive for BTV 8 in early 2009. Following two years of intensified monitoring with no further detections, Norway was considered free from bluetongue. Since then, the surveillance programme has primarily been based on bulk milk testing (2-5).

In 2023, bluetongue caused by BTV 3 re-emerged in the Netherlands and spread across Northern Europe, leading to its detection in Norway in September 2024 (2). In response, the surveillance programme in 2024 was expanded to include broader bulk milk screening, and vector surveillance. Screening revealed substantially higher seroprevalence in Southern Norway than in 2009. Control measures were implemented by the Norwegian Food Safety Authority (NFSA), in collaboration with the Norwegian Veterinary Institute (NVI) and the livestock industry. These measures included movement restrictions, targeted testing, and voluntary vaccination.

In 2025, the number of bulk milk sampling rounds was reduced to one, as the high seroprevalence and vaccination coverage reduced its epidemiological value. Vector surveillance continued, and sampling of individual animals from abattoirs in high-risk areas was added. The NFSA was responsible for implementing the surveillance programme and collecting blood samples at abattoirs. The NVI was responsible for programme design, the collection of bulk milk samples from the dairies, laboratory analyses, the collection and analyses of midge samples, and reporting.

Aim

Following the introduction of BTV in Norway in September 2024, the aim of the 2025 surveillance programme was early detection of new introductions of BTV and monitoring of ongoing circulation of BTV during the vector season. Vector surveillance aimed to identify the presence of potential BTV vector species and to monitor vector activity, indicated by the presence of parous (blood-fed) female *Culicoides* species.

Materials and methods

Bulk milk surveillance

Herds and sampling

The target population of the surveillance programme were all dairy cattle herds in areas in Southern Norway considered at risk of BTV introduction.

For bulk milk submission, herds were eligible for inclusion if they had tested negative for BTV antibodies in bulk milk in 2024, had not introduced animals from bulk milk antibody-positive herds, showed no clinical signs consistent with BTV infection, and had not vaccinated any animals against BTV 3.

The dairy herds located in target counties of Southern Norway were selected for bulk milk sampling in late August (Table 1).

Table 1. Numbers of dairy herds in counties with selected herds and their results in the surveillance programme for bluetongue in Norway in 2025.

County	Dairy herds*	Selected herds	Sampled herds	Positive herds
Østfold	100	15	12	1
Akershus	96	45	40	0
Oslo	2	1	-	-
Innlandet	1 139	88	80	0
Buskerud	131	124	98	2
Vestfold	44	7	6	1
Telemark	66	30	21	1
Agder	259	66	48	12
Rogaland	999	498	416	17
Vestland	907	126	97	1
Total	**3 743**	**1 000**	**818**	**35**

* Based on data from the Register of production subsidies as of 1st of March 2025.

Laboratory methods

Bulk milk samples were tested for antibodies against BTV, using a commercial indirect enzyme-linked immunosorbent assay (ELISA), ID Screen® Blue Tongue Milk Indirect (IDvet, Grabels, France), according to the manufacturer's instructions (6). Samples with doubtful results were re-tested in duplicate using the same method. Doubtful samples that remained doubtful after retesting were concluded as negative herds.

In cases where herds were followed up by testing of individual animals, blood samples from lactating dairy cows were tested with the ID Screen® Bluetongue Competition ELISA (IDvet, Grabels, France).

Individual animal surveillance

Herds and sampling

Whole blood with EDTA anticoagulant was collected from 200 cattle at four abattoirs in high-risk areas for BTV introduction during July and August. The animals originated from 64 herds in 10 municipalities along the coastline of Agder county. A maximum of five samples per herd were collected. All cattle over six months of age were eligible, except those likely to have been kept exclusively indoors.

Cattle were also sampled through the surveillance programme for *Brucella abortus*. Blood samples were collected from 90 cows from 36 herds across Norway that had experienced late-term abortions. Herds were eligible if they had at least two abortions occurring between the fifth month of pregnancy and 14 days before the expected calving date within the previous 12 months (7).

Laboratory methods

The EDTA blood samples collected at abattoirs were tested for BTV RNA using a combination of a pan-BTV and a BTV 3-specific RT-qPCR assay (8, 9).

Sampled obtained through the *Brucella abortus* surveillance programme were analysed for antibodies against BTV using the ID Screen® Bluetongue Competition ELISA (IDvet, Grabels, France).

Vector surveillance

Sample collection

Vector surveillance started in autumn 2024, following the introduction of bluetongue to Norway. In 2025, the traps were operated from mid-March to mid-June (spring), and from early September to end of November (autumn). Onderstepoort blacklight suction traps were used for collection of the midges. The traps were located at farms close to the towns or villages Søgne, Konsmo, Skoppum, Vigrestad, Stange, and Sandnes. The farmers were responsible for capturing and submitting the samples to the laboratory. From one of the traps, we received only one sample. The traps were to be placed near farm animals and to be active for a 24-hour period, once a week in the designated sampling periods. After collecting the sample from the trap, the catch was transferred to a container with ethanol and shipped to the laboratory.

Laboratory methods

The samples collected were examined using a stereomicroscope. All the *Culicoides* in the samples were isolated, and the female *Culicoides* (Figure 1) were examined using morphological criteria to designate the midges into the following categories: blood-fed/parous; ≥ 5/< 5/not detected in sample, bad morphology (blood-fed status not possible to determine), and presence of midges belonging to *Culicoides obsoletus* complex and/or *Culicoides pulicaris* complex.

Figure 1. Blood feeding *Culicoides* female. (Photo: Inger Sofie Hamnes, Veterinærinstituttet).

The criteria for vector active period, as given in Regulation (EU) 2020/689, is finding more than or equal to five blood-fed midges in catches. Identification and enumeration of blood-fed/parous females were performed on the *Culicoides* found in the samples. If ≥ 5 blood-fed *Culicoides* females were found (indicating vector active period), no further identification of parous status was done in the sample.

Results

Bulk milk surveillance

In late August 2025, bulk milk samples from 818 dairy herds (Figure 2) were collected and analysed in the surveillance programme. Of these, 35 (4.2%) were positive for antibodies against BTV.

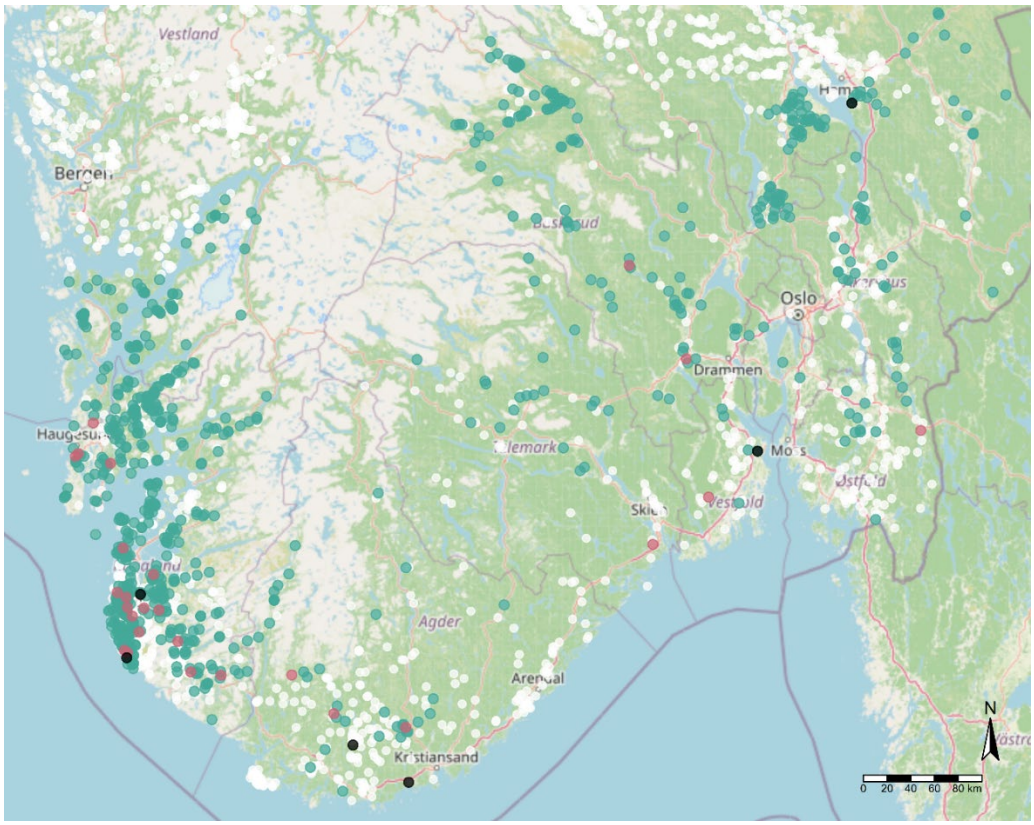

Figure 2. Detection of antibodies against bluetongue virus in bulk milk from 818 dairy herds in Southern Norway, 2025. Red dots mark dairy herds that tested positive, green dots mark negative herds, and white dots represent untested dairy farms. Black dots show the locations of the six midge traps.

Individual animal surveillance

A total of 200 EDTA blood samples from cattle in abattoirs were analysed by RT-qPCR. BTV 3 RNA was detected in one sample and not detected in the remaining 199 samples. The sample in which BTV 3 RNA was detected was collected from a Norwegian Red cow, approximately three years of age, originating from a herd in Vennesla municipality, Agder county.

Serological testing of 90 samples from cows with abortions identified six positive and 84 negative samples for antibodies against BTV. Of the six seropositive animals, three originated from two herds in Rogaland county and three from one herd in Telemark county.

Vector surveillance

Spring sampling period

A total of 46 samples were submitted and analysed from six locations (Figure 3, Table 2), 12 samples from Konsmo (Agder), 11 from Søgne (Agder), seven from Sandnes (Rogaland), six from Stange (Innlandet), five from Skoppum (Vestfold), and five from Vigrestad (Rogaland). The first sample was taken mid-March and sampling continued until farmers received information to stop sampling after > 5 blood fed midges were counted in the submitted samples. Vector active period started from end of April to mid-May for most of the locations. The first midge was caught 25th of March, but no blood fed midge was caught until 23rd of April.

A total of 1,912 female *Culicoides* was caught during the surveillance period, which gives an average of 42 midges per catch and ranging from zero to 410. In total 436 blood fed/parous females were caught, which is 23% of the total numbers of females caught.

The number of *Culicoides* collected varied considerably among sampling sites. The highest number of female *Culicoides* were caught in Søgne (863 of which 51 were blood fed). The highest number of blood fed midges were found in Stange (151 out of 427 females). The next location with high number of blood fed midges were Konsmo (133 out of 361 females). The numbers of blood fed midges were similar during the sampling period across the sites Vigrestad (34 out of 73), Sandnes (34 out of 65), and Skoppum (33 out of 123), despite differences in the total numbers of female biting midges collected.

The dominating species in the spring 2025 belonged to the *C. obsoletus* complex. This complex was present in all the catches containing *Culicoides* midges. The results from the 2025 spring vector surveillance are comparable with results from earlier.

The results from mid-March to mid-June (week 12-25) showed that ≥ 5 blood-fed/parous midges started to appear in trappings from 29th of April in Søgne followed by Stange on 11th of May. At the rest of the locations, Konsmo, Skoppum, and Vigrestad, ≥ 5 blood fed midges were present in trappings at different weeks (Figure 3).

From all locations, *C. obsoletus* complex was detected. *C. pulicaris* complex was found at all locations except Skoppum. Both these species complexes contain known competent vector species for BTV and other pathogens. In all samples, midges from the *C. obsoletus* complex were most commonly found, whereas midges from the *C. pulicaris* complex were present in 75.8% of the samples containing *Culicoides* spp. (Table 2).

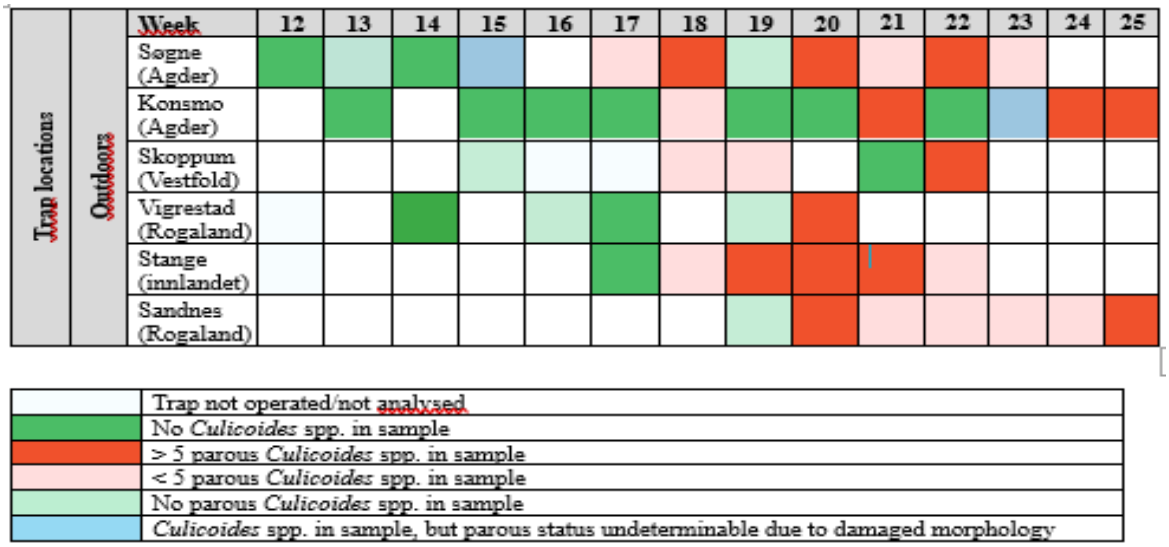

Figure 3. Blood-fed (parous) status in *Culicoides* in spring 2025.

Table 2. Results from spring vector surveillance 2025. Number of samples in the different categories is given per week.

	Week															
Category	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**Total**	**% samples**
Outdoor samples	1	2	2	2	2	4	3	5	5	4	4	3	2	2	41	89.1
Samples from inside open barn	0[c]	0[c]	0[c]	1	0[c]	0[c]	1	1	0[c]	1	1	0[c]	0[c]	0[c]	5	10.9
Total number of samples	**1**	**2**	**2**	**3**	**2**	**4**	**4**	**6**	**5**	**5**	**5**	**3**	**2**	**2**	**46**	
Culicoides spp. present	0	1	0	2	1	1	4	5	4	4	4	3	2	2	33	71.7
≥ 5 parous[a] *Culicoides* spp. present	0	0	0	0	0	0	1	1	4	2	2	0	1	2	13	28.3
1-4 parous[a] *Culicoides* spp. present	0	0	0	0	0	1	3	1	0	2	2	2	1	0	12	26.1
≥ 1 parous[a] *Culicoides* spp present	0	0	0	0	0	1	4	2	4	4	4	2	2	2	25	54.3
Culicoides spp. absent	1	1	2	1	1	3	0	1	1	1	1	0	0	0	12	26.1
Culicoides obsoletus complex present[b]	0	1	0	2	1	1	4	5	4	4	4	3	2	2	33	100
Culicoides pulicaris complex present[b]	0	0	0	1	1	1	3	4	4	4	2	2	1	2	25	75,8

a parous/blood-fed
b among 33 samples containing *Culicoides* spp.
c traps not operated or samples not analysed

Autumn sampling period

A total of 30 samples were submitted from six locations (Figure 4, Table 3). The number of female biting midges collected varied considerably among sampling sites. High number of female midges were caught from Søgne (4,190, including 1,140 blood fed midges). The next location with high number of blood fed midges was Sandnes (55 blood fed midges out of 124), followed by Skoppum (33 out of 158). In samples from Vigrestad, Stange and Konsmo, 27 out of 63, 12 out of 75, and 0 out of 3 collected midges were blood fed, respectively.

A total of 4,613 female *Culicoides* was caught during the autumn surveillance period, which gives an average of 154 midges per catch, with catches ranging from zero to 2,850. Overall, 1,267 blood fed/parous *Culicoides* were collected, which gives 27% of the total.

The results from September to November (week 36-48) show that ≥ 5 blood-fed/parous midges were present in trappings from Søgne from end of September until early-November, whereas in Konsmo no blood fed/parous midges were caught. In Skoppum, Sandnes, Vigrestad, and Stange, ≥ 5 blood fed/parous midges were present in trappings at different weeks (Figure 4).

From all locations, *Culicoides obsoletus* complex was detected, whereas *Culicoides pulicaris* complex was found at four locations (all except Konsmo and Stange). Both these species complexes contain known competent vector species. In the majority of samples (94.4%), midges from the *C. obsoletus* complex were most commonly found, whereas midges in the *C. pulicaris* complex were present in 72.2% of the samples with *Culicoides* spp. (Table 3).

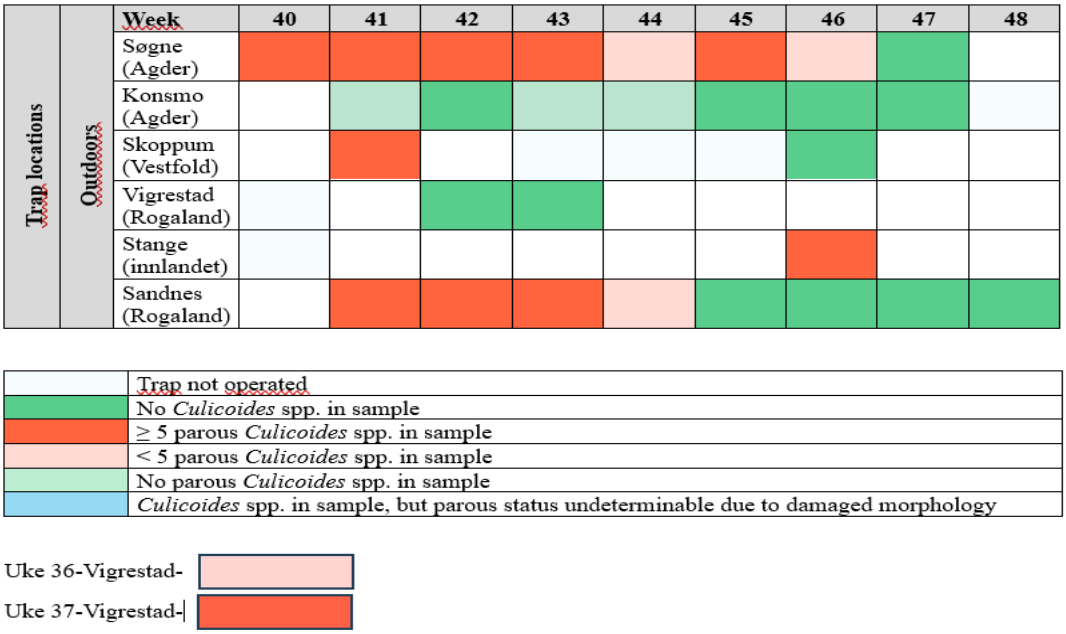

Figure 4. Blood-fed (parous) status in *Culicoides* in autumn 2025.

Table 3. Results from autumn vector surveillance 2025. Number of samples in the different categories is given per week.

	Week												
Category	**36**	**37**	**40**	**41**	**42**	**43**	**44**	**45**	**46**	**47**	**48**	**Total**	**% samples**
Outdoor samples	1	1	1	3	4	4	3	3	4	3	1	28	93.3
Samples from inside open barn	0	0	0	1	0	0	0	0	1	0	0	2	6.7
Total number of samples	**1**	**1**	**1**	**4**	**4**	**4**	**3**	**3**	**5**	**3**	**1**	**30**	
Culicoides spp. present (%)	1	1	1	4	2	3	3	1	2	0	0	18	60.0
≥ 5 parous[a] *Culicoides* spp. present	0	1	1	3	2	2	0	1	1	0	0	11	36.7
1-4 parous[a] *Culicoides* spp. present	1	0	0	0	0	0	2	0	1	0	0	4	13.3
≥ 1 parous[a] *Culicoides* spp present	1	1	1	3	2	2	2	1	2	0	0	15	50.0
Culicoides spp. absent	0	0	0	0	2	1	0	2	3	3	1	12	40.0
Culicoides obsoletus complex present[b]	0	1	1	4	2	3	3	1	2	0	0	17	94.4
Culicoides pulicaris complex present[b]	1	1	1	3	2	2	1	1	1	0	0	13	72.2

a parous/blood-fed
b among 18 samples containing *Culicoides* spp.

Discussion

Bulk milk and individual animal surveillance

Bluetongue re-emerged in Norway in September 2024, marking the first detection since 2009. Prior to this, the surveillance programme was designed to document freedom from BTV and detect potential introductions via windborne midges during the vector season. In 2025, the programme focused on early detection of new introductions and detection of ongoing circulation in high-risk areas. Surveillance targeted herds in the southern part of Southern Norway, where BTV was prevalent in 2024 and new introductions were considered most likely.

The 2025 results indicate a marked reduction in bluetongue activity compared with 2024, suggesting limited transmission during the 2025 vector season. Bulk milk surveillance did not provide evidence of new herd infections. Of 35 herds positive for antibodies against BTV, 19 were excluded due to non-compliance with the

inclusion criteria, including prior antibody detection in 2024, purchase of animals from BTV-positive herds, or vaccination against BTV. In addition, some positive results may have been attributable to young stock infected in 2024 that were not represented in the 2024 bulk milk samples. The remaining 16 seropositive herds were geographically distributed across the sampling area, and the negative samples associated with them in 2024 were likely recorded under the wrong herd. Accordingly, bulk milk surveillance provided no evidence of new herd infections in 2025.

Findings from passive surveillance support this interpretation. In 2025, BTV was detected in calves from 31 herds, most likely infected *in utero* during 2024 (10). In addition, BTV was detected in two adult cattle from two herds, one identified through trade-related testing and one through the abattoir surveillance. These animals may have been infected during the 2025 vector season. Neither animal showed clinical signs of bluetongue; however, it is not uncommon for infected cattle to display no or mild symptoms.

Bluetongue virus may be introduced into Norway either through import of infected animals, frozen semen, or by airborne transfer of infected *Culicoides* midges. Imports of ruminants to Norway are limited, and animals imported from areas not officially free from BTV are subject to testing requirements. Therefore, windborne introduction via infected midges is considered the most likely route. The geographical distribution of cases and seropositive herds in 2024-2025 was largely confined to Southern Norway, consistent with this route of introduction and with higher infection pressure and vaccination coverage in these areas.

Serological findings from the *Brucella abortus* surveillance programme were consistent with this pattern. Although samples were collected from herds nationwide, seropositive animals were only identified in high-risk areas in Rogaland and Telemark counties, likely due to prior exposure and/or vaccination rather than recent infection.

Overall, the results indicate that BTV transmission in 2025 was limited, with no clear evidence of widespread new infections at the herd or regional level.

Vector surveillance

The *Culicoides obsoletus* complex was the dominant group at all positive locations in the vector surveillance in 2025. This is consistent with the findings of the midge surveillance in the years 2007-2009 and 2022-2024 (2, 4, 10, 12). While the duration of the vector season may vary between years and locations depending on the weather conditions, the results from the vector surveillance indicate that the average vector active season in Norway is between early to mid-May and mid-November.

The highest midge activity was observed at the farm near Søgne until early November.

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