

19 June 2023

***Salmonella* control programme – results for 2022: no consistent trend for all poultry and production types**

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 programme by the German Federal Institute for Risk Assessment (BfR).

As seen in the previous year, evaluation of the data for 2022 shows no consistent trend or prevalence of *Salmonella* for all animal species and production types considered in the report. Regarding the control-relevant *Salmonella* types (serovars), the control objectives were achieved for all poultry groups considered, except for breeding turkeys. 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 pathogen and antibiotic 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 796 breeding hen flocks were examined 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 2022 are summarised in Figure 1.

Salmonella was detected in six flocks (0.8 %) in 2022 (Table 1). One of the five control-relevant serovars was found in one positive flock (0.1 %) (2021: 1 flock, 0.1 %). *S. Typhimurium* was detected in this flock. *S. Enteritidis* was detected in a flock the previous year. The serovars *S. Hadar* and *S. Virchow* were not discovered in 2022, as in previous years. The serovar *S. Infantis* was last detected in 2017. For 2021, the proportion of breeding hen flocks with positive detection of *Salmonella* was 4.8 %. Therefore, a clear declining trend in the detection of *Salmonella* in breeding hens to a low level (0.8 % in 2022, 4.8 % in 2021) can be seen. The detection rate for the control-relevant serovars remained at a comparable level.

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

Table 1: Examination of breeding poultry (*Gallus gallus*) according to Regulation (EU) No. 200/2010 in 2022

| | Number of flocks examined | <i>Salmonella</i> | | <i>S. Enteritidis</i> | | <i>S. Typhimurium</i> | | Top 5* | |
|---|---------------------------|-------------------|-----|-----------------------|---|-----------------------|-----|----------|-----|
| | | positive | % | positive | % | positive | % | positive | % |
| All breeds, total | | | | | | | | | |
| Sampling (total) | 796 | 6 | 0.8 | 0 | 0 | 1 | 0.1 | 1 | 0.1 |
| Of which: Sampling instigated by food business operator | 604 | 3 | 0.5 | 0 | 0 | 0 | 0 | 0 | 0 |
| Of which: Sampling in connection with official control | 778 | 4 | 0.5 | 0 | 0 | 1 | 0.1 | 1 | 0.1 |
| Of which laying hen parent-breeding | | | | | | | | | |
| Sampling (total) | 74 | 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 | 73 | 1 | 1.4 | 0 | 0 | 0 | 0 | 0 | 0 |
| Of which broiler parent-breeding | | | | | | | | | |
| Sampling (total) | 580 | 4 | 0.7 | 0 | 0 | 0 | 0 | 0 | 0 |
| Of which: Sampling instigated by food business operator | 390 | 3 | 0.8 | 0 | 0 | 0 | 0 | 0 | 0 |
| Of which: Sampling in connection with official control | 572 | 2 | 0.3 | 0 | 0 | 0 | 0 | 0 | 0 |

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

A total of 778 flocks of breeding hens were examined as part of **official control** (2021: 872). *Salmonella* was detected in four flocks (0.5 %) in 2022 (Table 1). The detection rate has therefore increased compared to the previous year (2021: two flock, 0.2 %). One control-

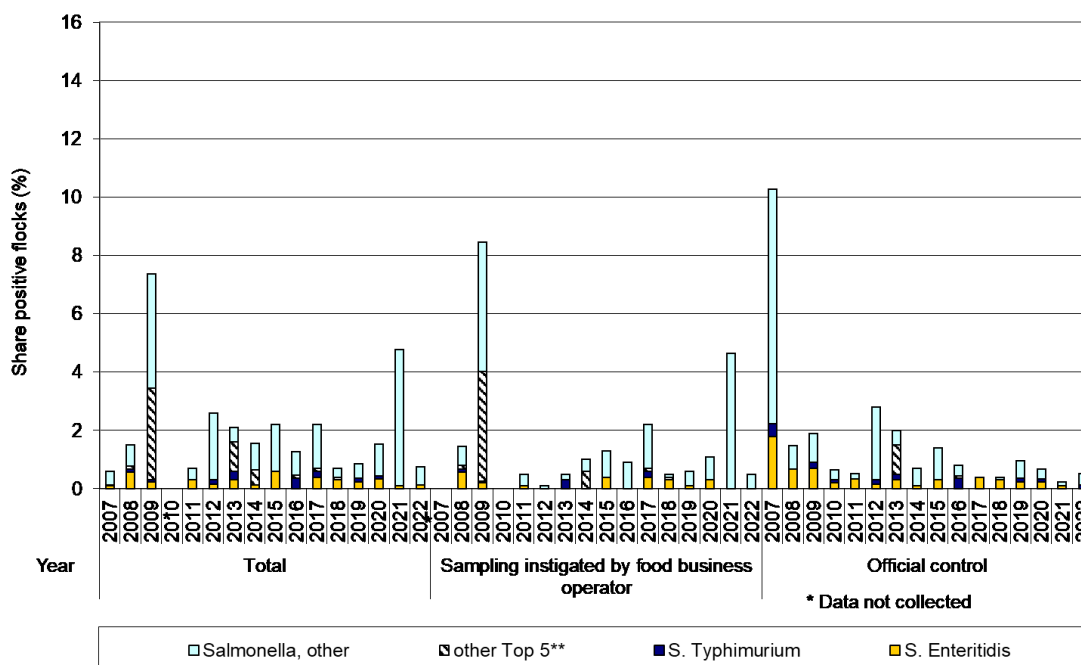
relevant serovar was discovered during the official monitoring in one flock (0.1 %; 2021: one flock, 0.1 %). It was *S. Typhimurium* compared to *S. Enteritidis* the previous year.

A total of 14 great-grandparent and 128 grandparent flocks were examined in 2022. *S. Typhimurium* was detected in one of the grandparent flocks. In the previous year, *Salmonella* was not found in any great-grandparent or grandparent flock; in 2020, this was the case in two grandparent flocks. From 2016 to 2019, no great-grandparent and grandparent flocks were found to have *Salmonella*. In contrast, *S. Enteritidis* or *S. Typhimurium* had been reported occasionally between 2013 to 2015.

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 detected in one of the 74 parent flocks in the egg production line (laying hen-parent breeding 1.4 %) and in 4 of the 580 parent flocks in the meat production line (broiler-parent breeding 0.7 %). None of them was a control-relevant serovar.

In 2021, no *Salmonella* was detected in any parent flock of laying breeders and 42 flocks of broiler breeders (6.5 %). In 2022, the situation for parent flocks in egg production is comparable with the previous year since only one case of *Salmonella* detection was reported. In the parent flocks of broiler breeders, the *Salmonella* detection rate decreased significantly again in 2022 at 0.7% and was below the value range of the previous years.

Figure 1: Proportion of flocks of breeding poultry (*Gallus gallus*) from 2007 to 2022, 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 173 flocks examined. Most of the samples were taken at the operators' instigation. In 2022, as in the previous year, *Salmonella* was not detected in any

flock. In 2017, *Salmonella* was 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* was not detected in any parent flock during the rearing phase either.

2.2 *Salmonella* control programme in laying hens

A total of 7,009 flocks were examined in accordance with Regulation (EU) No. 517/2011 in 2022. *Salmonella* was detected in 94 flocks (1.3 %) (Table 2). This situation corresponded to a less favourable situation compared to the previous year's value (2021: 1.0 %). In 59 flocks of laying hen (0.8 %) (in 2021: 48 flocks, 0.7 %) *S. Enteritidis* or *S. Typhimurium* were detected in the laying phase. *S. Enteritidis* was found in 29 flocks (0.4 %; in 2021: 0.5 %) and *S. Typhimurium* in 30 (0.4 %; in 2021: 0.2 %) of the flocks examined. It is clear that in 2022, cases of *Salmonella* detected were higher overall than in the previous year and, furthermore, the detection of *S. Typhimurium* increased, while the detection rate of *S. Enteritidis* dropped slightly.

Table 2: Examination of laying hens (*Gallus gallus*) according to Regulation (EU) No. 517/2011 in 2022

| | Number of flocks examined | <i>Salmonella</i> | | <i>S. Enteritidis</i> | | <i>S. Typhimurium</i> | | <i>S. Enteritidis / S. Typhimurium</i> | |
|--|---------------------------|-------------------|------|-----------------------|-----|-----------------------|-----|--|------|
| | | positive | % | positive | % | positive | % | positive | % |
| Sampling (total) | 7,009 | 94 | 1.3 | 29 | 0.4 | 30 | 0.4 | 59 | 0.8 |
| Of which: Sampling instigated by food business operator | 6,868 | 38 | 0.6 | 13 | 0.2 | 12 | 0.2 | 25 | 0.4 |
| Of which: Sampling in connection with official control | 3,391 | 60 | 1.8 | 20 | 0.6 | 18 | 0.5 | 38 | 1.1 |
| Of which: Routine sampling in connection with official control | 3,330 | 48 | 1.4 | 16 | 0.5 | 12 | 0.4 | 28 | 0.8 |
| Of which: Suspected cases and follow-up investigations in connection with official control | 61 | 12 | 19.7 | 4 | 6.6 | 6 | 9.8 | 10 | 16.4 |

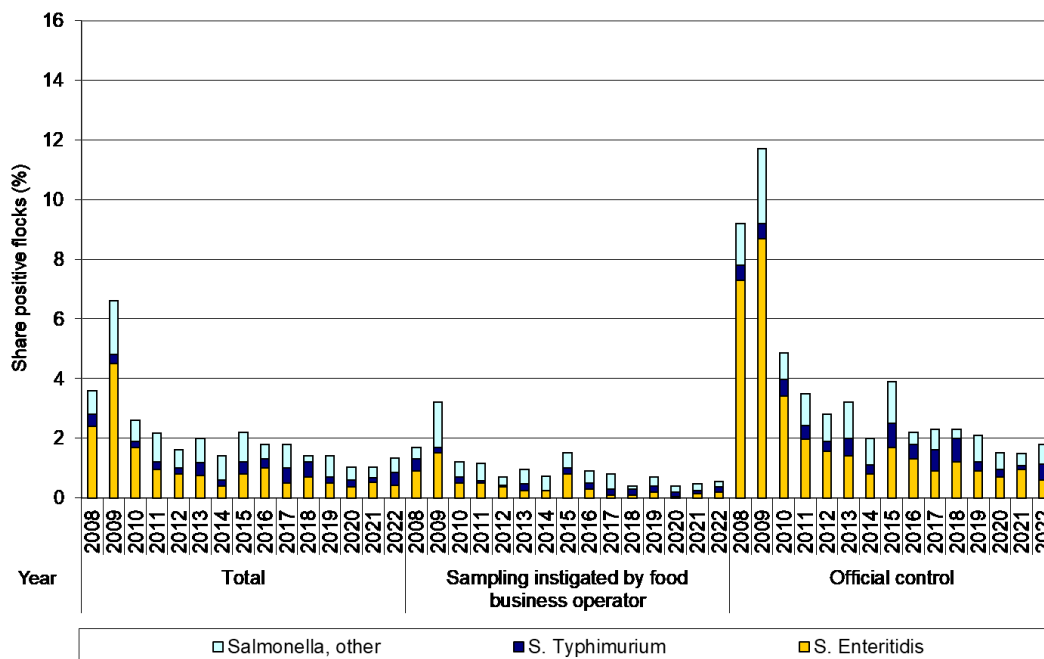
In 2022, *Salmonella* spp. was identified in the laying phase in 60 of the 3,391 laying hen flocks (1.8 %) by **official control**. *S. Enteritidis* or *S. Typhimurium* were found in 38 flocks (1.1 %). 20 flocks (0.6 %) exhibited *S. Enteritidis* and 18 flocks (0.5 %) *S. Typhimurium*. In 2021, as part of official control, *Salmonella* spp. was identified in 1.5 % of laying hen flocks and *S. Enteritidis* or *S. Typhimurium* was found in 1.1 % of the flocks. Therefore, the overall *Salmonella* detection rate as part of official monitoring increased compared to the previous year, while the detection rate of control-relevant serovars remained at the same level. However, there was a shift towards *S. Typhimurium*, meaning that the trend of the previous year with increased detection of *S. Enteritidis* did not continue.

The detection rates for laying hen flocks during the laying phase from 2008 to 2022 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.

For 2022, official controls were performed in 61 cases due either to a suspicion or as follow-up investigations. *Salmonella* spp. was identified in 12 of these flocks (Table 2).

When laying hens were examined during rearing, detection of *Salmonella* was reported in six of the total 792 flocks examined (0.8 %). One flock showed evidence of the control-relevant serovar *S. Enteritidis* and five flocks of a non-control-relevant serovar. In 2021, positive detection of *S. Enteritidis* was reported in one flock (0.09 %). Therefore, the situation with regard regarding *Salmonella* spp. has developed unfavourably.

Figure 2: Proportion of laying hen flocks during the laying phase from 2008 to 2022, in which *Salmonella* was detected according to examination reason and year



2.3 *Salmonella* control programme in broilers

A total of 26,282 flocks were examined. *Salmonella* was detected in 228 flocks (0.9 %) (Table 3). In 2021, 1.0 % of the flocks examined also tested positive for *Salmonella* spp. Serovars *S. Enteritidis* or *S. Typhimurium* were found in nine flocks (0.03 %) in 2022 (2021: 6 flocks, 0.02 %). *S. Enteritidis* was detected in five (0.02 %) and *S. Typhimurium* in four (0.02 %) of the flocks examined. *S. Enteritidis* (1 flock, 0.004 %) and *S. Typhimurium* (5 flocks, 0.02 %) were also detected in 2021 (Figure 3). Therefore, in 2022, the detection rate for *Salmonella* spp. has slightly decreased, but not for the control-relevant serovars. The frequent detection of *S. Infantis* has also not continued at the previous year's scale. While in 2021 this serovar was reported in 47 flocks, in 2022 this was the case in only 32 flocks.

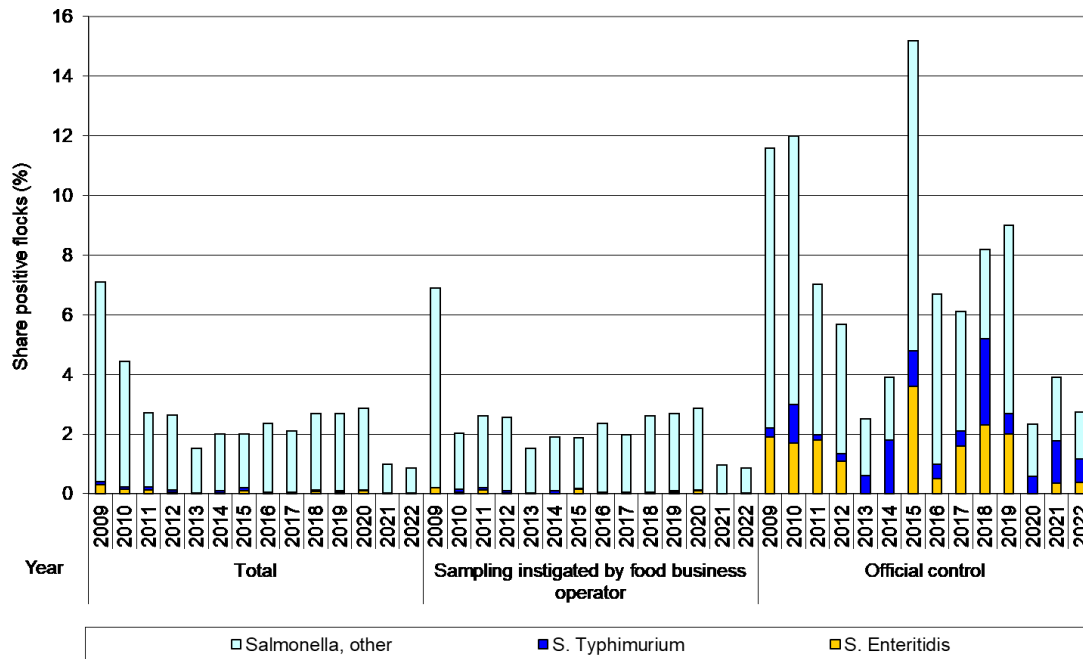
If we consider the detection rates in the context of self-monitoring and official testing separately, differences in the development of *Salmonella* detection rates can be seen in each case (Figure 3).

If we only consider **officially** examined flocks, seven of the 265 (2.6 %) examined flocks were found to be positive for *Salmonella*. A control-relevant serovar was detected in three flocks (1.1 %). One flock (0.4 %) tested positive for *S. Enteritidis* and two flocks (0.8 %) for *S. Typhimurium*. Compared to the previous year, the detection rate for *Salmonella* overall and for control-relevant serovars as part of the official investigation in 2022 has again decreased (2.6 % vs. 3.9 % in 2021).

Table 3: Examination of broilers (*Gallus gallus*) according to Regulation (EC) No. 200/2012 in 2022

| | Number of flocks examined | <i>Salmonella</i> | | <i>S. Enteritidis</i> | | <i>S. Typhimurium</i> | | <i>S. Enteritidis / S. Typhimurium</i> | |
|---|---------------------------|-------------------|------------|-----------------------|-------------|-----------------------|-------------|--|-------------|
| | | positive | % | positive | % | positive | % | positive | % |
| Sampling (total) | 26,282 | 228 | 0.9 | 5 | 0.02 | 4 | 0.02 | 9 | 0.03 |
| Of which: Sampling instigated by food business operator | 26,280 | 224 | 0.9 | 4 | 0.02 | 2 | 0.01 | 6 | 0.02 |
| Of which: Sampling in connection with official control | 265 | 7 | 2.6 | 1 | 0.4 | 2 | 0.8 | 3 | 1.1 |

Figure 3: Proportion of broiler flocks from 2009 to 2022, in which *Salmonella* was detected according to examination reason and year



2.4 *Salmonella* control programme for breeding turkeys

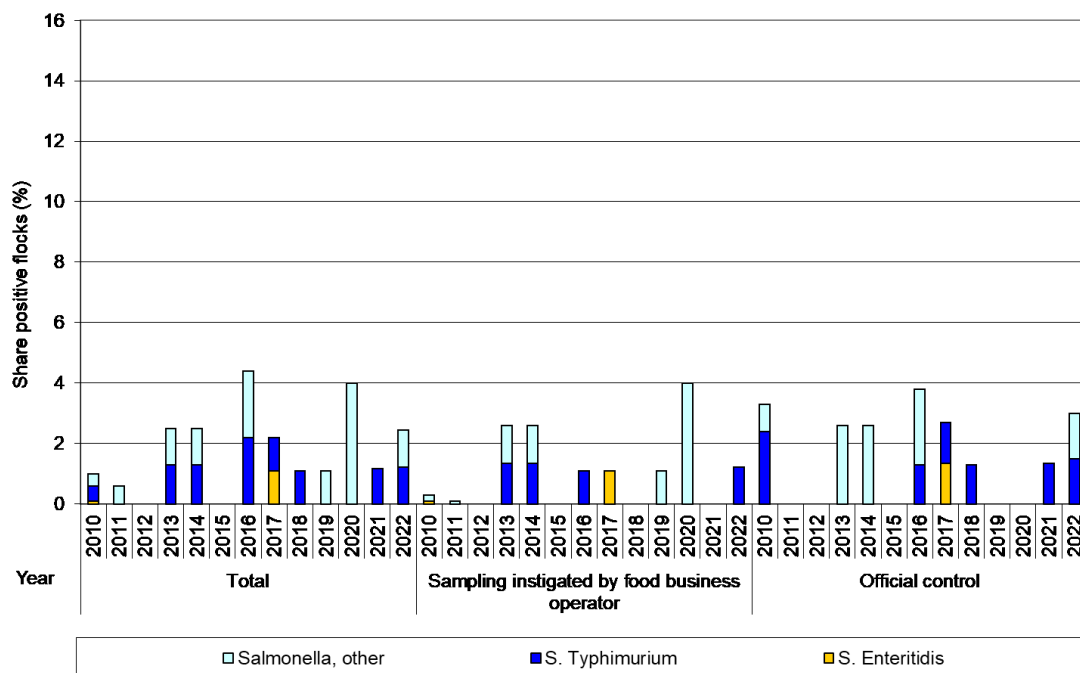
In total, examinations of 82 breeding turkey flocks were reported. Of these flocks, two flocks (2.4 %) were positive for *Salmonella* in 2022 (Table 4). The control-relevant serovar *S. Typhimurium* was detected in one of these flocks. This positive flock was identified in the course of a selfcontrol and an official control. In 2021, one positive flock (1.2 %) was reported as part of an official control. The flock tested positive for the control-relevant serovar *S. Typhimurium*. (Figure 4). Therefore, an increase was observed for *Salmonella* overall, but not for the control-relevant serovars.

Table 4: Examination of turkey breeding flocks according to Regulation (EC) No. 1190/2012 in 2022

| | Number of flocks examined | <i>Salmonella</i> | | <i>S. Enteritidis</i> | | <i>S. Typhimurium</i> | | <i>S. Enteritidis / S. Typhimurium</i> | |
|---|---------------------------|-------------------|-----|-----------------------|---|-----------------------|-----|--|-----|
| | | positive | % | positive | % | positive | % | positive | % |
| Sampling (total) | 82 | 2 | 2.4 | 0 | 0 | 1 | 1.2 | 1 | 1.2 |
| Of which: Sampling instigated by food business operator | 82 | 1 | 1.2 | 0 | 0 | 1 | 1.2 | 1 | 1.2 |
| Of which: Sampling in connection with official control | 67 | 2 | 3.0 | 0 | 0 | 1 | 1.5 | 1 | 1.5 |

During rearing, *Salmonella* was detected in two of the 32 flocks examined; both flocks tested positive for *S. Typhimurium*. One flock testing positive for *S. Typhimurium* was discovered in 2021. *S. Enteritidis* was last reported in a rearing flock in 2017.

Figure 4: Proportion of breeding turkey flocks from 2010 to 2022, in which *Salmonella* was detected according to examination reason and year



2.5 *Salmonella* control programme in fattening turkeys

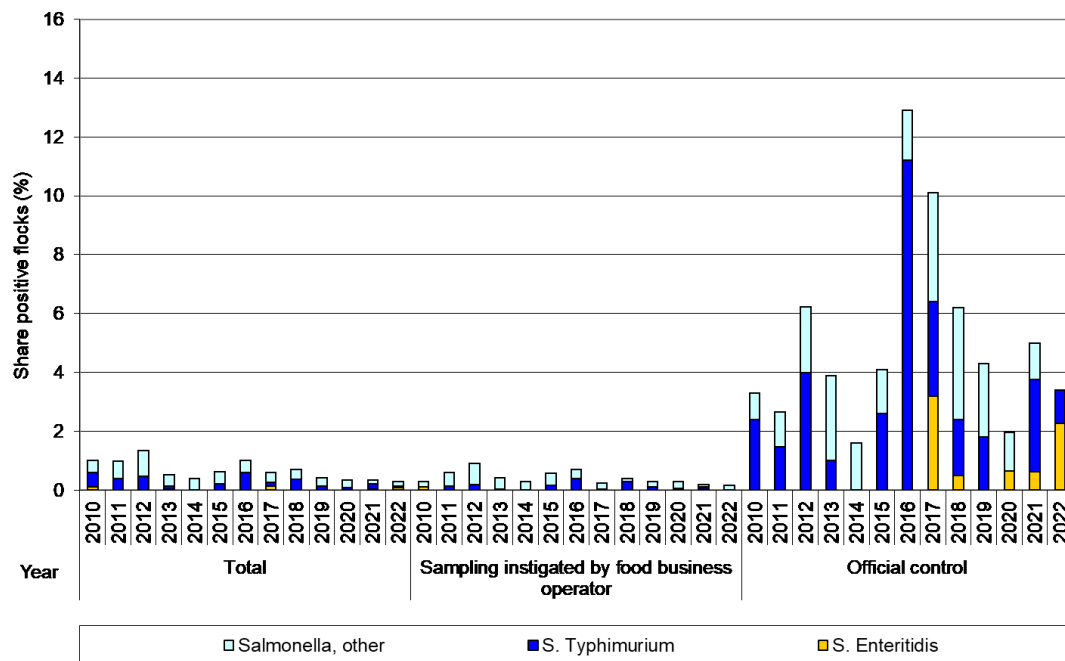
A total of 4,320 fattening turkey flocks were examined in accordance with Regulation (EU) No. 1190/2012 (Table 5). Of these flocks, 13 (0.3 %) were positive for *Salmonella* spp. In 2022, control-relevant serovars were detected in six flocks (0.14 %). Four flocks contained *S. Enteritidis* (0.09 %) and two flocks *S. Typhimurium* (0.05 %). In the previous year, 0.4 % of fattening turkey flocks examined tested positive for *Salmonella*. As regards control-relevant serovars, only *S. Typhimurium* (8 flocks, 0.2 %) and *S. Enteritidis* (2 flocks, 0.04%) were detected in 2021 (Figure 5). Therefore, the favourable situation of the last few years with regard to *Salmonella* continued in 2022 and the proportion of control-relevant serovars also slightly declined.

Table 5: Examination of fattening turkeys according to Regulation (EU) No. 1190/2012 in 2022

| | Number of flocks examined | <i>Salmonella</i> | | <i>S. Enteritidis</i> | | <i>S. Typhimurium</i> | | <i>S. Enteritidis / S. Typhimurium</i> | |
|---|---------------------------|-------------------|-----|-----------------------|------|-----------------------|------|--|------|
| | | positive | % | positive | % | positive | % | positive | % |
| Sampling (total) | 4,320 | 13 | 0.3 | 4 | 0.09 | 2 | 0.05 | 6 | 0.14 |
| Of which: Sampling instigated by food business operator | 4,320 | 7 | 0.2 | 0 | 0 | 0 | 0 | 0 | 0 |
| Of which: Sampling in connection with official control | 177 | 6 | 3.4 | 4 | 2.3 | 2 | 1.1 | 6 | 3.4 |

A high proportion of positive flocks (3.4 %) was still reported in the **official** investigations, although this is within the range seen in recent years (2021: 5.0 %, in 2020: 2.0 %, in 2019: 4.3 %).

Figure 5: Proportion of fattening turkey flocks from 2010 to 2022, 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 2022, they document no consistent trend or prevalence of *Salmonella* for all animal species and production types considered in the report, compared to the previous year.

The target values were achieved, with the exception of breeding turkeys (one flock positive). For breeding hen flocks, broilers and fattening turkeys, a prevalence of less than 1% for the control-relevant serovars was achieved, for laying hens the prevalence of 0.8 % was below the target value of 2%. Due to the small number of breeding turkey flocks examined, the 1 % target value is again exceeded by the single detection of *S. Typhimurium*.

The detection of *S. Enteritidis* and *S. Typhimurium* in various poultry flocks, especially in laying hens, broilers and fattening turkeys, should be further critically monitored. *S. Enteritidis* and *S. Typhimurium* were reported across all animal species and production types in 2022. The detection of *S. Infantis* in broilers has further decreased; the serovar was not detected in breeding hens. In broilers, this serovar is not one of the control-relevant serovars.

Salmonella was detected in 0.8 % of breeding hen flocks in 2022, 0.1 % of the flocks tested positive for a control-relevant serovar. Therefore, a clear declining trend in the detection of *Salmonella* in breeding hens can be seen, while the detection of control-relevant serovars remained at a low level.

In flocks of laying hens, the *Salmonella* prevalence in 2022 has risen slightly compared to the previous year; this also concerns the detection of the control-relevant serovar *S. Typhimurium*.

In 2022, the detection rate for *Salmonella* has slightly decreased for broilers, but not for the control-relevant serovars. Detection of *S. Infantis* has also continued to decline in 2022. As in previous years, broilers dominated the non-control-relevant serovars in all studies.

In 2022, *Salmonella* was again detected in a flock of breeding turkeys; it concerned *S. Typhimurium*.

In fattening turkey flocks, the favourable situation of the last few years with regard to *Salmonella* continued in 2022 and the proportion of control-relevant serovars also declined slightly.

Further information on *Salmonella* is available on the BfR website

Salmonella topic page

https://www.bfr.bund.de/en/salmonella_and_their_importance_as_pathogens-10638.html

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