

DOI 10.17590/20200804-153312

Salmonella control programme – results for 2019: Salmonella Enteritidis and Salmonella Typhimurium amongst laying hens in remission

BfR Opinion No. 034 / 2020 of 28 July 2020

As part of the EU-wide programme to combat *Salmonella*, the member states compile an annual report on the proportion of *Salmonella*-positive flocks in breeding poultry (*Gallus gallus*), laying hens, broilers and breeding and fattening turkeys. For the national report, the German federal states have forwarded the results of their investigations to the responsible federal authorities for evaluation since 2007. This data is used to compile the annual report on the control program by the German Federal Institute for Risk Assessment (BfR).

Evaluation of the data for 2019 shows a comparable occurrence (prevalence) of *Salmonella* for all animal species and production types (breeding hen flocks, laying hens, broilers, breeding turkeys and turkeys) considered in the report, compared to the previous year. Regarding the control-relevant *Salmonella* types (serovars), the control targets were achieved for all poultry groups considered. According to the requirements of community law, *Salmonella* serovars relevant for control should be detectable in a maximum of 1% or 2% (laying hens) of the flocks examined.

1 Legal foundation for reporting

Article 9 (1) of Directive 2003/99/EC provides that the data on the assessment of national control programmes according to Regulation (EC) No. 2160/2003 is published annually in the report on trends and sources of zoonoses, zoonotic pathogens and antimicrobial resistance.

2 Results

In the summarising evaluations, each flock is only shown once, even if it has been checked (“sampled”) several times in accordance with the specifications. The flocks examined overall, *Salmonella*-positive flocks and the proportion of positive flocks are listed in the tables of the examined animal species and production types, both in total and separately for the different examination reasons.

2.1 Salmonella control programme in breeding poultry (*Gallus gallus*)

According to Regulation (EU) No. 200/2010, a total of 846 breeding flocks were examined in total for all examination reasons (at the instigation of the food business operator and/or as part of official control) during the laying phase (Table 1). The detection rates for *Salmonella* spp. (sum of all serovars) and for the five control-relevant serovars (Top 5¹) from 2007 to 2019 are summarised in Figure 1.

Salmonella was detected in eight flocks (0.9%) in 2019 (Table 1). One of the five control-relevant serovars was found in three positive flocks (0.4%) (year 2018: two flocks, 0.3%). *S. Enteritidis* was detected in two flocks and *S. Typhimurium* was detected in one flock. Only *S. Enteritidis* was detected in the previous year. The serovars *S. Hadar* and *S. Virchow* were

¹ Top 5: *S. Enteritidis*, *S. Typhimurium* (including the monophasic variants), *S. Infantis*, *S. Hadar*, *S. Virchow*

not discovered in 2019, as in previous years. The serovar *S. Infantis* was last detected in 2017. For 2018, the proportion of breeding hen flocks with positive detection of *Salmonella* was 0.7%. The previous year's low level was not reached in 2019.

Table 1: Examination of breeding poultry (*Gallus gallus*) according to Regulation (EU) No. 200/2010 in 2019

	Number Examined flocks	<i>Salmonella</i>		<i>S. Enteritidis</i>		<i>S. Typhimurium</i>		Top 5*	
		positive	%	positive	%	positive	%	positive	%
All breeds, total									
Sampling (total)	846	8	0.9	2	0.2	1	0.1	3	0.4
Of which: Sampling instigated by food business operator	846	5	0.6	1	0.1	0	0	1	0.1
Of which: Sampling in connection with official control	828	8	1.0	2	0.2	1	0.1	3	0.4
Of which laying hen parent-breeding									
Sampling (total)	72	1	1.4	0	0	0	0	0	0
Of which: Sampling instigated by food business operator	72	0	0	0	0	0	0	0	0
Of which: Sampling in connection with official control	72	1	1.4	0	0	0	0	0	0
Of which broiler parent-breeding									
Sampling (total)	584	7	1.2	2	0.3	1	0.2	3	0.5
Of which: Sampling instigated by food business operator	584	5	0.9	1	0.2	0	0	1	0.2
Of which: Sampling in connection with official control	574	7	1.2	2	0.3	1	0.2	3	0.5

* *S. Enteritidis*, *S. Typhimurium* incl. monophasic variant, *S. Hadar*, *S. Infantis* and *S. Virchow*

A total of 828 breeding flocks were examined as part of official control (in 2018: 742). *Salmonella* was detected in eight flocks (1.0 %) in 2019 (Table 1). This constitutes an increase of the *Salmonella* rate compared to the previous year (in 2018: three flocks, 0.4 %). Control-relevant serovars were discovered during the official investigation in a total of three flocks (0.4%; year 2018: two flocks, 0.3%). In two flocks *S. Enteritidis* and in one flock *S. Typhimurium* was detected.

A total of 9 great-grandparent and 181 grandparent flocks were examined in 2019. *Salmonella* was not detected in any of these flocks. Likewise, from 2016 to 2018 no great-grandparents and grandparent flocks were found to have *Salmonella*. In contrast, three flocks tested positive for *S. Enteritidis* in 2015, one flock for *S. Enteritidis* in 2014 and two flocks for *S. Typhimurium* in 2013. In 2012 and 2011, no *Salmonella* had been found at these production levels.

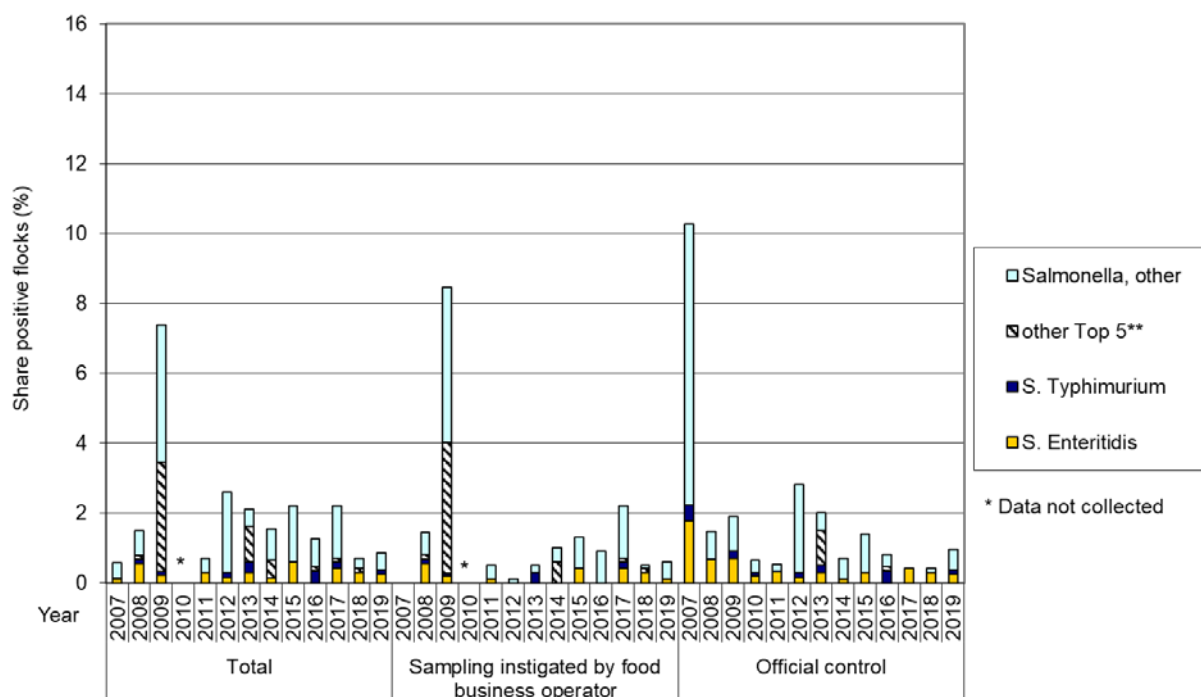
More precise classification with regard to the production type (egg production line, meat production line) was made for all parent flocks (Table 1). *Salmonella* was found in one of the 72 parent flocks of laying hen breeders (1.4%, laying hen breeders); however, it was not a control-relevant serovar. *Salmonella* was found in seven of the 584 parent flocks of broiler

breeders (1.2%, broiler breeders). Control-relevant serovars were detected in three parent flocks of broiler breeders (0.5%). *S. Enteritidis* was found in two flocks and *S. Typhimurium* in one flock.

In 2018, *Salmonella* was detected in one parent flock of laying hen breeders (0.5%) and four flocks of broiler breeders (1.1%). In contrast to 2019, *S. Enteritidis* had been the only control-relevant serovar in 2018. In 2019, the situation for parent flocks of laying hen breeders compares favourably with the previous year; one positive flock was reported in each case. At 1.2% in 2019, the *Salmonella* detection rate for parent flocks of broiler breeders was slightly above the value of 2018 at 1.1%, but is still lower than in previous years (2017: 4.7 %, in 2016: 2.1%, in 2015: 1.6 %, in 2014: 1.9 %).

The positive findings in the parent flocks of laying hen breeders or broiler breeders were made by official control and/or by investigations instigated by the operator.

Figure 1. Proportion of flocks of breeding poultry (*Gallus gallus*) from 2007 to 2019, in which *Salmonella* was detected, separated by examination reason and year (** other Top 5 = *S. Hadar*, *S. Infantis*, *S. Virchow*)



Within the examination of breeding poultry (*Gallus gallus*) during rearing, results were reported for a total of 187 flocks examined. Most of the samples were taken at the operators' instigation. In 2019, as in the previous year, *Salmonella* was not detected in any flock. In 2017, *Salmonella* had been detected in a total of five flocks, two of which were *S. Typhimurium* and one of which was *S. Infantis*. In the years prior to 2017, *Salmonella* had not been detected in any parent flock during the rearing phase either.

2.2 *Salmonella* control programme for laying hens

A total of 6,431 flocks were examined in accordance with Regulation (EU) No. 517/2011 in 2019. *Salmonella* was detected in 91 flocks (1.4 %) (Table 2). This situation corresponded to the previous year's value (2018: 1.4 %). In 49 flocks of laying hens (0.8 %) (in 2018: 73 flocks, 1.2%), *S. Enteritidis* or *S. Typhimurium* were found during the laying phase. *S. Enteritidis* was found in 35 flocks (0.5%; in 2018: 0.7 %) and *S. Typhimurium* in 14 (0.2 %; in 2018: 0.5 %) of the flocks examined. It becomes clear that in 2019 detection of *S. Enteritidis* and *S. Typhimurium* has decreased. Overall, no downward trend for *Salmonella* was identified in 2019. However, there was a decrease for the control-relevant serovars.

In 2019, *Salmonella* spp. was identified in the laying phase in 67 of the 3,162 laying hen flocks (2.1 %) by **official control**. *S. Enteritidis* or *S. Typhimurium* were found in 36 flocks (1.1 %). *S. Enteritidis* was isolated in 28 flocks (0.9%) and *S. Typhimurium* in eight flocks (0.3%). In 2018, as part of official control, *Salmonella* spp. was identified in 2.3 % of laying hen flocks and *S. Enteritidis* or *S. Typhimurium* was found in 2.0 % of the flocks. As a result, the detection rate of the two control-relevant serovars has decreased within official control compared to the previous year. The *Salmonella* detection rate was slightly lower than in the previous year.

The detection rates in laying hen flocks during the laying phase from 2008 to 2019, for *Salmonella* spp. (sum of all serovars) as well as for the serovars *S. Enteritidis* and *S. Typhimurium* are summarised in Figure 2 according to the different examination reasons.

Table 2: Examination of laying hens (*Gallus gallus*) according to Regulation (EU) No. 517/2011 in 2019

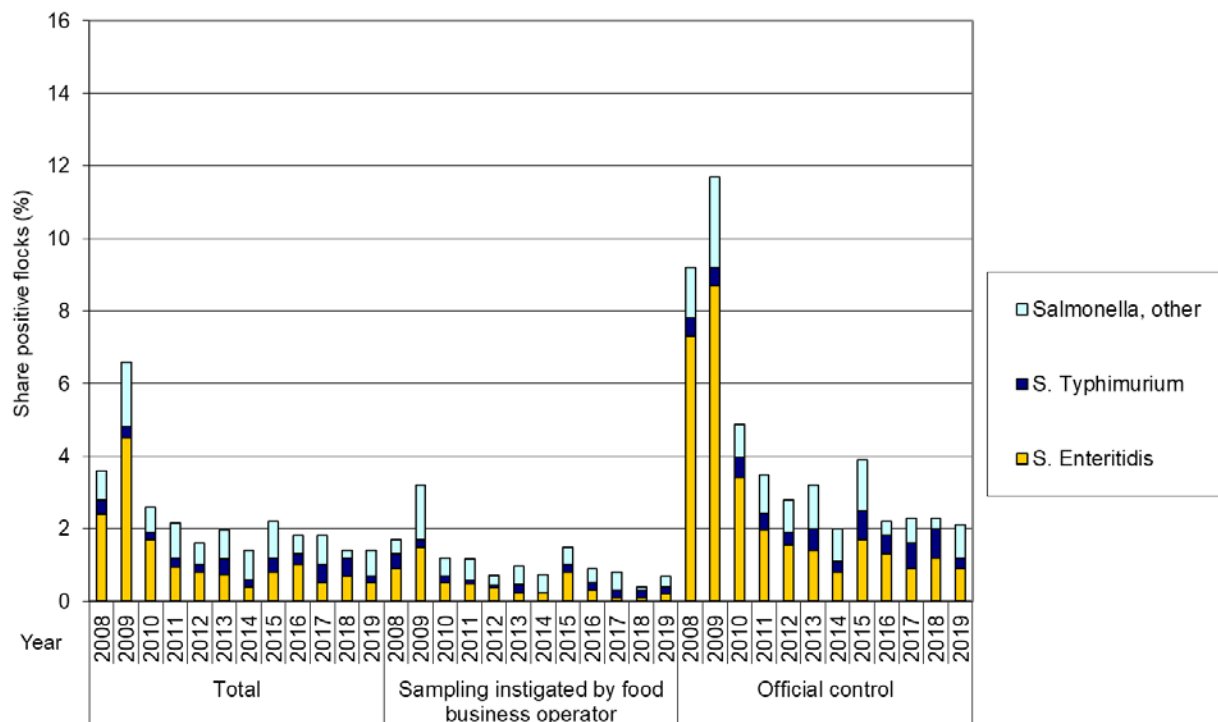
	Number examined Flocks	<i>Salmonella</i>		<i>S. Enteritidis</i>		<i>S. Typhimurium</i>		<i>S. Enteritidis / S. Typhimurium</i>	
		positive	%	positive	%	positive	%	positive	%
Sampling (total)	6431	91	1.4	35	0.5	14	0.2	49	0.8
Of which: Sampling instigated by food business operator	6333	46	0.7	15	0.2	10	0.2	25	0.4
Of which: Sampling in connection with official control	3162	67	2.1	28	0.9	8	0.3	36	1.1
Of which: Sampling in connection with official control	3078	44	1.4	14	0.5	6	0.2	20	0.6
Of which: Suspected cases and fol- low-up investigations in connection with official control	84	21	25.0	14	16.7	2	2.4	16	19.0

For 2019, official control was performed in 84 cases due either to suspicious cases or follow-up investigations. *Salmonella* spp. was identified in 21 of these flocks (Table 2).

When laying hens were examined during rearing, detection of *Salmonella* was reported in two of the total of 915 flocks examined (0.2 %). One flock exhibited the control-relevant

serovar *S. Typhimurium*. In 2018, positive detection (0.2 %) was reported for *S. Enteritidis*. The *Salmonella* detection rate is therefore at the level of the previous year.

Figure 2. Proportion of laying hen flocks during the laying phase from 2008 to 2019, in which *Salmonella* was detected according to examination reason and year



2.3 *Salmonella* control programme in broilers

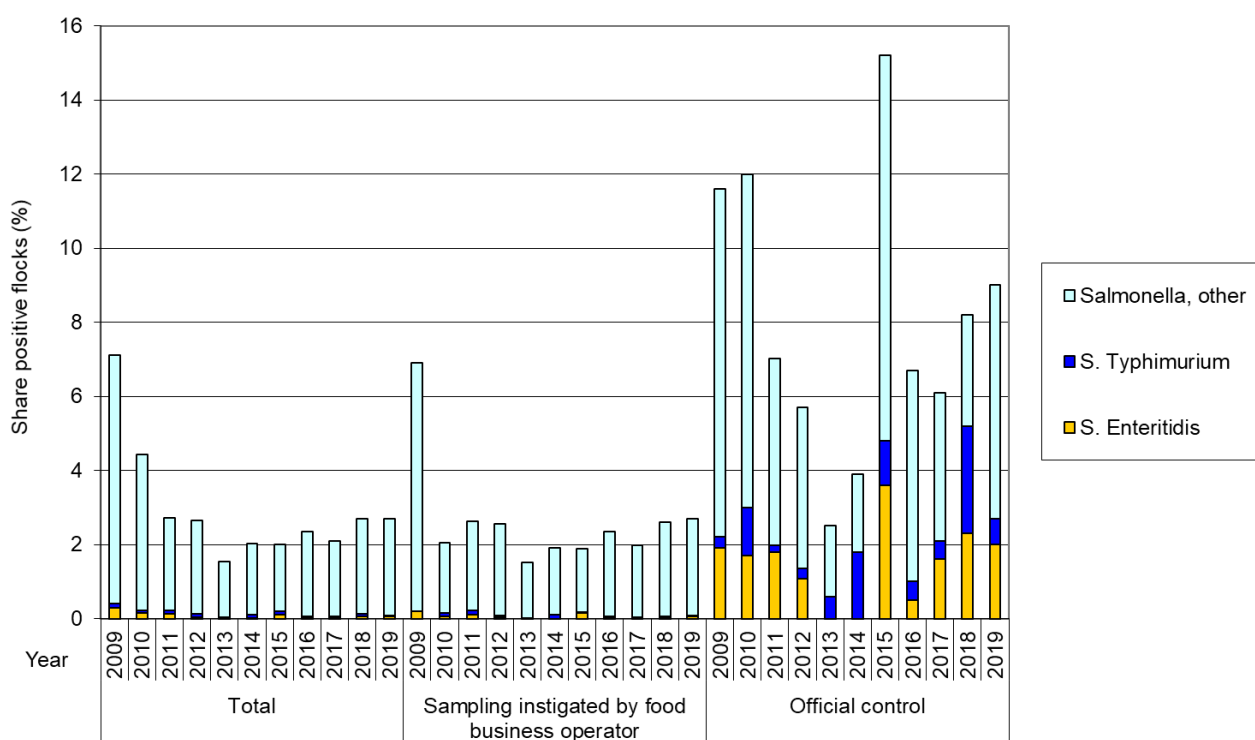
A total of 26,562 flocks were examined. *Salmonella* was detected in 718 flocks (2.7 %) (Table 3). In 2018, 2.7% of the flocks examined likewise had been tested positive for *Salmonella* spp.. Serovars *S. Enteritidis* or *S. Typhimurium* were found in 26 flocks (0.10 %) in 2019 (year 2018: 27 flocks, 0.13 %). 17 flocks (0.06 %) tested positive for *S. Enteritidis* and nine flocks (0.03 %) for *S. Typhimurium*. *S. Enteritidis* (14 flocks, 0.07 %) and *S. Typhimurium* (13 flocks, 0.06 %) had also been detected in 2018 (Figure 3).

If one considers the detection rates in the context of the internal controls and the official control separately, in each case the *Salmonella* detection rate was lower than in the previous year. The difference between the detection rates in the official investigation compared to the internal controls was also observed in 2019 (Figure 3).

Table 3: Examination of broilers (*Gallus gallus*) according to Regulation (EU) No. 200/2012 in 2019

	Number examined Flocks	<i>Salmonella</i>		<i>S. Enteritidis</i>		<i>S. Typhimurium</i>		<i>S. Enteritidis / S. Typhimurium</i>	
		positive	%	positive	%	positive	%	positive	%
Sampling (total)	26562	718	2.7	17	0.06	9	0.03	26	0.10
Of which: Sampling instigated by food business operator	26555	714	2.7	15	0.06	9	0.03	24	0.09
Of which: Sampling in connection with official control	301	27	9.0	6	2.0	2	0.7	8	2.7

Figure 3. Proportion of broiler flocks from 2009 to 2019, in which *Salmonella* was detected according to examination reason and year



2.4 *Salmonella* control programme in breeding turkeys

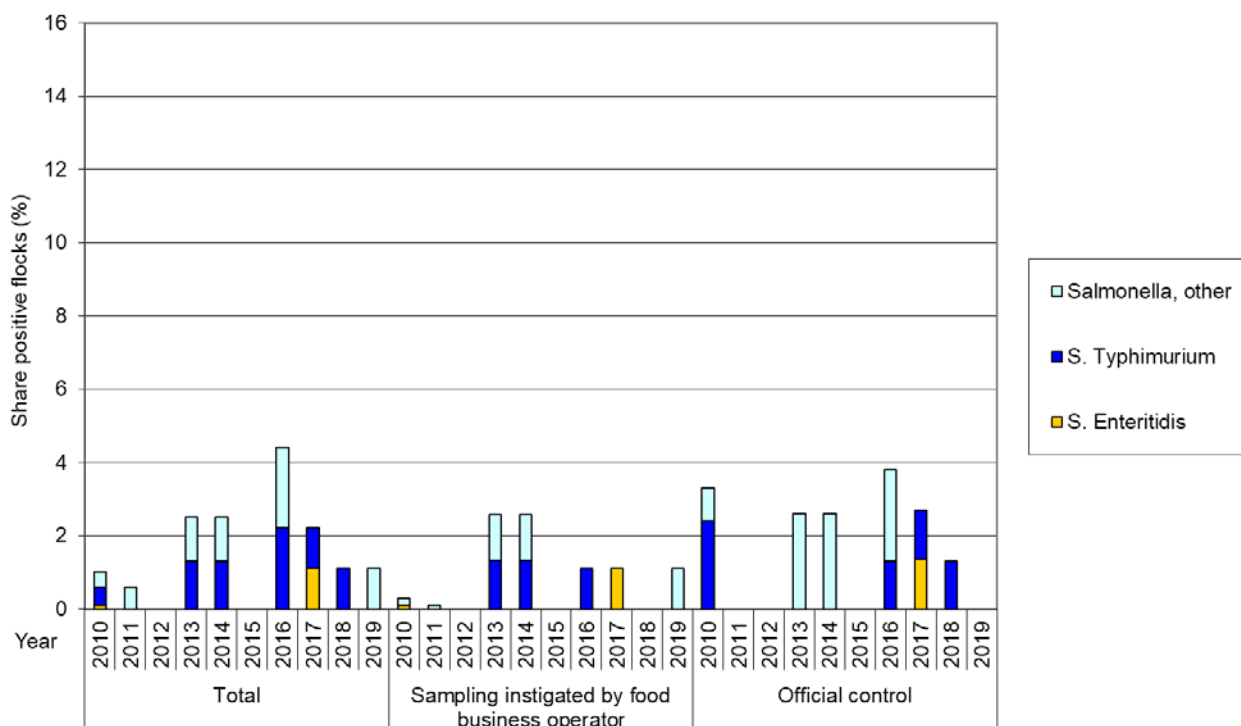
In total, examinations of 93 breeding turkey flocks were reported. Of these flocks, one flock (1.1 %) was positive for *Salmonella* in 2019 (Table 4). No control-relevant serovar was detected in this flock. The positive flock was identified during investigations performed by the food business operator. In 2018, one positive flock (1.1%) had been reported during official control. This flock was infected with *S. Typhimurium* (Figure 4).

Table 4: Examination of turkey breeding flocks according to Regulation (EC) No. 1190/2012 in 2019

	Number examined Flocks	Salmonella positive		S. Enteritidis positive		S. Typhimurium positive		S. Enteritidis / S. Typhimurium positive	
		positive	%	positive	%	positive	%	positive	%
Sampling (total)	93	1	1.1	0	0	0	0	0	0
Of which: Sampling instigated by food business operator	93	1	1.1	0	0	0	0	0	0
Of which: Sampling in connection with official control	77	0	0	0	0	0	0	0	0

Salmonella was found in four of the 34 flocks examined during rearing. No control-relevant serovars were detected. One positive flock had been discovered in 2018. *S. Enteritidis* had been reported in one flock in 2017. Before this, detection of *Salmonella* had last been reported in this group of animals in 2013, and was not a control-relevant serovar.

Figure 4. Proportion of breeding turkey flocks from 2010 to 2019 in which *Salmonella* was detected according to examination reason and year



2.5 *Salmonella* control programme for fattening turkeys

A total of 4,725 fattening turkey flocks were examined in accordance with Regulation (EU) No. 1190/2012 (Table 5). Of these flocks, 21 (0.4 %) were positive for *Salmonella* spp..

2019, *S. Typhimurium* (six flocks, 0.1%) was detected. In the previous year, 0.7 % of fattening turkey flocks examined had tested positive for *Salmonella*. Of control-relevant serovars, only *S. Typhimurium* (16 flocks, 0.3%) and *S. Enteritidis* (one flock, 0.02%) were detected in 2018 (Figure 5).

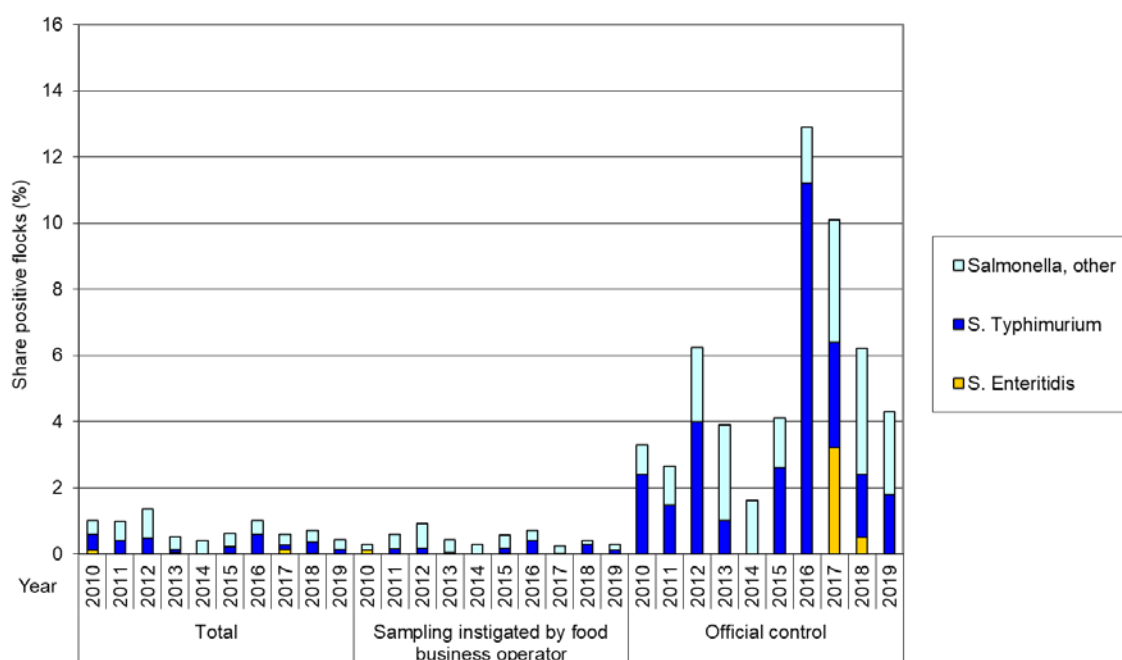
Table 5: Examination of fattening turkeys according to Regulation (EU) No. 1190/2012 in 2019

	Number examined Flocks	<i>Salmonella</i>		<i>S. Enteritidis</i>		<i>S. Typhimurium</i>		<i>S. Enteritidis / S. Typhimurium</i>	
		positive	%	positive	%	positive	%	positive	%
Sampling (total)	4725	21	0.4	0	0	6	0.1	6	0.1
Of which: Sampling instigated by food business operator	4715	15	0.3	0	0	3	0.1	3	0.1
Of which: Sampling in connection with official control	163	7	4.3	0	0	3	1.8	3	1.8

A high proportion of positive flocks (4.3 %) was still reported in the official control, albeit less than in 2018 (6.2%), and in 2017 (10.1%) and 2016 (12.9%). Compared to the period from 2013 to 2015 (4.1% in 2015; 1.6% in 2014; 3.9% in 2013), the 2019 detection rate was only slightly elevated.

Overall, the detection rates for *Salmonella* decreased slightly again in 2019. The detection rates have also dropped in official control.

Figure 5. Proportion of fattening turkey flocks from 2010 to 2019 in which *Salmonella* was detected according to examination reason and year



3 Summary

The results forwarded by the federal states as part of the control programmes according to Regulation (EC) No. 2160/2003 were summarised for reporting at the federal level. For 2019, they document a comparable or slightly reduced prevalence of *Salmonella* for all animal species and production types considered compared to the previous year. In relation to the control-relevant serovars, the community target value was achieved for all poultry groups included in the control programs. For breeding hens, broilers as well as breeding and fattening turkeys, a prevalence of less than 1% was achieved for the control-relevant serovars, for laying hens the prevalence of 0.8% was below the target value of 2%.

S. Enteritidis and/or *S. Typhimurium* were reported across all animal species and production types in 2019. *S. Infantis* was again only detected in broilers, but not in breeding flocks. In broilers, this serovar is not one of the control-relevant serovars.

Salmonella was detected in 0.9 % of breeding flocks in 2019, 0.4 % of the flocks tested positive for a control-relevant serovar. Therefore, the situation did not improve in 2019.

There was no decline in *Salmonella* prevalence in flocks of laying hens in 2019, but instead there was a reduction in the prevalence of control-relevant serovars. This affected both *S. Enteritidis* and *S. Typhimurium*.

No change in *Salmonella* prevalence and the detection of the control-relevant serovars *S. Enteritidis* and *S. Typhimurium* was observed in broilers in 2019. As in previous years, broilers dominated the non-control-relevant serovars in all studies.

In 2019, no *Salmonella* was found in breeding turkey flocks.

The observed *Salmonella* prevalence (0.4 %) in fattening turkey flocks declined again somewhat in 2019 after rising to 0.7 % in the previous year. Detection of *S. Typhimurium* but not of *S. Enteritidis* was reported again. This coincides with observations in previous years.

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