

## Chapter 2.5

### REPORTS OF *SALMONELLA* IN POULTRY

Poultry are subject to a number of voluntary testing programmes for *Salmonella*. They are also subject to statutory *Salmonella* testing programmes in order to fulfil the requirements of EU legislation (European Council Directive 2003/99/EC, Zoonoses Regulation 2160/2003 & Commission Regulation (EC) No 1003/2005). The Poultry Breeding Flocks and Hatcheries Order (PBFHO) 1993 has been the legal basis for a monitoring plan which has operated for *Salmonella* in breeding flocks of domestic fowl since 1993. In March 2007 the PBFHO 2007 replaced the PBFHO 1993 and set out the requirements for registration and sampling in a new *Salmonella* National Control Plan (NCP) for chicken breeding flocks. According to the new Order, statutory testing of breeding flocks of domestic fowl during the rearing phase and during the period of production of eggs for hatching must take place on the breeding flocks holding only and an enhanced sampling (boot swabs or composite faeces) and detection method using Modified Semi-Solid Rappaport Vassiliadis culture medium (ISO 6579: Annex D) is used. The PBFHO 2007 was in turn revoked and replaced by the Control of Salmonella in Poultry Order (CSPO) 2007, which came into force on 28<sup>th</sup> January 2008 and included the requirements for the implementation of an NCP in commercial laying flocks (to start in February 2008). Data collected under the CSPO 2007 will be presented in future publications. In addition, most major commercial companies take part in additional voluntary testing schemes, particularly involving broiler production and table egg laying flocks. This is reflected in the data presented in Table 1 which show that, in contrast to other species, the largest number of reports of *Salmonella* from poultry are the result of voluntary surveillance activity rather than the investigation of clinical disease. Most incidents in poultry are therefore not associated with clinical disease but with identification of subclinical carriage of *Salmonella*.

The numbers of incidents and isolations of *Salmonella* reported from poultry species are shown at Tables 38, 39, 47, 48, 53, 54, 58 and 59. The number of poultry submissions to VLA/SAC laboratories decreased by 48% in 2007 (3,156 submissions) compared to 2006 (6,098 submissions). These figures include submissions from wild ducks and geese. The decrease in poultry submissions was due to fewer Avian Influenza surveillance submissions having been received during 2007 in comparison with previous years.

Vaccines against *Salmonella* Enteritidis and *S. Typhimurium* are very widely used in the commercial layer sector and are also used in parent

broiler breeders. Their use is considered to have contributed to the control of *Salmonella* in poultry flocks.

The Zoonoses Regulation 2160/2003/EC came into force on the 21<sup>st</sup> December 2003 and requires that EU Member States put into place control plans for the monitoring and reduction of zoonoses at farm level, once the target to reduce the pathogen or infectious agent has been agreed. In order to set targets, standardised prevalence surveys have been carried out in each Member State to establish the baseline level of the specified zoonotic agent in poultry and pig food animal populations. The results of mandatory *Salmonella* prevalence surveys carried out in UK holdings of commercial egg-laying flocks in 2005 and in UK holdings of broiler flocks in 2006 were reported in previous editions of *Salmonella* in Livestock Production in GB.

A one-year mandatory survey to determine the prevalence of *Salmonella* in turkey flocks in the UK was completed in September 2007 as per the agreed protocol to be implemented in all Member States (Commission Decision 2006/662/EC). Five environmental faeces samples (faecal material collected on boot swabs) were taken from each eligible flock on breeder turkey holdings within nine weeks of slaughter and from one flock on each fattening turkey holding selected to take part in the survey within three weeks of slaughter. The survey required that all eligible flocks on all breeder holdings with more than 250 breeding birds were sampled. A random sample of fattening turkey holdings was drawn from the population stratified by holding size (500-4,999 birds, 5000+ birds) and devolved region.

A total of 116 breeding turkey flocks on 29 breeder holdings were sampled. The weighted flock prevalence of *Salmonella* spp. in breeding turkey flocks was estimated at 4.4% (CI<sub>95%</sub> 1.6-11.4%). Of the five serovars given top priority by the EU because of their public health significance, *S. Enteritidis*, *S. Hadar*, *S. Infantis* and *S. Virchow* were not isolated from any breeder holdings in the UK. *S. Typhimurium* was isolated from one flock on one breeder holding to give a weighted prevalence of *S. Enteritidis* and/or *S. Typhimurium* of 0.5% (CI<sub>95%</sub> 0.1-3.2%). Other *Salmonella* serovars found on UK breeding turkey holdings were *S. Kottbus* (2 holdings), *S. Derby* (1 holding) and *S. Heidelberg* (1 holding).

Samples that met the EC inclusion criteria were obtained from 317 fattening turkey flocks/holdings. The weighted flock prevalence of *Salmonella* spp. in fattening turkey flocks was estimated at 32.2% (CI<sub>95%</sub> 24.7-40.6%). *S. Typhimurium* was the only serovar from the EU's top five of public health significance that was isolated from UK fattening turkey flocks. *S. Typhimurium* was found on 16 meat turkey holdings to

give a weighted prevalence of *S. Enteritidis* and/or *S. Typhimurium* of 4.6% (CI<sub>95%</sub> 2.2-9.0%). The serovar most commonly found on UK fattening turkey holdings was *S. Kottbus*, which was isolated from 20% of holdings. *S. Typhimurium* was the second most common serovar found on UK meat turkey holdings.

A full report of the survey in the UK and other Member States is available on the EFSA website ([http://www.efsa.europa.eu/EFSA/Report/zoon\\_report\\_ej134\\_finturkeys\\_en,0.pdf](http://www.efsa.europa.eu/EFSA/Report/zoon_report_ej134_finturkeys_en,0.pdf)). The method used to estimate weighted flock prevalence is given in the report.

## **Chickens**

There were 142.3 million chickens in Great Britain reported in the June 2007 census, compared with 140.4 million in 2006 (an increase of 1.4%). Table 38 shows the number of reported incidents of *Salmonella* in chickens in 2007 (192), which was 37% lower than in 2006 (304). The majority of incidents arose from voluntary surveillance of broiler flocks by the poultry industry. Less than 5% of *Salmonella* reports in chickens were associated with clinical disease investigation.

Approximately 21,324 *Salmonella* tests were performed under the statutory monitoring requirements of the PBFHO 2007 and 33 of the samples (0.2%) were positive for *Salmonella*; this compares to 0.5% positive in 2006. The organism was isolated most frequently from boot swabs taken during the laying period (11,642 samples tested, 0.1% were positive).

In total, 0.07% of the adult chicken breeding flocks in GB, which were tested for *Salmonella* under the *Salmonella* NCP in breeders requirements in 2007, was found to be infected with any of the top 5 *Salmonella* serovars of public health significance as designated in the EU legislation. Only a single flock of broiler breeders was found to be infected with *S. Typhimurium*.

## ***Salmonella* Enteritidis**

The most common serovar reported from chickens in 2007 was *S. Enteritidis* (36 incidents) increasing from 17 in 2006. These represented 19% of *Salmonella* incidents in chickens. Numbers of reports of this serovar declined between 1992 and 2004, except for a small increase in reports in 2003, but since 2004 they have been increasing (Figure 36). This increase could be due to various factors,

including changes in the intensity of the voluntary operator monitoring by the commercial layer industry, as well as changes in the methods used for sample collection and sample examination for *Salmonella*. The reported phage types were: PT8 (ten incidents), PT4 (eleven incidents), PT1 (five incidents), PT35 (four incidents), PT6 and UNTY (two incidents each), and single incident reports of PTs 5a and PT7. Reports of PT1 decreased in spite of overall increasing trend. PT4 and PT8 were respectively the first and second most commonly reported *S. Enteritidis* phage types in chickens (Table 42) and in humans (Table 7) in 2007. There were seven incidents in broiler flocks (five incidents of PT1 and single incidents of PT8 and UNTY) and 29 incidents in egg layer flocks (eleven incidents of PT4, nine incidents of PT8, four incidents of PT35, two incidents of PT6 and single incidents of PT5a, PT7 and UNTY). The big increase in the number of *S. Enteritidis* reports from egg layer flocks in 2007 (29 incidents) in comparison with 2006 (three incidents) was most likely due to increased sampling of layer flocks according to new enhanced sampling protocols and sensitive detection methods in preparation for the new *Salmonella* National Control Programme in chicken layers, which was implemented in Great Britain at the beginning of February 2008, as well as due to *Salmonellas* isolated from intensive samples collected during advisory and investigation visits conducted by government veterinarians in order to assist the industry to identify if and where *Salmonella* infection was present on their holdings. Over a third of the *Salmonella* incidents in egg layer flocks were reported in the last quarter of 2007 and, as the data resulted from a different monitoring system compared with previous years, it is not directly comparable with earlier data. The data refer to *Salmonella* incidents and not *Salmonella* infected flocks, and it originated from samples collected from all parts of the layer industry including back-yard flocks and pet chickens, and environmental samples not directly derived from flocks or their immediate surroundings. There were also single isolations of PT13 and PT14b; the isolation of PT13 was a vaccine strain and the isolation of PT14b resulted from environmental sampling of a depleted hatchery.

### ***Salmonella* Typhimurium**

There were six reported incidents of *Salmonella* Typhimurium in 2007. Reports of *S. Typhimurium* represented 3% of all reports from chickens. The proportion of this serovar of all incident reports in chickens has remained at similar levels in recent years (Fig 36). In 2007 the following types were reported: DT8 and UNTY (two incidents of each), and single incidents of DT104 and DT193. DT8 (a duck associated *S. Typhimurium* definitive type) was reported from a broiler production flock and from a backyard flock. The single reports of DT104 and

DT193 were from layer flocks. There was a decreasing trend in *S. Typhimurium* DT104 reported from chickens between 2003 and 2007. The UNTY reports were from a layer flock, and from a broiler-breeder unit sampled at approximately 60 weeks of age under statutory monitoring according to the requirements of the PBFHO 2007. The breeder site had already been depleted and cleansing and disinfection was underway when an investigation visit was made to the premises to give advice on hygiene, management and zoonoses control.

### **Other serovars**

The second most common serovar reported from chickens in Great Britain in 2007 was *S. Livingstone* (25 incidents). The relative proportion of this serovar has decreased from 17.8% in 2006 to 13.0% in 2007. In addition there were three reports of *Salmonella* 6,7:-:- which may be related to *S. Livingstone* (these are not shown separately in Table 38, but are included under “structure only”).

The proportion of reports of *S. Senftenberg* decreased from 10.2 % in 2006 to 8.9% in 2007; this was the third most commonly reported serovar. Other common serovars were *S. Agama* (8.3% of all incidents), *S. Kedougou* and *S. Mbandaka* (7.3% of all incidents each). Twelve of the 16 incidents of *S. Agama* reported from chickens in 2007 were from holdings of broiler breeders of two companies, of which two flocks tested positive under the PBFHO, and one incident is thought to relate to feed contamination.

The number of reports of *S. Virchow* decreased from five in 2006 to three in 2007. Of these three incidents, the most common phage type was PT2 (two incidents), and there was also one report of PT57. The reports of PT2 were both from broiler flocks and the report of PT57 was from a layer flock. There were also single isolations of PT4 and PT26 reported; these were both from voluntary hatchery samples taken from the environment where the details of the supply flock could not be established.

*S. Hadar* and *S. Infantis* were not reported from chicken flocks in 2007, however there was a single isolation of *S. Infantis* from a voluntary hatchery sampling of the environment where the details of the supply flock could not be established.

There was one isolation of *S. Pullorum* reported in 2007. Full information on the phage type results of this culture was unavailable at the time of data collation.

A single report of *S. Newport* was received in 2007, from a layer flock. The isolate was sensitive to all the antimicrobials tested against.

There was a decrease in the number reports of *S. Ohio* and *S. Thompson* from 36 and 14 in 2006 to six and none in 2007 respectively. *Salmonella* Eimsbuettel, *S. Stanley* and *S. Wangata* have not been reported from chickens since 2002. New *Salmonella* serovars reported in 2007 were: *Salmonella* Bovismorbificans (last reported in 1997), *S. Durham* (never reported in chickens previously), *Salmonella* Poona (last reported in 2002) and *S. Thomasville* (last reported in 2001).

Clinical fowl typhoid caused by *S. Gallinarum* was identified in a commercial caged layer holding and in a small backyard flock in 2005. These were the first reports of *S. Gallinarum* in Great Britain since 1986. A third outbreak, geographically close to the original one, was identified in a second commercial cage layer holding in spring of 2006, and in autumn of 2006 a fourth outbreak of fowl typhoid was confirmed in a small free range backyard flock of layer chickens. There was no confirmed connection between the backyard flocks and the commercial holdings. In 2007 there were six reports of *S. Gallinarum* in layer chickens. These were the result of voluntary monitoring from the same commercial layer holding from which *S. Gallinarum* reports were received in 2006.

National trends for *Salmonella* in chickens are difficult to interpret since a large proportion of reports of a specific serovar may originate from a small number of large integrated companies. Most incidents were identified by voluntary environmental sampling of broiler farms when the birds were two to five weeks of age.

In 2007 there were 13 *Salmonella* reports of non-GB origin from domestic fowl: two *S. Binza* reports from birds originating from France, three *S. Enteritidis* reports (one of phage type PT22, one of phage type PT23 and one of phage type PT7) from birds originating from the Czech Republic, and eight reports from birds originating from the United States (one *S. Montevideo*, four *S. Agona*, two *S. Thompson* and one *S. Heidelberg*). These reports are excluded from the tables and figures of this publication.

In 2007 the following *Salmonella* serovars were reported from chickens for reasons other than routine surveillance, for example through research projects, but were not reported through routine surveillance: *S. Enteritidis* phage types PT4b, PT21b and PT24, *S. Typhimurium* definitive types DT9, DT40 and DT195, *S. Muenster*, *S. Java* PT3b

variant 9 and *S. Mishmarhaemek*. These reports are not included in the tabulations of this publication.

## Turkeys

Table 47 shows a decrease (39%) in the number of incidents of *Salmonella* reported in turkey flocks in 2007 compared to 2006. 21% of reports were associated with investigations of clinical disease, while 74% arose through voluntary surveillance activities. Reports of *S. Typhimurium* in 2007 (12 incidents) decreased by 69% in comparison with 2006 (39 incidents). The rise in *S. Typhimurium* in turkeys in 2006 was mainly due to an increase in reports in the first half of the year, as the result of voluntary environmental monitoring by a single company. In 2007 all 12 incidents involved DT104. Nine of these incidents were reported from meat production turkeys belonging to the same company.

In 2007 there were no reports of *S. Enteritidis*, *S. Hadar*, *S. Infantis*, or *S. Virchow* from turkey flocks.

The most common serovar reported in 2007 was *S. Derby*. The relative proportion (33.0% of incidents) of this serovar has increased in 2007, compared with 2006 (17.4% of incidents).

The second most common serovar reported was *S. Kottbus* (21.4% of reports). *Salmonella* Kedougou and *S. Typhimurium* were the third and fourth most commonly reported serovars (11.6% & 10.7% of reports respectively). Both the number of incident reports and the relative proportion of *S. Senftenberg* increased in 2007 (nine incident reports, 8.0% of incidents) in comparison with 2006 (one incident report, 0.5% of all incidents). None of the incidents were from breeding flocks or hatcheries, but four of the nine incidents reported in 2007 were from meat production turkeys on three holdings. *S. Senftenberg* is a common "hatchery isolate".

In 2007 there was a decrease in the number of reports of *S. Agona*, *S. Indiana*, and *S. Newport*. Ciprofloxacin resistance was detected in isolates of *S. Newport*. However, it should be noted that VLA changed the interpretive criteria in 2007 (see Chapter 6). *S. Mons* was a *Salmonella* serovar reported for the first time in GB turkeys in 2007. *Salmonella* Stanley has not been reported from turkeys since 2002.

In 2007 there were two *Salmonella* incidents of non-GB origin reported from turkeys: one report of *S. Kedougou* and one report of *S. Kottbus* from birds originating from France. These reports are excluded from the tables and figures of this publication.

In 2007 the following *Salmonella* serovars were reported from turkeys for reasons other than routine surveillance, for example through research projects and the EU *Salmonella* in turkeys survey, but were not reported through routine surveillance: *S. Typhimurium* definitive types DT6 variant, DT120, DT135 and U302, and *S. Bardo*. These reports are not included in the tabulations of this publication.

## Ducks and Geese

There was one report of *Salmonella* from geese in 2007: that was *S. Indiana*. There were 14 reports from geese in 2006, no reports in 2005, while there were two reports in 2004.

The number of reports of *Salmonella* from ducks and geese in 2007 decreased by 22% compared with 2006. Reports from ducks represented 11% of all *Salmonella* reports in 2003 compared with 16% in 2004, 18% in 2005, 20% in 2006 and 19% in 2007. This data is the result of enhanced voluntary surveillance activities by the duck industry (Table 1). Only a very small number of incidents are associated with clinical disease investigation (0.6%).

The most common serovars reported in ducks and geese were *S. Indiana* (41.5%), *S. Binza* (11.5%), *S. Mbandaka* (9.9%), *S. Orion* (8.8%), and *S. Hadar* (8.0%). The relative proportions of these serovars increased from 2006, when they were 31.4%, 8.0%, 3.9%, 7.7% and 4.7% respectively. All the *S. Mbandaka* reports were from the same company and more than half of them were repeatedly reported from a small number of farms. The number, and proportion, of reports of *S. Hadar* increased in 2007 (29 reports, 8.0% of all incident reports) compared with 2006 (22 reports; 4.7% of all incident reports); the most common phage types were PT2, PT10, PT11 and PT22. *S. Hadar* PT46 was reported in 2007. This was last reported from ducks in 2002. A variety of other serovars were reported. The number of incidents and relative proportion of *S. Kottbus*, *S. Saint Paul* and *S. Senftenberg* decreased in 2007 compared with 2006. *Salmonella* Heidelberg was a new serovar reported from ducks in 2007 (previously reported in 1989). *Salmonella* Muenchen has not been reported from ducks since 2002.

In 2007 there were four reports of *S. Typhimurium*, a marked decrease since 2006 (34 incident reports). The majority of the incidents in 2006 were reported in the first quarter and were the result of voluntary environmental monitoring by a single company. The phage types reported in 2007 were DT99 (two reports), DT8 (one report), and there

was one report of UNTY. DT99, which is a pigeon related *S. Typhimurium* type, was previously reported in ducks in 1998.

In 2007 both the number of incidents (ten) and the relative proportion (2.7%) of reports of *S. Enteritidis* decreased in comparison with 2006 (16 incident reports, 3.4% of all incidents). The most common phage types were PT8 and PT9b (three incident reports of each). There were two reports of phage type PT23, and single reports of phage types PT6 and UNTY. PT8 and PT23 were new phage types reported in 2007. *S. Enteritidis* PT23 and PT8 have not been reported from ducks previously. PT8 is a common phage type associated with human illness.

### **Game Birds**

In 2007 reports of *Salmonella* in game birds (30 reports) decreased by 63.9% compared with 2006 (83 reports). Most reports (23) were associated with clinically diseased pheasants and partridges (Table 1). The most commonly reported serovars were *S. Binza* (11 incident reports, 36.7% of all incident reports) and *S. Typhimurium* (six incident reports; 20.0% of all incident reports). Both the number of reports and the relative proportion of *S. Typhimurium* from game birds decreased in 2007 compared to 2006 (35 incident reports; 42.2% of all incident reports). There were two incident reports of *S. Typhimurium* DT195, and single reports of DT2, DT8, DT41 and DT193. There were two reports of *S. Enteritidis* in game birds in 2007, both of phage type PT13a, and reported from pheasants on the same premises. *Salmonella* Stanley has not been reported from game birds since 2002. New serovars reported from game birds in 2007 included *S. Havana* and *S. Livingstone*. Neither of these serovars was previously reported from pheasants or partridges.

In 2007 there were nine *Salmonella* reports from game birds of non-GB origin: five reports (*S. Senftenberg*, *S. Derby*, *S. Agona*, *S. Orion* and *S. Pullorum*) from partridges originating from France, three reports (*S. Orion*, *S. Rissen* and *S. Binza*) from pheasants originating from the United States, and one report of *S. Typhimurium* DT195 originating from pheasants from France. These reports are excluded from the tables and figures of this publication.

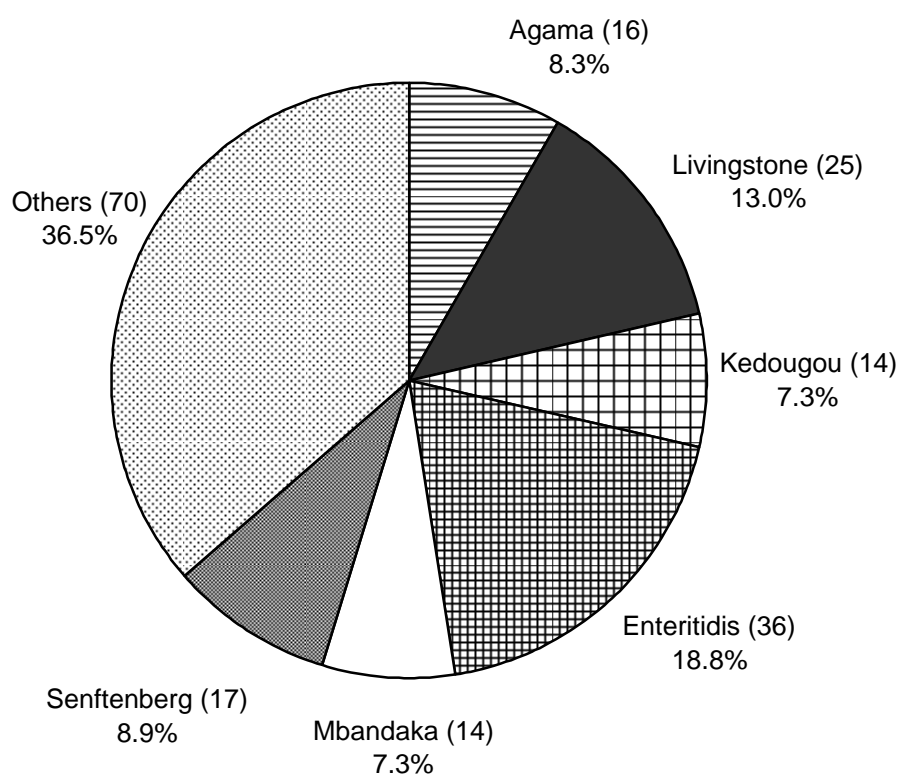
**Table 38: *Salmonella* in chickens on all premises**

<i>Salmonella</i> Incidents (Isolations)	2003		2004		2005		2006		2007	
ENTERICA ENTERICA										
Agama	6	( 6)	1	( 1)	4	( 4)	2	( 2)	16	( 17)
Agona	5	( 5)	2	( 2)	5	( 5)	4	( 4)	5	( 8)
Ajiobo	1	( 1)	-	( -)	-	( -)	-	( -)	1	( 1)
Anatum	6	( 6)	-	( -)	4	( 4)	2	( 2)	1	( 1)
Binza	8	( 8)	1	( 1)	1	( 1)	-	( -)	3	( 6)
Bovismorbificans	-	( -)	-	( -)	-	( -)	-	( -)	1	( 1)
Braenderup	2	( 2)	1	( 1)	-	( -)	-	( -)	-	( -)
Brandenburg	15	( 18)	19	( 22)	-	( -)	-	( -)	-	( -)
Bredeney	12	( 12)	-	( -)	-	( -)	-	( -)	-	( -)
Carno	1	( 1)	-	( -)	-	( -)	-	( -)	-	( -)
Cerro	-	( -)	-	( -)	-	( -)	3	( 6)	-	( -)
Cubana	1	( 1)	-	( -)	1	( 1)	-	( -)	-	( -)
Derby	3	( 3)	-	( -)	1	( 1)	-	( -)	1	( 1)
Dublin	-	( -)	1	( 1)	1	( 1)	-	( -)	1	( 1)
Durham	-	( -)	-	( -)	-	( -)	-	( -)	1	( 2)
Enteritidis	44	( 48)	8	( 13)	21	( 30)	17	( 27)	36	( 81)
Gallinarum	-	( -)	-	( -)	5	( 9)	5	( 14)	6	( 18)
Give	6	( 6)	28	( 28)	6	( 6)	4	( 4)	1	( 1)
Gloucester	-	( -)	-	( -)	1	( 1)	-	( -)	-	( -)
Goldcoast	10	( 10)	-	( -)	1	( 1)	-	( -)	-	( -)
Hadar	7	( 7)	-	( -)	-	( -)	5	( 6)	-	( -)
Havana	11	( 11)	5	( 5)	5	( 5)	9	( 9)	4	( 4)
Heidelberg	2	( 2)	-	( -)	-	( -)	-	( -)	-	( -)
Idikan	-	( -)	2	( 2)	11	( 11)	2	( 2)	-	( -)
Indiana	4	( 4)	8	( 8)	1	( 2)	3	( 3)	1	( 1)
Infantis	9	( 9)	18	( 18)	6	( 6)	3	( 4)	-	( 1)
Kedougou	48	( 49)	33	( 33)	35	( 36)	29	( 35)	14	( 15)
Kentucky	-	( -)	5	( 5)	1	( 1)	1	( 1)	5	( 9)
Kottbus	5	( 5)	5	( 5)	4	( 4)	2	( 2)	3	( 3)
Larochelle	-	( -)	-	( -)	1	( 1)	-	( -)	-	( -)
Lexington	-	( -)	10	( 10)	3	( 3)	-	( -)	-	( -)
Liverpool	16	( 27)	38	( 47)	16	( 17)	2	( 3)	-	( -)
Livingstone	144	( 151)	140	( 150)	163	( 171)	54	( 66)	25	( 37)
Mbandaka	43	( 54)	20	( 23)	20	( 24)	10	( 11)	14	( 16)
Meleagridis	1	( 1)	1	( 1)	2	( 2)	-	( -)	-	( -)
Menston	-	( -)	-	( -)	2	( 2)	-	( -)	-	( -)
Montevideo	50	( 50)	15	( 15)	15	( 15)	9	( 13)	1	( 1)
Newport	6	( 6)	11	( 11)	2	( 2)	2	( 2)	1	( 1)

**Table 38: *Salmonella* in chickens on all premises**

<i>Salmonella</i> Incidents (Isolations)	2003		2004		2005		2006		2007	
ENTERICA ENTERICA										
Ohio	32	( 32)	31	( 31)	23	( 23)	36	( 36)	6	( 6)
Orion	4	( 4)	1	( 1)	-	( -)	-	( -)	-	( -)
Oskarshamn	-	( -)	-	( -)	-	( -)	1	( 1)	-	( -)
Poona	-	( -)	-	( -)	-	( -)	-	( -)	4	( 4)
Pullorum	2	( 2)	3	( 3)	-	( -)	1	( 2)	-	( 1)
Reading	1	( 1)	1	( 1)	-	( -)	-	( -)	-	( -)
Rissen	-	( -)	-	( -)	3	( 3)	-	( -)	-	( -)
Saint Paul	-	( -)	2	( 2)	-	( -)	1	( 1)	-	( -)
Schwarzengrund	-	( -)	-	( -)	-	( -)	1	( 1)	-	( -)
Senftenberg	69	( 73)	74	( 79)	75	( 78)	31	( 53)	17	( 37)
Stourbridge	1	( 1)	-	( -)	-	( -)	2	( 2)	-	( -)
Sundsvall	-	( -)	-	( -)	1	( 1)	-	( -)	-	( -)
Taksony	-	( -)	-	( -)	-	( -)	1	( 1)	-	( -)
Tennessee	7	( 7)	2	( 2)	1	( 1)	-	( -)	-	( -)
Thomasville	-	( -)	-	( -)	-	( -)	-	( -)	1	( 1)
Thompson	13	( 14)	36	( 36)	32	( 33)	14	( 15)	-	( -)
Typhimurium	23	( 26)	12	( 12)	9	( 9)	10	( 10)	6	( 8)
Virchow	75	( 79)	31	( 32)	15	( 15)	5	( 6)	3	( 8)
Worthington	1	( 1)	-	( -)	-	( -)	1	( 1)	-	( -)
Yoruba	1	( 1)	1	( 1)	2	( 2)	-	( -)	2	( 2)
ENTERICA DIARIZONAE										
61:k:1,5,7	-	( -)	-	( -)	1	( 1)	-	( -)	-	( -)
UNSPECIFIED										
structure only	115	( 173)	66	( 110)	57	( 121)	31	( 78)	7	( 19)
rough strain	4	( 5)	3	( 3)	11	( 11)	1	( 3)	5	( 5)
TOTAL	814	( 924)	635	( 717)	568	( 665)	304	( 428)	192	( 317)

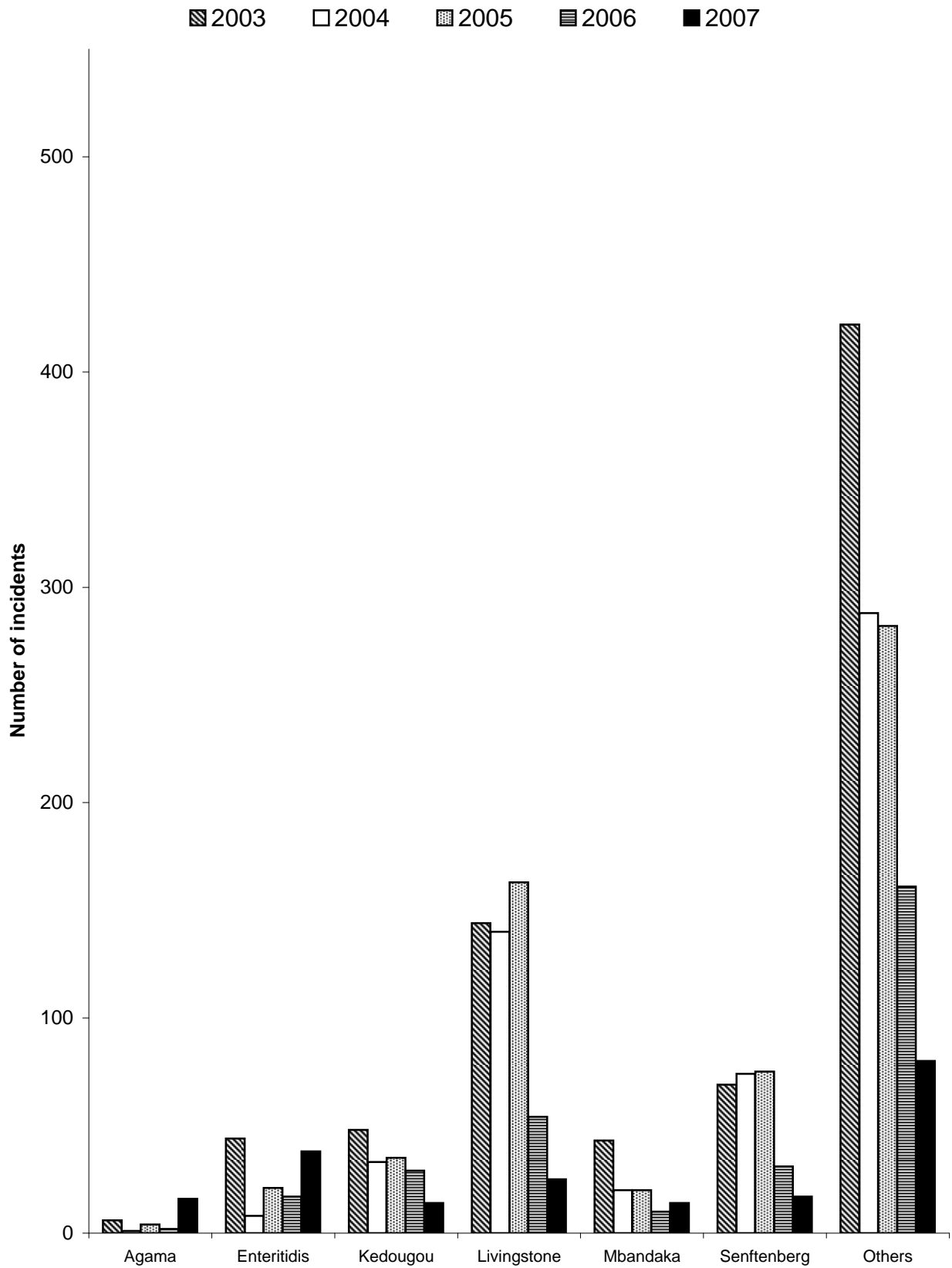
**Fig 31: Incidents of *Salmonella* serotypes in chickens in 2007**



**Table 39: Incidents of the top 5 *Salmonella* serotypes in chickens in 2007 as a % of all incidents compared to previous years**

Serotype	2003	2004	2005	2006	2007
S. Enteritidis %	5.4	1.3	3.7	5.6	18.8
S. Livingstone %	17.7	22.0	28.7	17.8	13.0
S. Senftenberg %	8.5	11.6	13.2	10.2	8.9
S. Agama %	0.7	0.2	0.7	0.7	8.3
S. Kedougou %	5.9	5.2	6.2	9.5	7.3
S. Mbandaka %	5.3	3.1	3.5	3.3	7.3
Total no. incidents	814	635	568	304	192

Fig 32: Incidents of *Salmonella* serotypes in chickens (2003 - 2007)



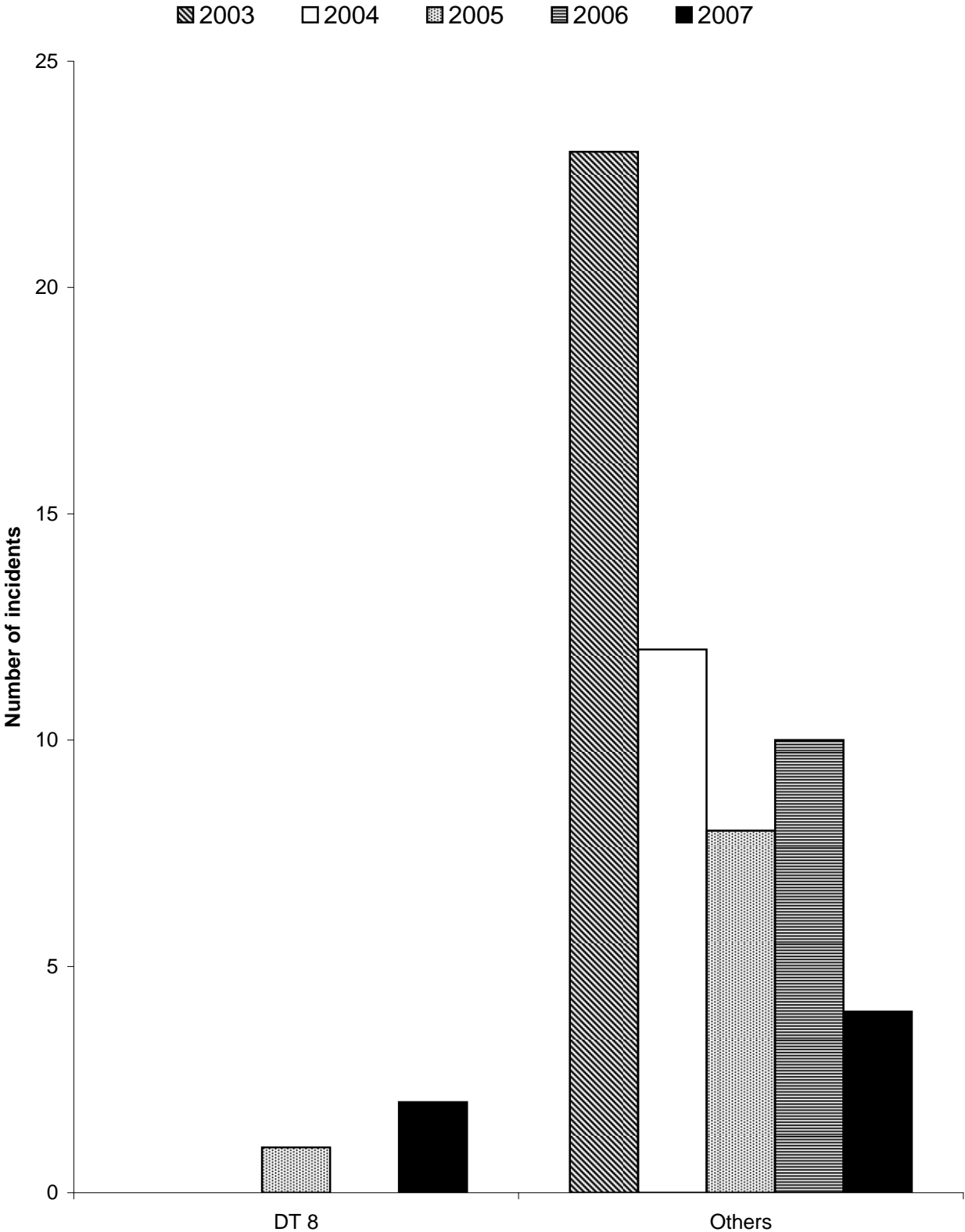
**Table 40: *Salmonella* of public health significance in chickens - number of incidents in 2007**

<i>Salmonella</i>	Broilers	Broiler Breeders	Layers	Pet/Backyard flock	Total
Enteritidis PT1	5	0	0	0	5
Enteritidis PT4	0	0	11	0	11
Enteritidis PT5a	0	0	1	0	1
Enteritidis PT6	0	0	2	0	2
Enteritidis PT7	0	0	1	0	1
Enteritidis PT8	1	0	9	0	10
Enteritidis PT35	0	0	4	0	4
Enteritidis UNTY	1	0	1	0	2
Typhimurium DT8	1	0	0	1	2
Typhimurium DT104	0	0	1	0	1
Typhimurium DT193	0	0	1	0	1
Typhimurium UNTY	0	1	1	0	2
Virchow PT2	2	0	0	0	2
Virchow PT57	0	0	1	0	1
Total	10	1	33	1	45

**Table 41: S. Typhimurium in chickens on all premises**

Definitive Types Incidents (Isolations)	2003	2004	2005	2006	2007
2	1 ( 1)	- ( -)	- ( -)	- ( -)	- ( -)
8	- ( -)	- ( -)	1 ( 1)	- ( -)	2 ( 3)
12	1 ( 1)	- ( -)	- ( -)	- ( -)	- ( -)
40	- ( -)	1 ( 1)	- ( -)	3 ( 3)	- ( -)
41	1 ( 1)	1 ( 1)	- ( -)	- ( -)	- ( -)
49	1 ( 1)	1 ( 1)	1 ( 1)	- ( -)	- ( -)
56	- ( -)	1 ( 1)	- ( -)	- ( -)	- ( -)
85	- ( -)	- ( -)	1 ( 1)	- ( -)	- ( -)
104	11 ( 13)	6 ( 6)	6 ( 6)	5 ( 5)	1 ( 2)
120	- ( -)	1 ( 1)	- ( -)	- ( -)	- ( -)
193	2 ( 2)	1 ( 1)	- ( -)	- ( -)	1 ( 1)
193a	2 ( 2)	- ( -)	- ( -)	- ( -)	- ( -)
195	- ( -)	- ( -)	- ( -)	1 ( 1)	- ( -)
U302	2 ( 2)	- ( -)	- ( -)	- ( -)	- ( -)
U317	1 ( 1)	- ( -)	- ( -)	- ( -)	- ( -)
RDNC	- ( 1)	- ( -)	- ( -)	- ( -)	- ( -)
UNTY	1 ( 1)	- ( -)	- ( -)	1 ( 1)	2 ( 2)
<b>TOTAL</b>	<b>23 ( 26)</b>	<b>12 ( 12)</b>	<b>9 ( 9)</b>	<b>10 ( 10)</b>	<b>6 ( 8)</b>

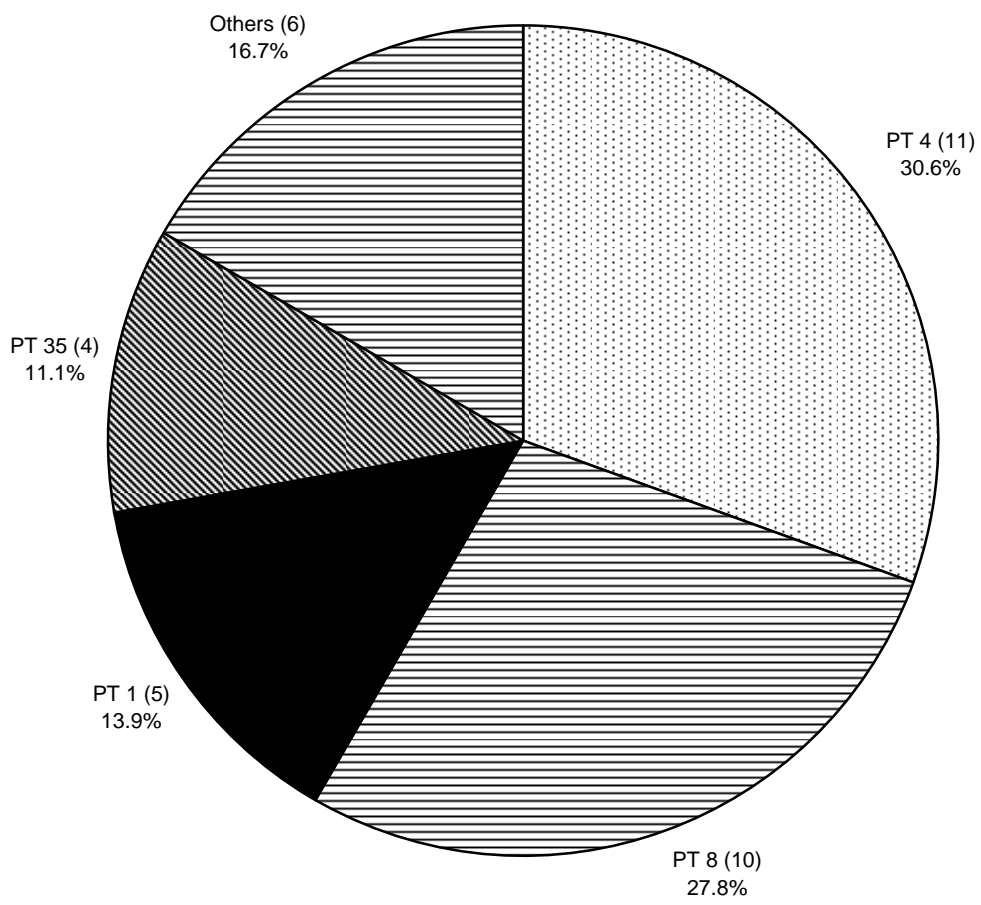
**Fig 33: Incidents of *Salmonella* Typhimurium definitive types in chickens (2003 - 2007)**



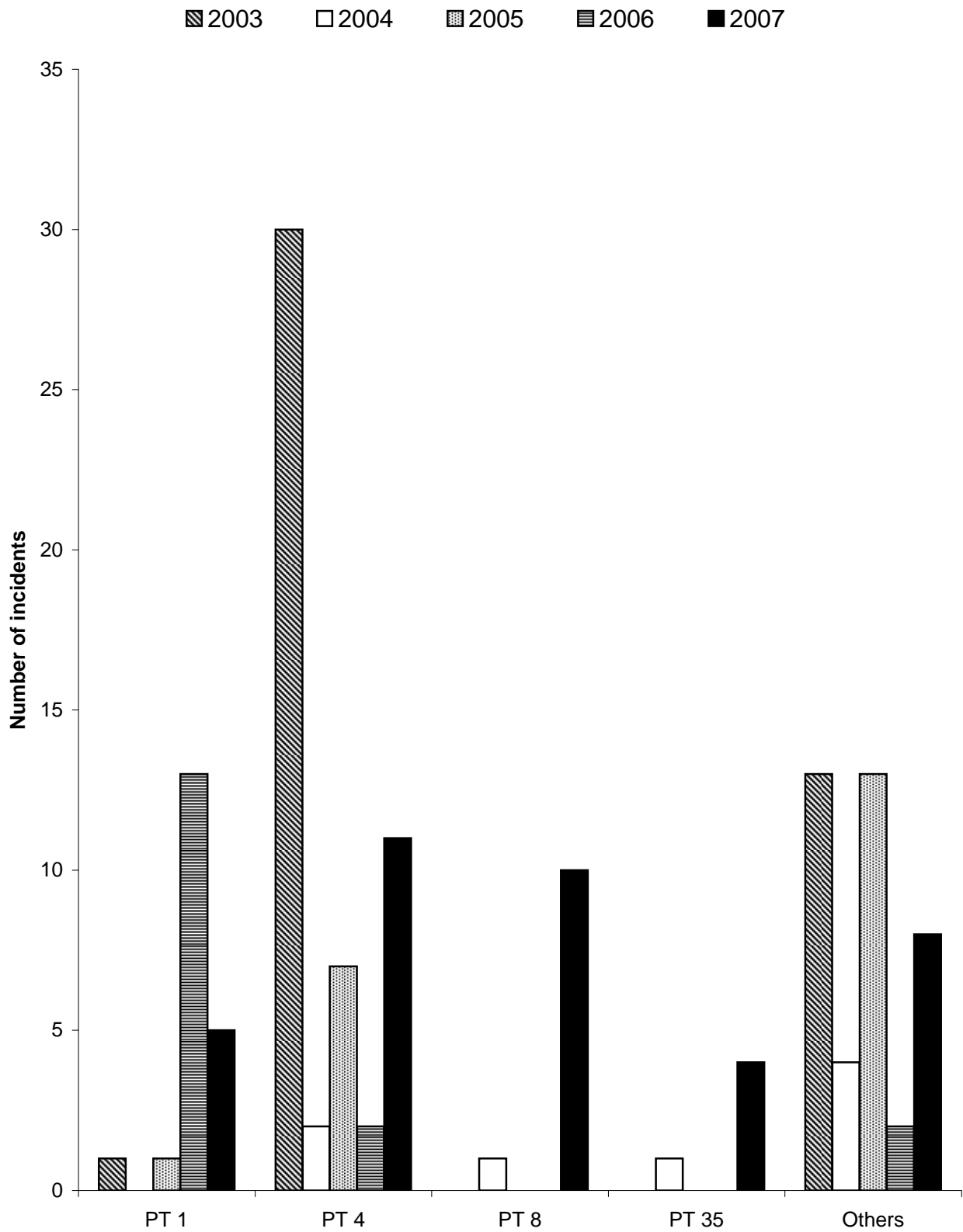
**Table 42: S. Enteritidis in chickens on all premises**

Phage Types Incidents (Isolations)	2003		2004		2005		2006		2007	
1	1	( 1)	-	( -)	1	( 1)	13	( 16)	5	( 5)
4	30	( 32)	2	( 7)	7	( 15)	2	( 9)	11	( 47)
4b	-	( -)	-	( -)	2	( 2)	-	( -)	-	( -)
5a	-	( -)	-	( -)	1	( 1)	-	( -)	1	( 1)
6	7	( 7)	2	( 2)	2	( 2)	1	( 1)	2	( 2)
6a	5	( 5)	-	( -)	2	( 2)	-	( -)	-	( -)
7	-	( 1)	1	( 1)	2	( 3)	-	( -)	1	( 1)
8	-	( -)	1	( 1)	-	( -)	-	( -)	10	( 14)
9b	-	( -)	-	( -)	1	( 1)	-	( -)	-	( -)
11	-	( -)	1	( 1)	-	( -)	-	( -)	-	( -)
12	1	( 1)	-	( -)	2	( 2)	-	( -)	-	( -)
13	-	( -)	-	( -)	-	( -)	-	( -)	-	( 1)
14b	-	( -)	-	( -)	-	( -)	-	( -)	-	( 1)
28	-	( -)	-	( -)	-	( -)	1	( 1)	-	( -)
35	-	( -)	1	( 1)	-	( -)	-	( -)	4	( 6)
NOPT	-	( 1)	-	( -)	-	( -)	-	( -)	-	( -)
UNTY	-	( -)	-	( -)	1	( 1)	-	( -)	2	( 3)
TOTAL	44	( 48)	8	( 13)	21	( 30)	17	( 27)	36	( 81)

Fig 34: Incidents of *Salmonella* Enteritidis phage types in chickens in 2007



**Fig 35: Incidents of *Salmonella* Enteritidis phage types in chickens (2003 - 2007)**



**Table 43: S. Hadar in chickens on all premises**

Phage Types Incidents (Isolations)	2003		2004		2005		2006		2007	
9	2	( 2)	-	( -)	-	( -)	-	( -)	-	( -)
10	2	( 2)	-	( -)	-	( -)	1	( 2)	-	( -)
22	-	( -)	-	( -)	-	( -)	3	( 3)	-	( -)
47	-	( -)	-	( -)	-	( -)	1	( 1)	-	( -)
58a	3	( 3)	-	( -)	-	( -)	-	( -)	-	( -)
TOTAL	7	( 7)	-	( -)	-	( -)	5	( 6)	-	( -)

**Table 44: S. Pullorum in chickens on all premises**

Phage Types Incidents (Isolations)	2003		2004		2005		2006		2007	
1	1	( 1)	3	( 3)	-	( -)	-	( -)	-	( -)
15	1	( 1)	-	( -)	-	( -)	-	( -)	-	( -)
17	-	( -)	-	( -)	-	( -)	1	( 1)	-	( -)
NOPT	-	( -)	-	( -)	-	( -)	-	( -)	-	( -)
untyped	-	( -)	-	( -)	-	( -)	-	( 1)	-	( 1)
TOTAL	2	( 2)	3	( 3)	-	( -)	1	( 2)	-	( 1)

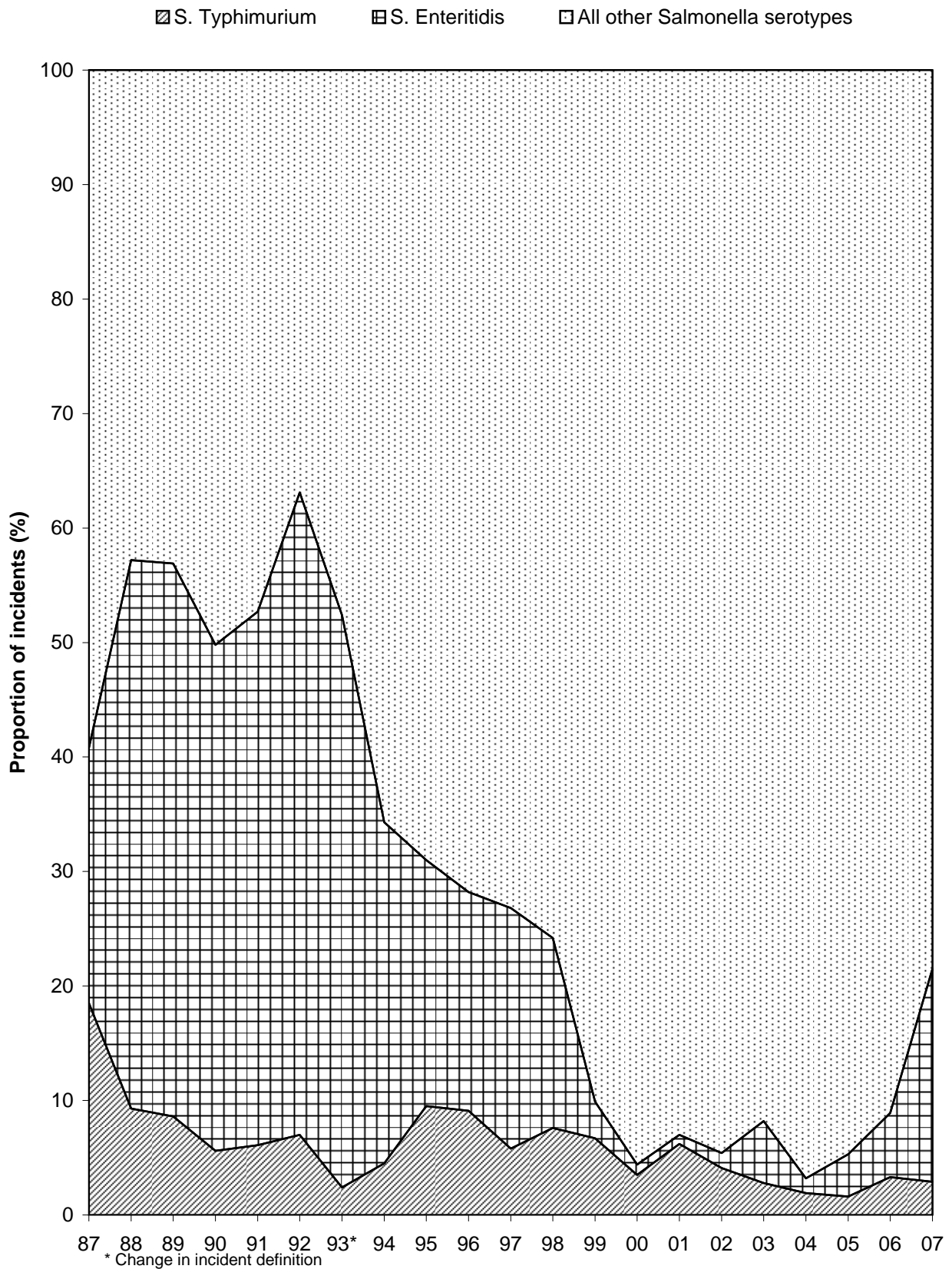
**Table 45: S. Thompson in chickens on all premises**

Phage Types Incidents (Isolations)	2003	2004	2005	2006	2007
1	1 ( 1)	- ( -)	- ( -)	- ( -)	- ( -)
1a	4 ( 4)	12 ( 12)	10 ( 11)	6 ( 7)	- ( -)
6	7 ( 8)	22 ( 22)	10 ( 10)	6 ( 6)	- ( -)
11	- ( -)	1 ( 1)	- ( -)	- ( -)	- ( -)
14	1 ( 1)	- ( -)	2 ( 2)	- ( -)	- ( -)
RDNC	- ( -)	1 ( 1)	1 ( 1)	1 ( 1)	- ( -)
UNTY	- ( -)	- ( -)	- ( -)	1 ( 1)	- ( -)
untyped	- ( -)	- ( -)	9 ( 9)	- ( -)	- ( -)
TOTAL	13 ( 14)	36 ( 36)	32 ( 33)	14 ( 15)	- ( -)

**Table 46: S. Virchow in chickens on all premises**

Phage Types Incidents (Isolations)	2003	2004	2005	2006	2007
2	52 ( 53)	20 ( 20)	13 ( 13)	4 ( 5)	2 ( 4)
4	17 ( 17)	7 ( 7)	- ( -)	- ( -)	- ( 1)
26	4 ( 4)	2 ( 2)	- ( -)	1 ( 1)	- ( 1)
31	- ( -)	- ( -)	1 ( 1)	- ( -)	- ( -)
35	1 ( 1)	2 ( 2)	- ( -)	- ( -)	- ( -)
57	1 ( 1)	- ( -)	1 ( 1)	- ( -)	1 ( 1)
RDNC	- ( 1)	- ( -)	- ( -)	- ( -)	- ( 1)
NOPT	- ( 2)	- ( 1)	- ( -)	- ( -)	- ( -)
TOTAL	75 ( 79)	31 ( 32)	15 ( 15)	5 ( 6)	3 ( 8)

**Fig 36: *S. Enteritidis* and *S. Typhimurium* as a proportion of all incident reports in chickens (1987 - 2007)**



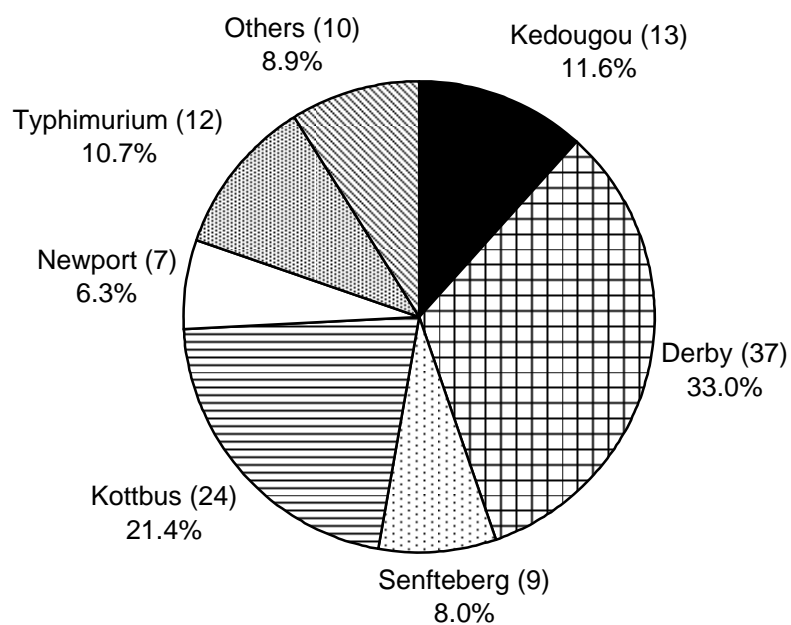
**Table 47: *Salmonella* in turkeys on all premises**

<i>Salmonella</i> Incidents (Isolations)	2003		2004		2005		2006		2007	
ENTERICA ENTERICA										
Agama	-	( - )	3	( 3 )	-	( - )	1	( 1 )	1	( 1 )
Agona	22	( 22 )	16	( 17 )	19	( 19 )	9	( 11 )	1	( 1 )
Ajiobo	-	( - )	3	( 3 )	-	( - )	-	( - )	1	( 1 )
Anatum	-	( - )	-	( - )	4	( 4 )	-	( - )	-	( - )
Binza	-	( - )	1	( 1 )	-	( - )	1	( 2 )	-	( - )
Bredeney	6	( 6 )	3	( 3 )	1	( 1 )	-	( - )	-	( - )
Corvallis	3	( 3 )	6	( 6 )	1	( 1 )	-	( - )	-	( - )
Derby	41	( 42 )	21	( 21 )	57	( 59 )	32	( 49 )	37	( 48 )
Dublin	-	( - )	2	( 2 )	-	( - )	-	( - )	-	( - )
Enteritidis	-	( - )	1	( 1 )	-	( - )	-	( - )	-	( - )
Fischerkietz	-	( - )	2	( 2 )	-	( - )	-	( - )	-	( - )
Goldcoast	1	( 1 )	-	( - )	-	( - )	-	( - )	-	( - )
Hadar	14	( 14 )	8	( 9 )	-	( - )	1	( 1 )	-	( - )
Indiana	35	( 39 )	23	( 23 )	30	( 33 )	10	( 15 )	3	( 3 )
Infantis	1	( 1 )	-	( - )	-	( - )	-	( - )	-	( - )
Kedougou	6	( 6 )	19	( 19 )	18	( 18 )	21	( 24 )	13	( 22 )
Kentucky	-	( - )	1	( 1 )	-	( - )	-	( - )	-	( - )
Kottbus	30	( 31 )	27	( 28 )	43	( 46 )	26	( 34 )	24	( 38 )
Larochelle	1	( 1 )	-	( - )	-	( - )	-	( - )	-	( - )
Manhattan	1	( 1 )	-	( - )	-	( - )	-	( - )	-	( - )
Mbandaka	-	( - )	1	( 1 )	1	( 1 )	-	( - )	-	( - )
Meleagridis	1	( 1 )	-	( - )	1	( 1 )	-	( - )	-	( - )
Menston	1	( 1 )	-	( - )	-	( - )	-	( - )	-	( - )
Mons	-	( - )	-	( - )	-	( - )	-	( - )	1	( 1 )
Montevideo	65	( 65 )	9	( 9 )	15	( 15 )	6	( 9 )	2	( 2 )
Newport	33	( 33 )	37	( 37 )	35	( 35 )	14	( 19 )	7	( 8 )
Orion	-	( - )	1	( 1 )	1	( 1 )	-	( - )	-	( - )
Poona	-	( - )	1	( 1 )	-	( - )	-	( - )	-	( - )
Rissen	-	( - )	2	( 2 )	2	( 2 )	-	( - )	-	( - )
Saint Paul	-	( - )	-	( - )	2	( 2 )	-	( - )	1	( 2 )
Schwarzengrund	2	( 2 )	-	( - )	-	( - )	-	( - )	-	( - )
Senftenberg	-	( - )	-	( - )	3	( 3 )	1	( 1 )	9	( 21 )
Stourbridge	-	( - )	-	( - )	-	( - )	1	( 1 )	-	( - )

**Table 47: *Salmonella* in turkeys on all premises**

<i>Salmonella</i> Incidents (Isolations)	2003	2004	2005	2006	2007
ENTERICA ENTERICA					
Taksony	- ( -)	- ( -)	- ( -)	2 ( 2)	- ( -)
Typhimurium	36 ( 39)	44 ( 47)	27 ( 27)	39 ( 52)	12 ( 14)
Virchow	13 ( 13)	11 ( 11)	5 ( 5)	10 ( 14)	- ( -)
UNSPECIFIED					
structure only	28 ( 28)	14 ( 14)	19 ( 19)	8 ( 15)	- ( -)
rough strain	9 ( 9)	1 ( 1)	1 ( 1)	2 ( 2)	- ( -)
TOTAL	349 ( 358)	257 ( 263)	285 ( 293)	184 ( 252)	112 ( 162)

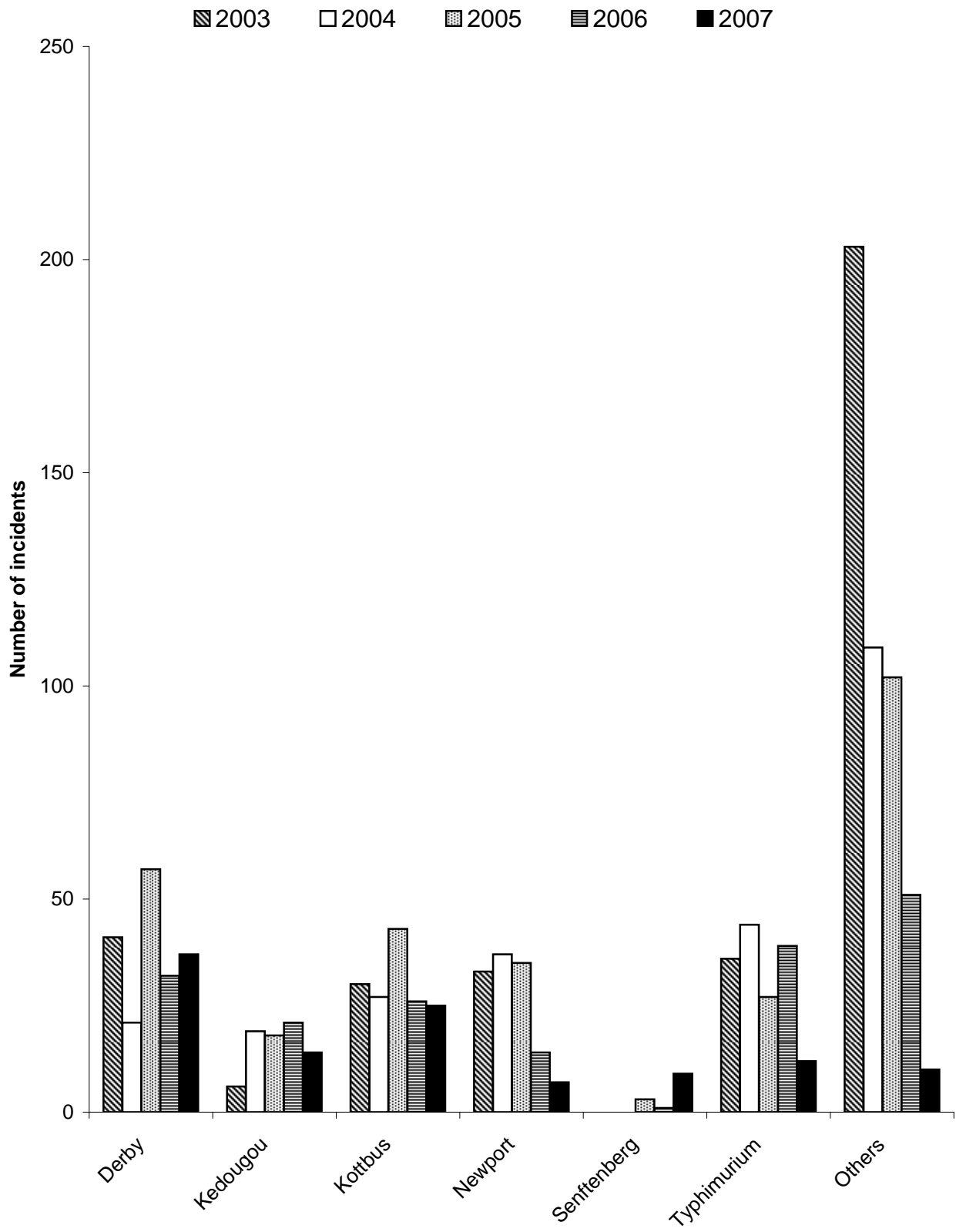
**Fig 37: Incidents of *Salmonella* serotypes in turkeys in 2007**



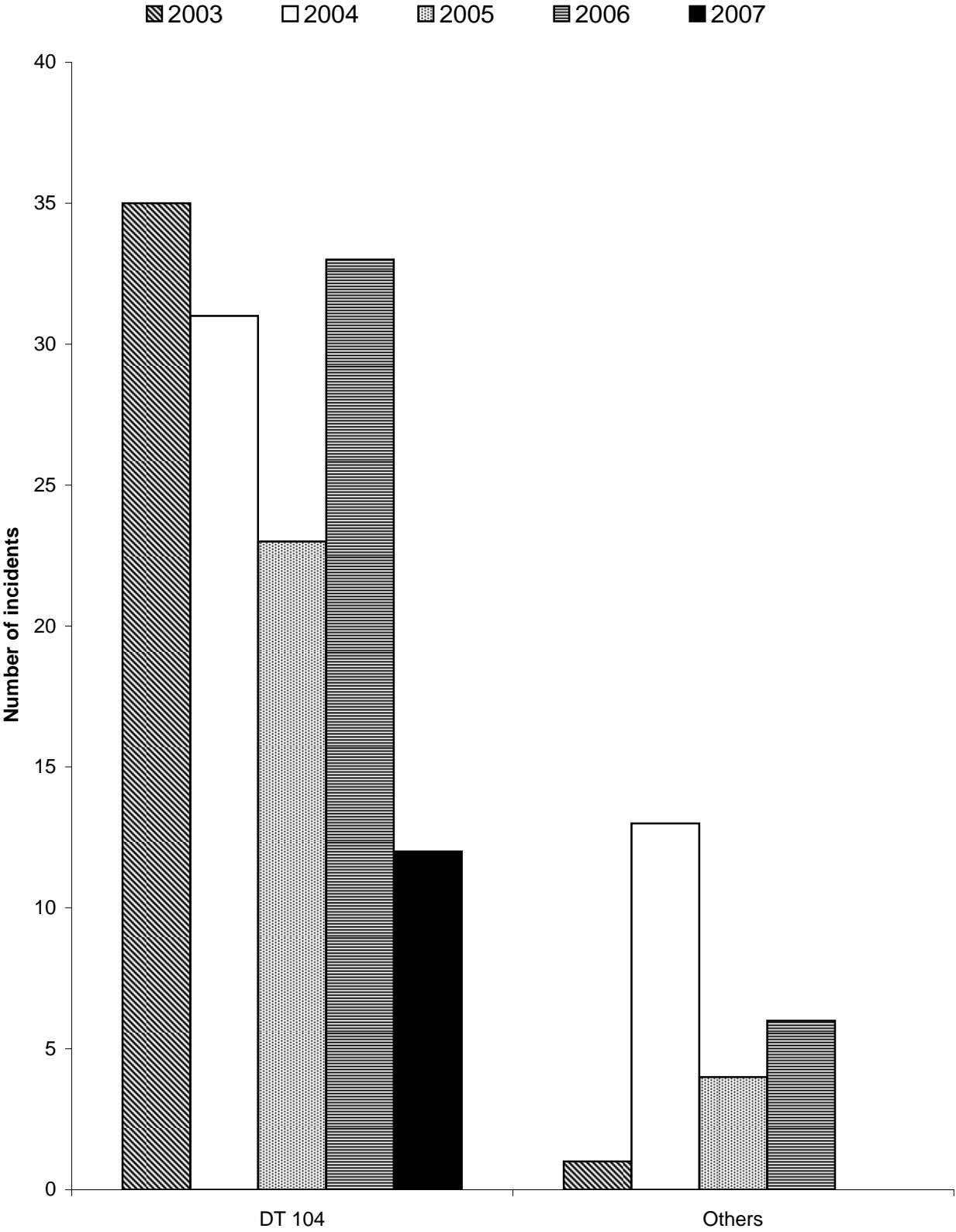
**Table 48: Incidents of the top 5 *Salmonella* serotypes in turkeys in 2007 as a % of all incidents compared to previous years**

Serotype	2003	2004	2005	2006	2007
S. Derby %	11.7	8.2	20.0	17.4	33.0
S. Kottbus %	8.6	10.5	15.1	14.1	21.4
S. Kedougou %	1.7	7.4	6.3	11.4	11.6
S. Typhimurium %	10.3	17.1	9.5	21.2	10.7
S. Senftenberg %	0	0	1.1	0.5	8.0
Total no. incidents	349	257	285	184	112

Fig 38: Incidents of *Salmonella* serotypes in turkeys (2003 - 2007)



**Fig 39: Incidents of *Salmonella* Typhimurium definitive types in turkeys (2003 - 2007)**



**Table 49: S. Typhimurium in turkeys on all premises**

Definitive Types Incidents (Isolations)	2003	2004	2005	2006	2007
8	- ( -)	- ( -)	- ( -)	1 ( 1)	- ( -)
41	- ( -)	1 ( 1)	- ( -)	- ( -)	- ( -)
56	- ( -)	1 ( 1)	1 ( 1)	- ( -)	- ( -)
99	- ( -)	5 ( 6)	- ( -)	- ( -)	- ( -)
104	35 ( 38)	31 ( 33)	23 ( 23)	33 ( 45)	12 ( 14)
120	- ( -)	5 ( 5)	- ( -)	1 ( 1)	- ( -)
193	- ( -)	- ( -)	- ( -)	- ( 1)	- ( -)
U288	1 ( 1)	- ( -)	1 ( 1)	- ( -)	- ( -)
U302	- ( -)	- ( -)	2 ( 2)	2 ( 2)	- ( -)
UNTY	- ( -)	1 ( 1)	- ( -)	2 ( 2)	- ( -)
TOTAL	36 ( 39)	44 ( 47)	27 ( 27)	39 ( 52)	12 ( 14)

**Table 50: S. Enteritidis in turkeys on all premises**

Phage Types Incidents (Isolations)	2003	2004	2005	2006	2007
UNTY	- ( -)	1 ( 1)	- ( -)	- ( -)	- ( -)
TOTAL	- ( -)	1 ( 1)	- ( -)	- ( -)	- ( -)

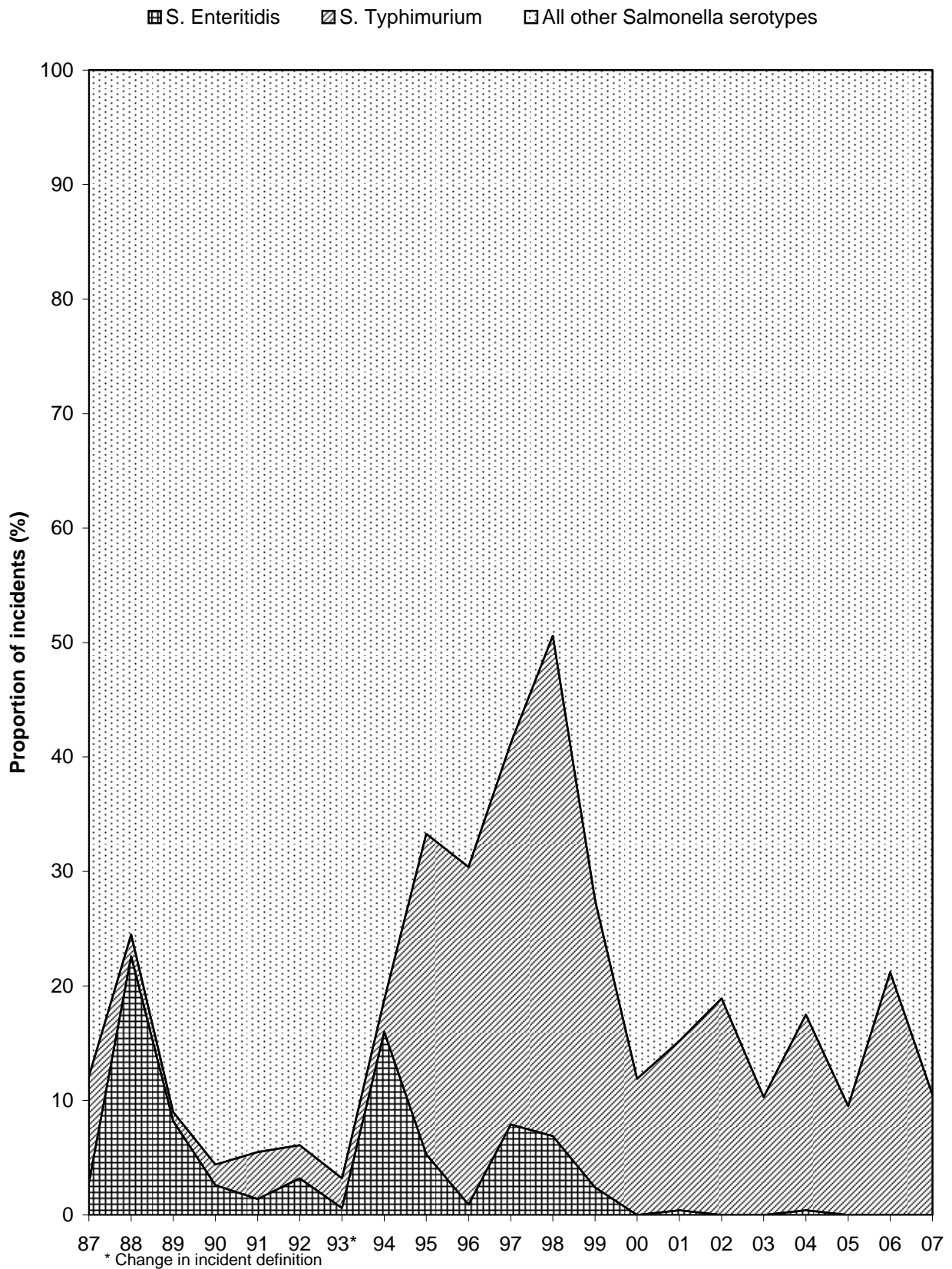
**Table 51: S. Hadar in turkeys on all premises**

Phage Types Incidents (Isolations)	2003	2004	2005	2006	2007
1	- ( -)	- ( -)	- ( -)	1 ( 1)	- ( -)
2	1 ( 1)	- ( -)	- ( -)	- ( -)	- ( -)
10	12 ( 12)	8 ( 8)	- ( -)	- ( -)	- ( -)
18	1 ( 1)	- ( -)	- ( -)	- ( -)	- ( -)
untyped	- ( -)	- ( 1)	- ( -)	- ( -)	- ( -)
TOTAL	14 ( 14)	8 ( 9)	- ( -)	1 ( 1)	- ( -)

**Table 52: S. Virchow in turkeys on all premises**

Phage Types Incidents (Isolations)	2003	2004	2005	2006	2007
19	- ( -)	1 ( 1)	- ( -)	- ( -)	- ( -)
26	13 ( 13)	10 ( 10)	3 ( 3)	- ( -)	- ( -)
30	- ( -)	- ( -)	- ( -)	5 ( 9)	- ( -)
31	- ( -)	- ( -)	2 ( 2)	5 ( 5)	- ( -)
TOTAL	13 ( 13)	11 ( 11)	5 ( 5)	10 ( 14)	- ( -)

**Fig 40 : S. Enteritidis and S. Typhimurium as a proportion of all reports in turkeys (1987 - 2007)**



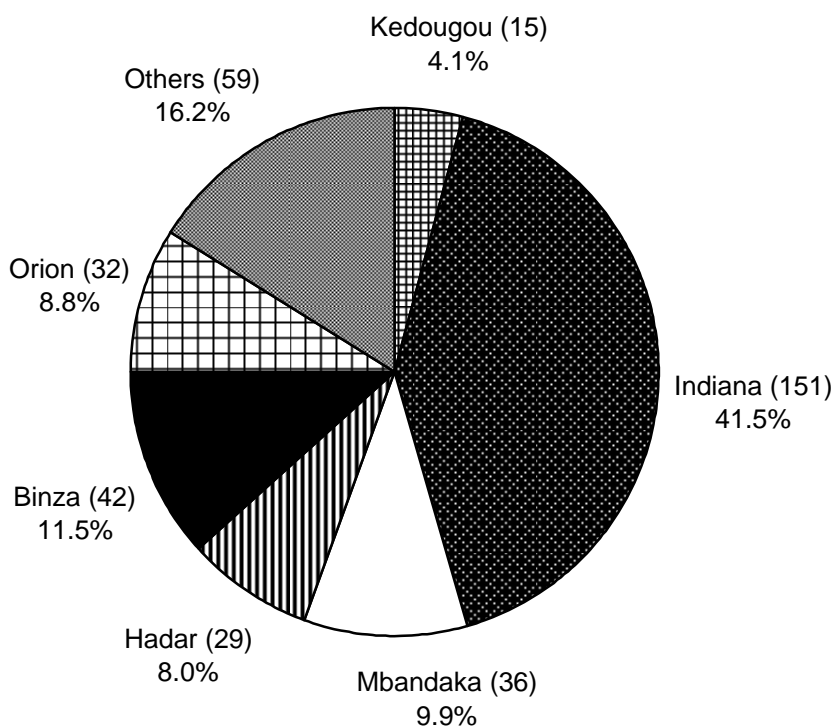
**Table 53: *Salmonella* in ducks & geese on all premises**

<i>Salmonella</i> Incidents (Isolations)	2003		2004		2005		2006		2007	
ENTERICA ENTERICA										
Agama	-	( - )	-	( - )	-	( - )	1	( 2 )	-	( - )
Agona	3	( 3 )	3	( 3 )	-	( - )	-	( - )	-	( - )
Anatum	-	( - )	3	( 3 )	1	( 1 )	1	( 1 )	-	( - )
Binza	71	( 73 )	83	( 86 )	43	( 46 )	37	( 49 )	42	( 50 )
Bredeney	-	( - )	-	( - )	-	( - )	1	( 1 )	-	( - )
Derby	2	( 2 )	2	( 2 )	5	( 5 )	7	( 10 )	1	( 1 )
Durham	-	( - )	-	( - )	-	( - )	1	( 1 )	-	( - )
Enteritidis	6	( 6 )	8	( 8 )	66	( 69 )	16	( 33 )	10	( 17 )
Give	24	( 24 )	15	( 15 )	15	( 15 )	12	( 13 )	17	( 19 )
Goldcoast	2	( 2 )	2	( 2 )	-	( - )	2	( 2 )	-	( - )
Hadar	31	( 33 )	52	( 57 )	26	( 27 )	22	( 24 )	29	( 29 )
Havana	6	( 6 )	5	( 5 )	3	( 3 )	3	( 4 )	2	( 3 )
Heidelberg	-	( - )	-	( - )	-	( - )	-	( - )	1	( 1 )
Idikan	-	( - )	1	( 1 )	-	( - )	-	( - )	-	( - )
Indiana	131	( 133 )	134	( 137 )	178	( 184 )	146	( 204 )	151	( 189 )
Kedougou	22	( 22 )	32	( 33 )	28	( 28 )	38	( 69 )	15	( 31 )
Kentucky	-	( - )	-	( - )	-	( - )	1	( 1 )	-	( - )
Kottbus	4	( 4 )	5	( 5 )	45	( 45 )	21	( 34 )	2	( 2 )
Livingstone	47	( 47 )	98	( 98 )	12	( 12 )	8	( 12 )	6	( 6 )
Mbandaka	-	( - )	-	( - )	-	( - )	18	( 27 )	36	( 42 )
Newport	-	( - )	1	( 1 )	-	( - )	1	( 1 )	-	( - )
Ohio	-	( - )	-	( - )	2	( 2 )	2	( 2 )	1	( 1 )
Orion	40	( 40 )	39	( 40 )	42	( 43 )	36	( 49 )	32	( 39 )
Poona	-	( - )	-	( - )	1	( 1 )	-	( - )	-	( - )
Reading	-	( - )	-	( - )	4	( 4 )	-	( - )	-	( - )
Saint Paul	2	( 2 )	3	( 3 )	25	( 25 )	11	( 13 )	-	( - )
Schwarzengrund	-	( - )	-	( - )	1	( 1 )	-	( - )	-	( - )
Senftenberg	-	( - )	1	( 1 )	60	( 62 )	17	( 31 )	10	( 13 )
Typhimurium	13	( 13 )	8	( 9 )	72	( 72 )	34	( 65 )	4	( 5 )
Yoruba	-	( - )	-	( - )	-	( - )	1	( 1 )	-	( - )

**Table 53: *Salmonella* in ducks & geese on all premises**

<i>Salmonella</i> Incidents (Isolations)	2003	2004	2005	2006	2007
UNSPECIFIED					
structure only	11 ( 11)	20 ( 21)	24 ( 24)	21 ( 24)	5 ( 5)
rough strain	1 ( 1)	- ( -)	- ( -)	5 ( 5)	- ( -)
untyped	- ( -)	- ( -)	- ( -)	1 ( 1)	- ( -)
untypable	1 ( 1)	- ( -)	- ( -)	1 ( 1)	- ( -)
TOTAL	417 ( 423)	515 ( 530)	653 ( 669)	465 ( 680)	364 ( 453)

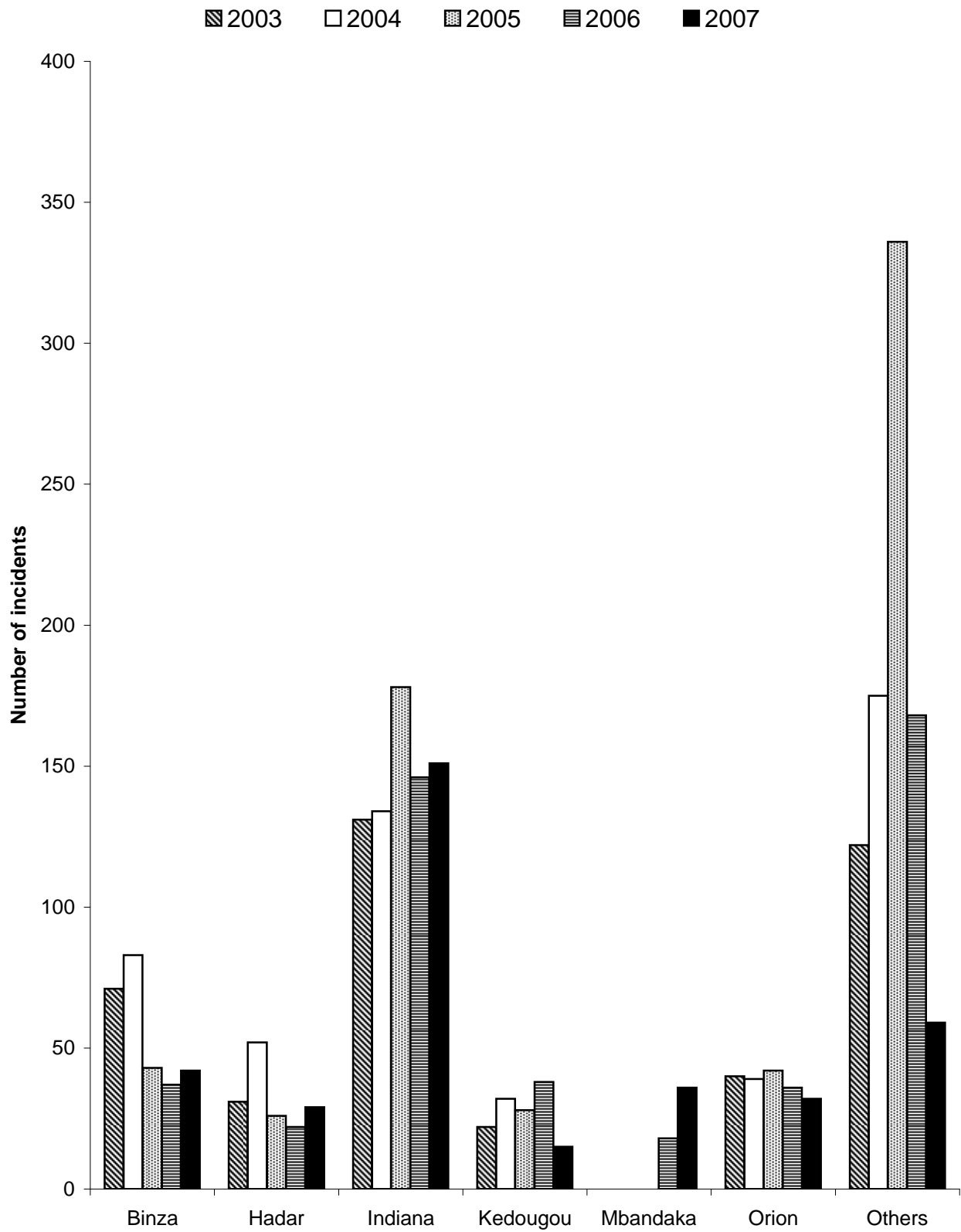
**Fig 41: Incidents of *Salmonella* serotypes in ducks and geese in 2007**



**Table 54: Incidents of the top 5 *Salmonella* serotypes in ducks & geese in 2007 as a % of all incidents compared to previous years**

Serotype	2003	2004	2005	2006	2007
S. Indiana %	31.4	26.0	27.3	31.4	41.5
S. Binza %	17.0	16.1	6.6	8.0	11.5
S. Mbandaka %	0	0	0	3.9	9.9
S. Orion %	9.6	7.6	6.4	7.7	8.8
S. Hadar %	7.4	10.1	4.0	4.7	8.0
Total no. incidents	417	515	653	465	364

**Fig 42: Incidents of *Salmonella* serotypes in ducks and geese (2003 - 2007)**



**Table 55: S. Typhimurium in ducks & geese on all premises**

Definitive Types Incidents (Isolations)	2003	2004	2005	2006	2007
2	- ( -)	- ( -)	- ( -)	- ( 2)	- ( -)
8	10 ( 10)	5 ( 5)	61 ( 61)	17 ( 40)	1 ( 2)
30	3 ( 3)	1 ( 1)	6 ( 6)	6 ( 6)	- ( -)
41	- ( -)	2 ( 2)	2 ( 2)	3 ( 3)	- ( -)
66	- ( -)	- ( -)	1 ( 1)	- ( -)	- ( -)
99	- ( -)	- ( -)	- ( -)	- ( -)	2 ( 2)
193	- ( -)	- ( -)	- ( -)	1 ( 1)	- ( -)
195	- ( -)	- ( -)	- ( -)	5 ( 5)	- ( -)
U288	- ( -)	- ( -)	- ( -)	1 ( 2)	- ( -)
U309	- ( -)	- ( -)	- ( -)	1 ( 1)	- ( -)
RDNC	- ( -)	- ( 1)	- ( -)	- ( 1)	- ( -)
NOPT	- ( -)	- ( -)	- ( -)	- ( 3)	- ( -)
UNTY	- ( -)	- ( -)	2 ( 2)	- ( -)	1 ( 1)
untyped	- ( -)	- ( -)	- ( -)	- ( 1)	- ( -)
<b>TOTAL</b>	<b>13 ( 13)</b>	<b>8 ( 9)</b>	<b>72 ( 72)</b>	<b>34 ( 65)</b>	<b>4 ( 5)</b>

**Table 56: S. Enteritidis in ducks & geese on all premises**

Phage Types Incidents (Isolations)	2003	2004	2005	2006	2007
1	- ( -)	3 ( 3)	- ( -)	- ( -)	- ( -)
3	- ( -)	- ( -)	1 ( 1)	1 ( 1)	- ( -)
4	- ( -)	1 ( 1)	- ( -)	- ( -)	- ( -)
6	- ( -)	- ( -)	7 ( 7)	2 ( 3)	1 ( 1)
6a	- ( -)	- ( -)	31 ( 32)	4 ( 10)	- ( -)
7	- ( -)	- ( -)	- ( -)	1 ( 1)	- ( -)
8	- ( -)	- ( -)	- ( -)	- ( -)	3 ( 4)
9b	6 ( 6)	3 ( 3)	12 ( 12)	6 ( 12)	3 ( 3)
13a	- ( -)	- ( -)	1 ( 1)	- ( 1)	- ( 6)
14b	- ( -)	- ( -)	9 ( 9)	- ( 1)	- ( -)
23	- ( -)	- ( -)	- ( -)	- ( -)	2 ( 2)
35	- ( -)	1 ( 1)	- ( -)	- ( -)	- ( -)
RDNC	- ( -)	- ( -)	- ( 1)	- ( -)	- ( -)
NOPT	- ( -)	- ( -)	- ( 1)	- ( -)	- ( -)
UNTY	- ( -)	- ( -)	5 ( 5)	2 ( 4)	1 ( 1)
<b>TOTAL</b>	<b>6 ( 6)</b>	<b>8 ( 8)</b>	<b>66 ( 69)</b>	<b>16 ( 33)</b>	<b>10 ( 17)</b>

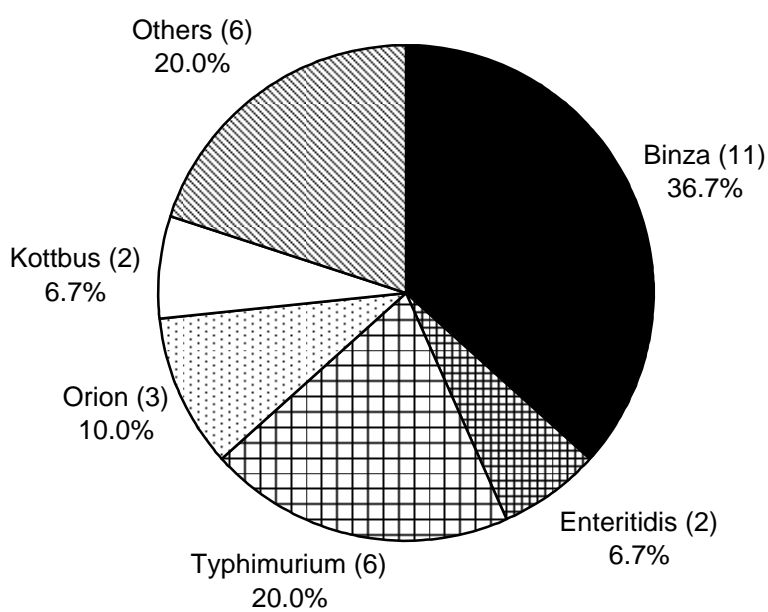
**Table 57: S. Hadar in ducks & geese on all premises**

Phage Types Incidents (Isolations)	2003	2004	2005	2006	2007
2	3 ( 3)	7 ( 7)	3 ( 3)	3 ( 3)	8 ( 8)
5	1 ( 1)	- ( -)	- ( -)	- ( -)	- ( -)
9	- ( -)	1 ( 1)	- ( -)	- ( -)	- ( -)
10	3 ( 3)	5 ( 5)	5 ( 6)	6 ( 6)	7 ( 7)
11	10 ( 10)	8 ( 8)	3 ( 3)	3 ( 3)	6 ( 6)
18	- ( -)	1 ( 1)	- ( -)	- ( -)	- ( -)
22	12 ( 12)	26 ( 28)	8 ( 8)	9 ( 10)	4 ( 4)
46	- ( -)	- ( -)	- ( -)	- ( -)	1 ( 1)
51	1 ( 1)	1 ( 1)	- ( -)	- ( -)	- ( -)
58a	1 ( 1)	- ( -)	- ( -)	- ( -)	- ( -)
62	- ( -)	2 ( 2)	5 ( 5)	- ( -)	- ( -)
RDNC	- ( 1)	- ( 1)	- ( -)	- ( -)	- ( -)
NOPT	- ( -)	- ( -)	- ( -)	- ( 1)	- ( -)
UNTY	- ( -)	1 ( 1)	2 ( 2)	1 ( 1)	3 ( 3)
untyped	- ( 1)	- ( 2)	- ( -)	- ( -)	- ( -)
TOTAL	31 ( 33)	52 ( 57)	26 ( 27)	22 ( 24)	29 ( 29)

**Table 58: *Salmonella* in game birds on all premises**

<i>Salmonella</i> Incidents (Isolations)	2003	2004	2005	2006	2007
<b>ENTERICA ENTERICA</b>					
Agona	2 ( 2)	- ( -)	- ( -)	- ( -)	- ( -)
Binza	10 ( 10)	7 ( 7)	13 ( 14)	28 ( 31)	11 ( 12)
Derby	1 ( 1)	1 ( 1)	- ( -)	2 ( 2)	1 ( 2)
Dublin	- ( -)	1 ( 1)	- ( -)	- ( -)	- ( -)
Enteritidis	2 ( 2)	- ( -)	- ( -)	- ( -)	2 ( 4)
Hadar	- ( 1)	- ( -)	- ( -)	- ( -)	- ( -)
Havana	- ( -)	- ( -)	- ( -)	- ( -)	1 ( 1)
Indiana	- ( -)	- ( -)	1 ( 1)	1 ( 4)	1 ( 4)
Infantis	- ( -)	1 ( 1)	- ( -)	- ( -)	- ( -)
Kedougou	- ( -)	- ( -)	- ( -)	6 ( 7)	- ( -)
Kottbus	1 ( 1)	- ( -)	- ( -)	1 ( 2)	2 ( 2)
Livingstone	- ( -)	- ( -)	- ( -)	- ( -)	1 ( 1)
Newport	1 ( 1)	- ( -)	- ( -)	- ( -)	- ( -)
Orion	8 ( 8)	2 ( 2)	4 ( 4)	4 ( 5)	3 ( 3)
Pullorum	3 ( 3)	- ( 1)	- ( 1)	- ( 1)	- ( -)
Regent	- ( -)	- ( -)	- ( -)	1 ( 1)	- ( -)
Rissen	- ( -)	- ( -)	- ( -)	1 ( 1)	1 ( 1)
Senftenberg	1 ( 1)	- ( -)	- ( -)	2 ( 2)	- ( -)
Tennessee	- ( -)	- ( -)	1 ( 1)	- ( -)	- ( -)
Typhimurium	2 ( 2)	3 ( 3)	4 ( 4)	35 ( 43)	6 ( 6)
<b>UNSPECIFIED</b>					
structure only	1 ( 1)	- ( -)	1 ( 1)	1 ( 1)	1 ( 2)
rough strain	- ( -)	- ( -)	- ( -)	1 ( 1)	- ( -)
untypable	- ( 1)	- ( -)	- ( -)	- ( -)	- ( -)
<b>TOTAL</b>	<b>32 ( 34)</b>	<b>15 ( 16)</b>	<b>24 ( 26)</b>	<b>83 ( 101)</b>	<b>30 ( 38)</b>

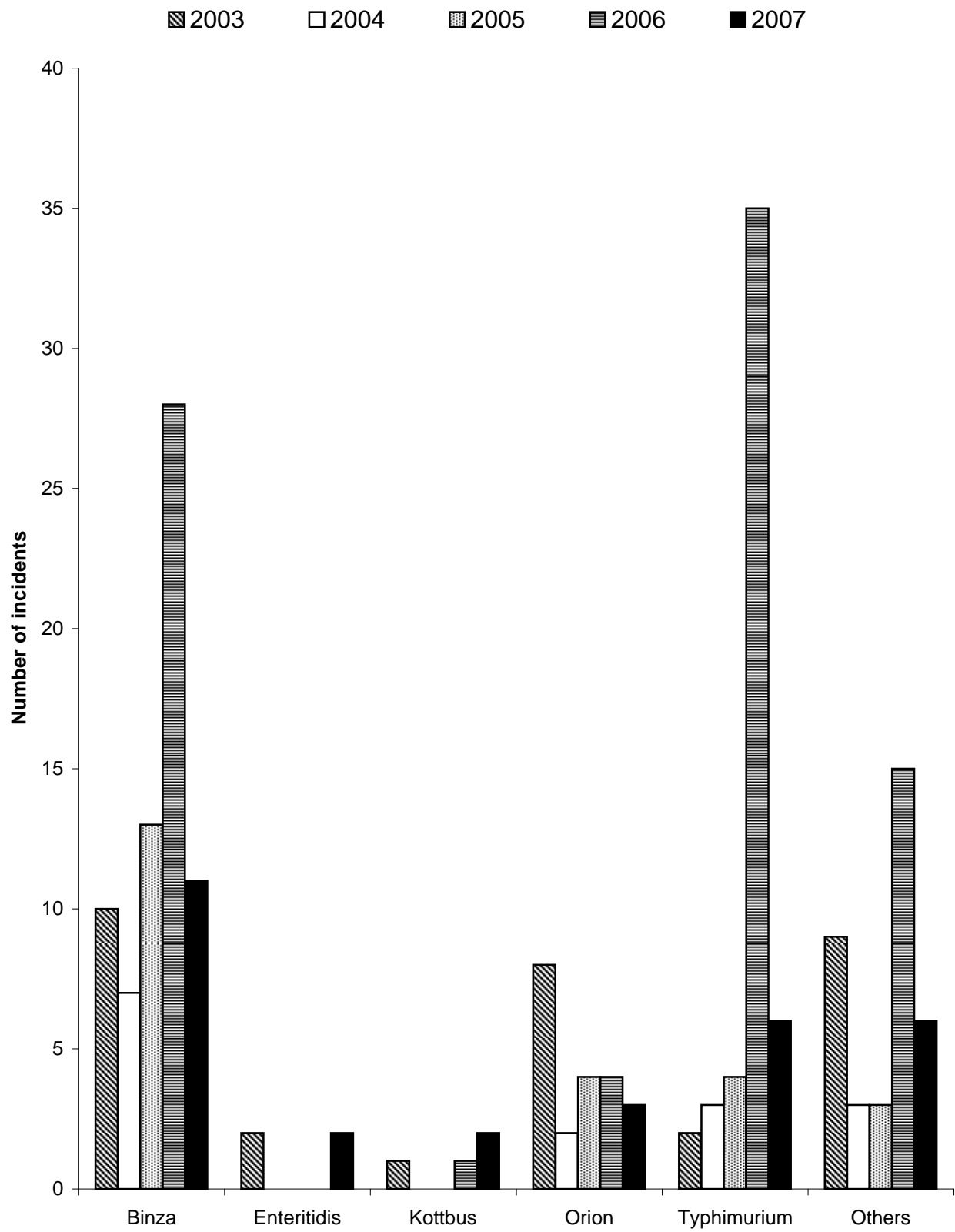
**Fig 43: Incidents of *Salmonella* serotypes in game birds in 2007**



**Table 59: Incidents of the top 4 *Salmonella* serotypes in game birds in 2007 as a % of all incidents compared to previous years**

Serotype	2003	2004	2005	2006	2007
S. Binza %	31.3	46.7	54.2	33.7	36.7
S. Typhimurium %	6.3	20.0	16.7	42.2	20.0
S. Orion %	25.0	13.3	16.7	4.8	10.0
S. Enteritidis %	6.3	0	0	0	6.7
S. Kottbus %	3.1	0	0	1.2	6.7
Total no. incidents	32	15	24	83	30

**Fig 44: Incidents of *Salmonella* serotypes in game birds (2003 - 2007)**



**Table 60: S. Typhimurium in game birds on all premises**

Definitive Types Incidents (Isolations)	2003	2004	2005	2006	2007
2	- ( -)	- ( -)	1 ( 1)	5 ( 5)	1 ( 1)
8	- ( -)	- ( -)	- ( -)	3 ( 3)	1 ( 1)
41	- ( -)	- ( -)	1 ( 1)	- ( -)	1 ( 1)
56	- ( -)	- ( -)	- ( -)	1 ( 1)	- ( -)
104	1 ( 1)	1 ( 1)	1 ( 1)	- ( -)	- ( -)
135	- ( -)	- ( -)	- ( -)	4 ( 4)	- ( -)
193	- ( -)	1 ( 1)	1 ( 1)	- ( -)	1 ( 1)
195	1 ( 1)	- ( -)	- ( -)	22 ( 24)	2 ( 2)
U310	- ( -)	1 ( 1)	- ( -)	- ( -)	- ( -)
RDNC	- ( -)	- ( -)	- ( -)	- ( 2)	- ( -)
UNTY	- ( -)	- ( -)	- ( -)	- ( 1)	- ( -)
untyped	- ( -)	- ( -)	- ( -)	- ( 3)	- ( -)
TOTAL	2 ( 2)	3 ( 3)	4 ( 4)	35 ( 43)	6 ( 6)

**Table 61: S. Enteritidis in game birds on all premises**

Phage Types Incidents (Isolations)	2003	2004	2005	2006	2007
13a	2 ( 2)	- ( -)	- ( -)	- ( -)	2 ( 4)
TOTAL	2 ( 2)	- ( -)	- ( -)	- ( -)	2 ( 4)

**Table 62: S. Pullorum in game birds on all premises**

Phage Types Incidents (Isolations)	2003	2004	2005	2006	2007
7	3 ( 3)	- ( -)	- ( -)	- ( -)	- ( -)
NOPT	- ( -)	- ( -)	- ( -)	- ( 1)	- ( -)
untyped	- ( -)	- ( 1)	- ( 1)	- ( -)	- ( -)
TOTAL	3 ( 3)	- ( 1)	- ( 1)	- ( 1)	- ( -)