Chapter 2.5

REPORTS OF *SALMONELLA* IN POULTRY

Poultry are subject to a number of statutory and voluntary testing programmes for *Salmonella*. The Poultry Breeding Flocks and Hatcheries Order (PBFHO) 1993 requires regular monitoring of breeding flocks throughout their lifespan by bacteriological sampling of composite faeces at farms and testing of progeny at hatcheries, following standardised sampling protocols and laboratory methods. In addition to the statutory scheme, an increasing number of commercial companies operate 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 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*. Most monitoring involves the collection of composite environmental samples, rather than individual bird samples.

The numbers of incidents and isolations of *Salmonella* reported from poultry species are shown at Tables 40, 41, 50, 51, 56, 57, 61 and 62. The uncertain effect of the GB epidemic of Foot and Mouth Disease on diagnostic sampling and laboratory submissions for *Salmonella* examination may limit the comparability of 2001 data with other years. Statutory monitoring of chicken breeding flocks and hatcheries for *Salmonella* continued during the FMD epidemic but with some disruption. The number of poultry diagnostic submissions to VLA/SAC laboratories increased by 11% in 2005 (2,557 submissions) compared to 2004 (2,294 submissions).

Vaccines against *Salmonella* Enteritidis and *S*. Typhimurium are now very widely used in the commercial layer sector and are also used in parent broiler breeders. Their use will have undoubtedly contributed to the control of *Salmonella* in poultry flocks.

The Zoonoses Regulation 2160/2003 came into force on the 21st December 2003 and requires that 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. Because the Directive 92/117/EEC contained detailed compulsory requirements for the regular testing of breeding flocks of *Gallus Gallus*, this was considered a basis to collect such data in th EU. Collection of these data, which covered at least the five most frequent *Salmonella* serotypes in human salmonellosis (*S*. Enteritidis, *S*. Typhimurium,

S. Hadar, *S*. Virchow and *S*. Infantis) started from 1 January 2004 and continued during the year. Information was submitted to the Commission relating to the occurence of *Salmonella* isolates in breeding flocks in the UK in 2004. Analysis of the information submitted indicated that the level of *Salmonella* Hadar, *Salmonella* Infantis and *Salmonella* Virchow in breeding flocks was 0.00%, 0.15%, 0.30% respectively. The overall occurrence of all *Salmonella* serovars was estimated at 6.3% percent. The occurrence of the five *Salmonella* serovars of public health significance was calculated as 0.4 percent.

A new national control programme for *Salmonella* in breeding flocks will be implemented to comply with Regulation 2160/2003 and is planned to come into effect on or before 1st January 2007. The aim of the National Control Plan in the UK for breeders (*Gallus Gallus*) is to reduce and/or maintain the prevalence of *Salmonella* serovars of public health significance in breeding flocks of *Gallus gallus* on holdings in the UK at least to the target level set out in Regulation 1003/2005 which is a reduction of the maximum percentage of adult breeding flocks (comprising at least 250 birds) remaining positive to 1% or less by 31st December 2009. The percentage of flocks infected with *S.* Enteritidis, *S.* Typhimurium, *S.* Hadar, *S.* Infantis, and *S.* Virchow in 2004 using current detection methods is below the 1.0% target set for 31st December 2009. All breeding flocks of 250 birds or more, and all hatcheries with an incubator capacity of 1000 eggs or more will be required to register as now with the Competent Authority and operators will implement a mandatory sampling programme at the farm level. Official control measures will required to apply to breeding flocks of *Gallus Gallus* suspected of being infected with any of the top five *Salmonella* serovars of public health significance. Compulsory slaughter of breeding flocks infected with *S*. Enteritidis and *S*. Typhimurium will continue.

A mandatory survey of flocks of laying hens in UK for *Salmonella* began on 1st October 2004. Samples were collected over a twelve-month period. The holding-level *Salmonella* prevalence was estimated at 11.7% ($CI_{95\%}$ 9.3 - 14.0%). The most common serovar identified was *S.* Enteritidis at a prevalence of 5.8% ($CI_{95\%}$ 4.2 - 7.4%) and the majority of these isolates (70%) were phage types 4, 6, 7 and 35. *S.* Typhimurium was the second most prevalent serovar and was found in 1.8% of farms ($CI_{95\%}$ 0.8-2.9%). Besides *S.* Enteritidis and *S.* Typhimurium, of the three other serovars given top priority by the EU because of their public health significance, *S.* Virchow and *S.* Infantis were each isolated from one holding and *S.* Hadar was not isolated from any holdings. A mandatory survey of broiler flocks for *Salmonella* began on 1st October 2005. The United Kingdom is required to sample 375 premises, one flock per premises, over a twelve month

period as per the agreed protocol to be implemented in all member states (2005/636/EC: Commission Decision). Five boot swabs will be taken from each flock within three weeks of depopulation. The samples taken in Great Britain are then tested at VLA Weybridge and the results passed to Defra for submission to the Commission for further analysis to establish a baseline for the prevalence of *Salmonella* in flocks of broilers in the Community.

Chickens

The June 2005 agricultural census reported that there were 135.6 million chickens in Great Britain compared with 147.8 million in 2004, (a decrease of 8.3%). Table 40 shows the number of reported incidents of *Salmonella* in chickens in 2005 (631), which was 10% lower than in 2004 (699). The majority of incidents arose from voluntary surveillance of broiler flocks by the poultry industry. Because the amount of voluntary testing has increased by an unknown quantity in recent years it is difficult to interpret long term trends. Less than 10% of *Salmonella* reports in chickens are associated with clinical disease investigation. There were 209 *Salmonella* incident reports from compulsory or voluntary monitoring of chicken breeding flocks in 2005, 55% of which was the result of environmental monitoring at hatcheries. There were no confirmed breeding flock infections with *Salmonella* Enteritidis or Typhimurium in 2005.

Approximately 26,000 *Salmonella* tests were performed under the statutory monitoring requirements of the PBFHO 1993 and 114 (0.44%) were positive for *Salmonella;* this compares to 0.27% positive in 2004. The organism was isolated most frequently from day old chick carcases and was only isolated from one out of 1,742 composite faeces samples (0.06%) collected when the chicks were four weeks of age.

Only 22 incidents were reported as a result of this statutory monitoring of breeding flocks in 2005 (Table 1).

***Salmonella* Enteritidis**

Numbers of reports of this serovar had been declining steadily since 1997, except for a small increase in reports in 2003 (Table 40). However in 2005 23 incidents were reported; increasing from 8 in 2004. These represented 3.6% of *Salmonella* incidents in chickens. The most commonly reported phage types were: PT4 (eight incidents, two of which were the result of follow-up visits from the EU Layer survey) PT7 (three incidents), and two incident each of PTs 4b, 6, 6a and 12. Phage type PT4b has never been reported before, while phage types PT5a and PT9b have been previously reported from chickens in 1999 as the

result of routine surveillance. There was a single incident of phage type PT1 and two incidents each of PT6a and PT12, which were previously reported from chickens in 2003. There were three incidents in broiler flocks (single incidents of phage types PT9b, PT6a and PT12) and seventeen incidents in egg layer flocks (seven of phage type PT4, two of phage type PT7, two of phage type PT14b and six of phage type PT6). There was one report of phage type PT9b from a broiler breeding flock. This report resulted from environmental sampling from multiple supply flocks into a hatchery (supply flocks: broiler breeder parents, sample type: hatchery debris) and could not be attributed to any particular source. There were two more reports of *S*. Enteritidis (single incidents of phage types PT4 and PT7), which resulted from sampling of cull chicks in a hatchery. The supply flock was a layer breeding flock, originating from another member state which was informed of the results.

Salmonella Typhimurium

There were only 9 reported incidents of *Salmonella* Typhimurium in 2005. Reports of *S*. Typhimurium represented 1.4% of all reports, a marked decrease compared with recent years (Fig 33). The most common phage type was DT104 (6 incidents: 67%). Other definitive types reported were: single incidents of DTs 8, 49 and 85. There were five reports of DT104 from broiler flocks in 2005, and one from a layer flock. Definitive type DT8 (commonly associated with ducks) was from a broiler flock and it has not been reported in chickens under routine surveillance since 1998. Both definitive types DT49 and DT85 were from layer flocks. The last time definitive type DT85 was reported from chickens was in 2002. There were no reports of *S*. Typhimurium in chicken breeding flocks in 2005.

Other Serovars

The most common serovar reported from chickens in 2005 was *S*. Livingstone (169 incidents). The majority of these reports (107 incidents) were from broiler flocks, while there were 60 reports from broiler breeder flocks and two reports from layer flocks. The relative proportion of this serovar has increased from 20.9% in 2004 to 26.8% in 2005. In addition there were 104 reports of *S*. 6,7:-:- which are related to *S.* Livingstone (these are not shown separately in Table 40, but are included under “structure only”). Reports of this serovar have risen in recent years.

The proportion of reports of *S*. Senftenberg rose slightly in 2005 (12.4% of all incidents) compared to 2004 (11.2% of all incidents); it remains the second most commonly reported serovar. Other common serovars were *S*. Kedougou (5.5% of all incidents) and *S*. Mbandaka (3.8% of all incidents).

The number of reports of *S.* Virchow more than halved compared with 2004. Of 12 incidents, the most common phage type was PT2 (10 incidents). Six of these incidents were reported from broiler production flocks, while 4 were reported from broiler breeding flocks. There was one report of phage type PT31 from a broiler production flock. This phage type was previously reported from chickens in 2001. There was also one report of phage type PT57 from a broiler breeding flock. This phage type was last reported from chickens in 2003.

There were no reports of *S*. Hadar from chickens in 2005, the same as in 2004. There were six reports of *S*. Infantis, all were from broiler production flocks. There were18 incidents of *S*. Infantis from chickens in 2004. There were no reports of *S*. Pullorum, compared to three (all of phage type PT1) in 2004 and two reports of *S*. Newport in 2005, both from broiler production flocks, compared with eleven reports in 2004; None of the *S*. Newport isolates were associated with multiple antibiotic resistant strains (resistance to ≥ 4 antibiotics) and there was no evidence of resistance to third generation cephalosporins.

There was an increase in the number reports of *S*. Idikan and a decrease in the number of reports of *S*. Brandenburg, *S*. Give, *S*. Indiana, *S*. Lexington, *S*. Liverpool, *S*. Ohio and *S*. Thompson. *Salmonella* Champaign, *S*. Manhattan and *S*. Panama have not been reported from chickens since 2000. New *Salmonella* serovars reported in 2005 included: *Salmonella* Anatum, *S*. Cubana, *S*. Derby and *S*. Goldcoast (all of these were previously reported in 2003), *S*. Larochelle (last reported in 2002), *S*. Menston (last reported in 1985) and *S*. Gloucester, *S*. Sundsvall and *S*. Gallinarum. *Salmonella* Gloucester has never been reported from livestock before. It was previously reported from compound cattle feed in 1996. *Salmonella* Sundsvall has never been reported from chickens before. It was previously reported from feed ingredients (soya meal) in 2004 and from reptiles in 1996.

Salmonella Gallinarum associated with high mortality was reported in premises with caged layer birds in 2005. Clinical signs included sudden death or comb pallor with ruffled feathers and watery diarrhoea was often present at necropsy. The gross post-mortem lesions seen included enlarged livers and spleens and multifocal necrosis in the

livers suggesting an acute septicaemia. Cultures of livers and spleens on blood agar and MacConkey medium recovered a profuse growth of a non lactose-fermenting bacterial isolate. Sub-cultures of this isolate were submitted to the VLA and *Salmonella* Gallinarum (a non-motile Group D *Salmonella* with a characteristic seminal smell) was identified. The control programme for the disease included depopulation, dry cleaning and disinfection, as well as vaccination. The VLA provided detailed advice on cleaning and disinfection, biosecurity and use of bird sentinels and conducted investigation visits at the farm, where extensive sampling was carried out. An unrelated case was identified following the investigation of a disease outbreak in a small backyard flock. The owner volunteered to cull the remaining birds, clean and disinfect the site, and rest it for a period of six months. A neighbouring site which shared the birds' sacks with these premises was also visited but *Salmonella* was not isolated. These were the first reports of *S*. Gallinarum as part of routine surveillance in GB since 1986.

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, or monitoring of the environment at hatcheries.

In 2005 there were seven *Salmonella* reports of non-GB origin from domestic fowl. The majority of these were the result of progeny monitoring in GB where the parent flocks were outside of Great Britain. Five of these were reports of *S*. Senftenberg, from broiler breeder flocks originating from N. Ireland. The other two were reports of *S*. Enteritidis, of phage types PT4 and PT7. Both of these originated from another member state. These reports are included in the tables and figures of this publication.

In 2005 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*. Coeln, *S*. Corvallis, *S*. Duisburg, *S*. Enteritidis phage types PT14b, PT1b, PT21b, PT24, PT29, PT35, PT5c and PT8, *S*. Haifa, *S*. Heidelberg, *S*. Kissarawe, *S*. Muenchen, *S*. Oranienburg, *S*. Ouakam, *S*. Panama, *S*. Rissen, *S*. Stanley, *S*. Typhimurium definitive types DT1, DT208, DT2a, DT36 and DT56 and *S*. Thompson phage type PT2. These reports are not included in the tabulations of this publication.

Turkeys

Table 50 shows an increase (8%) in the number of incidents of *Salmonella* reported in turkey flocks in 2005. 12% of reports were associated with clinical disease, while 86% arose through voluntary surveillance activities. The most common serovar reported in 2005 was *S*. Derby. Both the number (55 reports) and the relative proportion (19.7% of incidents) of this serovar has increased in 2005, compared with 2004 (21 reports-8.1% of incidents). The majority of the *S*. Derby reports from turkeys in 2005 were from a single company.

In 2005 reports of *Salmonella* Typhimurium, which was the most common serovar reported in 2004 with 44 incidents (17.1% of all incident reports), decreased to 24 (8.6% of all incident reports). Twenty of the 24 incidents (83%) involved DT104. There were two reports of U302 and single incidents of U288 and DT56. Phage types U302 and U288, both pig-related, were last reported from turkeys, the first in 2002 and the second in 2003.

There were no reports of *S*. Enteritidis from turkey flocks in 2005. In 2004 there was one report of a culture which did not react with any of the phages in the typing scheme (UNTY).

There were no reports of *S*. Hadar in 2005, compared with 8 reports of phage type PT10 and a report of an untyped isolate in 2004. There were no reports of *S*. Infantis, the same as in 2004, while there were five reports of *S*. Virchow (three of phage type PT26 and two of phage type PT31), compared with eleven reports in 2004.

The second most common serovar reported was *S*. Kottbus (15.4% of reports). The relative proportion of this serovar increased, compared to 2004, when it was 10.5%. *Salmonella* Newport was the third most common serovar reported (12.2% of reports). There is little evidence for any trend over the last five years and no reported resistance to 3rd generation cephalosporins. Reports of *S*. Indiana increased by 30% in 2005 compared with 2004 and it was the fourth most commonly reported serovar. There was also an increase in reports of *S*. Montevideo from 9 in 2004 to 15 in 2005 but reports were still markedly below 2003. *Salmonella* Anatum, *S*. Saint Paul and *S.* Senftenberg, all reported in 2005, were previously reported in 2002, while *S*. Meleagridis and *S*. Menston, also reported in 2005, were previously reported in 2003. *Salmonella* Braenderup, *S*. Champaign and *S*. Heidelberg have not been reported from turkeys since 2000.

In 2005 the following *Salmonella* serovar was reported from turkeys for reasons other than routine surveillance, for example through research projects, but was not reported through routine surveillance:
S. Agama.

Ducks and Geese

There were no reports of *Salmonella* from geese in 2005, while there were two reports in 2004, one of which was *S*. Enteritidis PT4.

The increase in reports of *Salmonella* from ducks seen in recent years was sustained in 2005 – the number of reports increased by 21% compared with 2004. Reports from ducks represented 10% of all *Salmonella* reports in 2003 compared with 15% in 2004 and 21% in 2005. This is the result of enhanced voluntary surveillance activities by the duck industry (Table 1). Only a small number of incidents are associated with clinical disease investigation (3.5%).

The most common serovars reported were *S*. Indiana (27.2%), *S*. Typhimurium (11.3%), *S*. Enteritidis (10%), *S*. Senftenberg (8.9%), and *S*. Binza (7.2%). The relative proportion of these serovars changed from 2004, with a great increase in incidents of *S.* Typhimurium, *S*. Enteritidis and *S*. Senftenberg, while incidents of *S*. Binza and S. Livingstone decreased. The majority of the *S*. Senftenberg reports were from a single farm, the same as the single incident report in 2004. The number, and proportion, of reports of *S.* Hadar decreased in 2005 compared with 2004; the most common phage types were PT22, PT10 and PT62. A variety of other serovars were reported, the number of incidents of *S.* Kottbus increased compared with 2004, while the number of incidents of *S*. Livingstone decreased in 2005 compared with 2004. The majority of the *S*. Kottbus reports were from the same premises. *Salmonella* Ohio, *S*. Poona, *S*. Reading and *S*. Schwarzengrund were new serovars reported from ducks in 2005. *Salmonella* Reading has never been reported from ducks before, *S*. Schwarzengrund was previously reported in 1987, *S*. Ohio in 1991 and *S*. Poona in 1999. *S*. Paratyphi B variant Java and *S*. Virchow have not been reported since 2000.

There were 71 reports of *S*. Typhimurium, a marked increase over previous years. The majority of these incidents were reported in the last quarter of 2005 and were the result of voluntary environmental monitoring at a single company. The most common phage type was DT8 (60 reports) and there were six reports of DT30, two reports of DT41, one report of DT66 and two reports of isolates which did not react with any of the phages in the typing scheme (UNTY). Definitive type DT66 was reported for the first time in 2005; this was previously

reported in 1993. Definitive types DT104, DT104b and DT40 were last reported from ducks in 2000.

There were 63 reports of *S*. Enteritidis in ducks. Most were reported during the last quarter of 2005 and resulted from voluntary environmental hatchery monitoring at a single company. The most common phage type was PT6a (29 reports). This was previously reported from ducks in 1992. There were eleven reports of phage type PT9b. New phage types reported in 2005 included PT3 (1 report), PT6 (7 reports) and PT14b(9 reports). Phage types PT3 and PT14b have never been reported from ducks before, while PT6 was previously reported in 1995. Phage types PT8, PT9a and PT21 have not been reported since 2000.

In 2005 there were three *Salmonella* reports of non-GB origin from ducks. These were one report of *S*. Saint Paul, one report of *S*. Enteritidis which reacts with the phages, but does not conform to a recognised pattern of lysis (RDNC) and one report of *S*. Typhimurium definitive type DT8. These reports are included in the tables and figures of this publication.

Game Birds

Reports of *Salmonella* in game birds in 2005 (17 reports) increased by 31% compared with 2004 (13 reports). Most reports were associated with clinically diseased pheasants and, as in previous years, most reports were *S*. Binza or *S*. Orion (76%). There was one incident report of *S*. Typhimurium (DT193) and three *S*. Typhimurium isolations from Scotland (single reports of definitive types DT2, DT41 and DT104); all were from pheasants. Definitive types DT2 and DT41 have never been reported before from game birds. There was a single reported isolation of *S*. Pullorum (untyped) associated with clinical disease in pheasants. There were no reports of *S*. Enteritidis in game birds in 2005, the same as in 2004. *Salmonella* Ajiobo and *S*. Goldcoast have not been reported since 2000. New serovars reported from game birds in 2005 included *S*. Tennessee, which was previously reported in 1989 from a pheasant and *S*. Indiana, which was previously reported in 2002.

In 2005 there were two *Salmonella* reports of non-GB origin from game birds. These were the result of sampling in GB, where the birds originated from outside of GB. Both were from pheasants. The first was a report of *S*. Orion and the second was the report of *S*. Tennessee. These reports are included in the tables and figures of this publication.

Table 40: *Salmonella* in chickens on all premises

Salmonella Incidents (Isolations)	*2001**		2002		2003		2004		2005	
ENTERICA ENTERICA										
Agama	*2*	*(2)*	1	(1)	6	(6)	1	(1)	4	(4)
Agona	*14*	*(15)*	3	(3)	5	(5)	2	(2)	5	(5)
Ajiobo	*-*	*(-)*	1	(1)	1	(1)	-	(-)	-	(-)
Anatum	*7*	*(7)*	1	(1)	6	(6)	-	(-)	4	(4)
Binza	*24*	*(26)*	54	(57)	7	(8)	1	(1)	1	(1)
Braenderup	*-*	*(-)*	1	(1)	2	(2)	1	(1)	-	(-)
Brandenburg	*-*	*(-)*	-	(-)	11	(18)	20	(22)	-	(-)
Bredeney	*6*	*(6)*	12	(13)	12	(12)	-	(-)	-	(-)
Carno	*-*	*(-)*	-	(-)	1	(1)	-	(-)	-	(-)
Cubana	*1*	*(1)*	-	(-)	1	(1)	-	(-)	1	(1)
Derby	*3*	*(4)*	3	(4)	1	(3)	-	(-)	1	(1)
Dublin	*-*	*(-)*	-	(-)	-	(-)	1	(1)	1	(1)
Ealing	*1*	*(1)*	-	(-)	-	(-)	-	(-)	-	(-)
Eimsbuettel	*6*	*(7)*	1	(1)	-	(-)	-	(-)	-	(-)
Enteritidis	*7*	*(7)*	11	(15)	43	(48)	8	(13)	23	(30)
Gallinarum	*-*	*(-)*	-	(-)	-	(-)	-	(-)	4	(9)
Give	*18*	*(18)*	18	(18)	6	(6)	28	(28)	6	(6)
Gloucester	*-*	*(-)*	-	(-)	-	(-)	-	(-)	1	(1)
Goldcoast	*1*	*(1)*	10	(11)	10	(10)	-	(-)	1	(1)
Hadar	*6*	*(8)*	17	(17)	7	(7)	-	(-)	-	(-)
Havana	*2*	*(2)*	2	(2)	11	(11)	5	(5)	5	(5)
Heidelberg	*50*	*(57)*	23	(23)	2	(2)	-	(-)	-	(-)
Idikan	*1*	*(1)*	1	(1)	-	(-)	2	(2)	11	(11)
Indiana	*7*	*(12)*	7	(8)	4	(4)	8	(8)	2	(2)
Infantis	*3*	*(5)*	3	(3)	9	(9)	18	(18)	6	(6)
Kedougou	*42*	*(49)*	60	(70)	47	(49)	33	(33)	35	(36)
Kentucky	*10*	*(15)*	2	(3)	-	(-)	5	(5)	1	(1)
Kottbus	*2*	*(2)*	1	(1)	5	(5)	5	(5)	4	(4)
Larochelle	*2*	*(2)*	2	(2)	-	(-)	-	(-)	1	(1)
Lexington	*1*	*(1)*	1	(1)	-	(-)	10	(10)	3	(3)
Lille	*1*	*(1)*	-	(-)	-	(-)	-	(-)	-	(-)
Liverpool	*60*	*(73)*	31	(35)	27	(27)	46	(47)	17	(17)
Livingstone	*75*	*(90)*	122	(200)	148	(151)	146	(148)	169	(170)
Mbandaka	*58*	*(78)*	51	(58)	50	(54)	22	(23)	24	(24)
Meleagridis	*-*	*(-)*	-	(-)	1	(1)	1	(1)	2	(2)
Menston	*-*	*(-)*	-	(-)	-	(-)	-	(-)	2	(2)
Montevideo	*56*	*(94)*	56	(112)	50	(50)	15	(15)	14	(14)
New Brunswick	*1*	*(1)*	-	(-)	-	(-)	-	(-)	-	(-)
Newport	*5*	*(5)*	8	(10)	6	(6)	11	(11)	2	(2)

Table 40: *Salmonella* in chickens on all premises

Salmonella Incidents (Isolations)	*2001**		2002		2003		2004		2005	
ENTERICA ENTERICA										
Ohio	*23*	*(27)*	38	(49)	32	(32)	31	(31)	23	(23)
Orion	*-*	*(-)*	15	(15)	4	(4)	1	(1)	-	(-)
Poona	*1*	*(1)*	-	(-)	-	(-)	-	(-)	-	(-)
Pullorum	*1*	*(1)*	1	(1)	2	(2)	3	(3)	-	(-)
Reading	*-*	*(-)*	-	(-)	1	(1)	1	(1)	-	(-)
Saint Paul	*-*	*(-)*	-	(-)	-	(-)	2	(2)	-	(-)
Senftenberg	*146*	*(263)*	107	(150)	71	(73)	78	(79)	78	(78)
Stanley	*-*	*(-)*	1	(1)	-	(-)	-	(-)	-	(-)
Stourbridge	*-*	*(-)*	-	(-)	1	(1)	-	(-)	-	(-)
Sundsvall	*-*	*(-)*	-	(-)	-	(-)	-	(-)	1	(1)
Taksony	*-*	*(-)*	1	(1)	-	(-)	-	(-)	-	(-)
Tennessee	*1*	*(1)*	4	(4)	7	(7)	2	(2)	1	(1)
Thomasville	*1*	*(1)*	-	(-)	-	(-)	-	(-)	-	(-)
Thompson	*57*	*(57)*	31	(31)	13	(14)	36	(36)	21	(23)
Typhimurium	*54*	*(64)*	36	(44)	23	(26)	12	(12)	9	(9)
Virchow	*23*	*(24)*	47	(48)	74	(79)	32	(32)	12	(13)
Wangata	*-*	*(-)*	1	(1)	-	(-)	-	(-)	-	(-)
Worthington	*1*	*(1)*	-	(-)	1	(1)	-	(-)	-	(-)
Yoruba	*-*	*(-)*	-	(-)	1	(1)	1	(1)	2	(2)
UNSPECIFIED										
structure only	*90*	*(113)*	82	(92)	167	(173)	108	(110)	119	(119)
rough strain	*3*	*(3)*	2	(2)	4	(5)	3	(3)	11	(11)
TOTAL	*873*	*(1147)*	869	(1111)	880	(924)	699	(715)	631	(649)

* 2001 data may not be comparable due to impact of FMD epidemic

Fig 28: Incidents in *Salmonella* serotypes in chickens in 2005

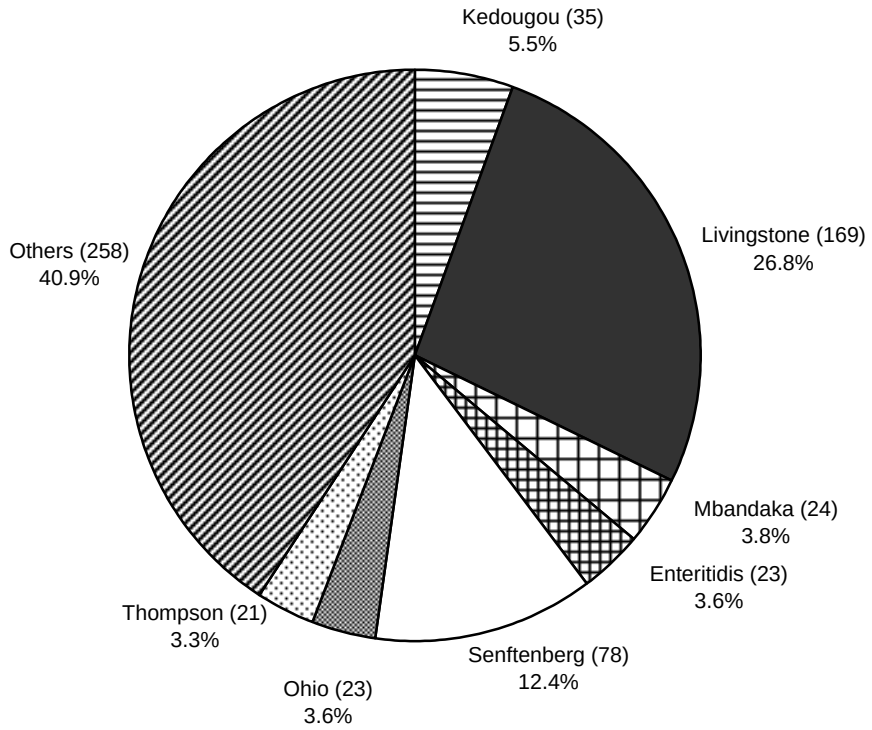
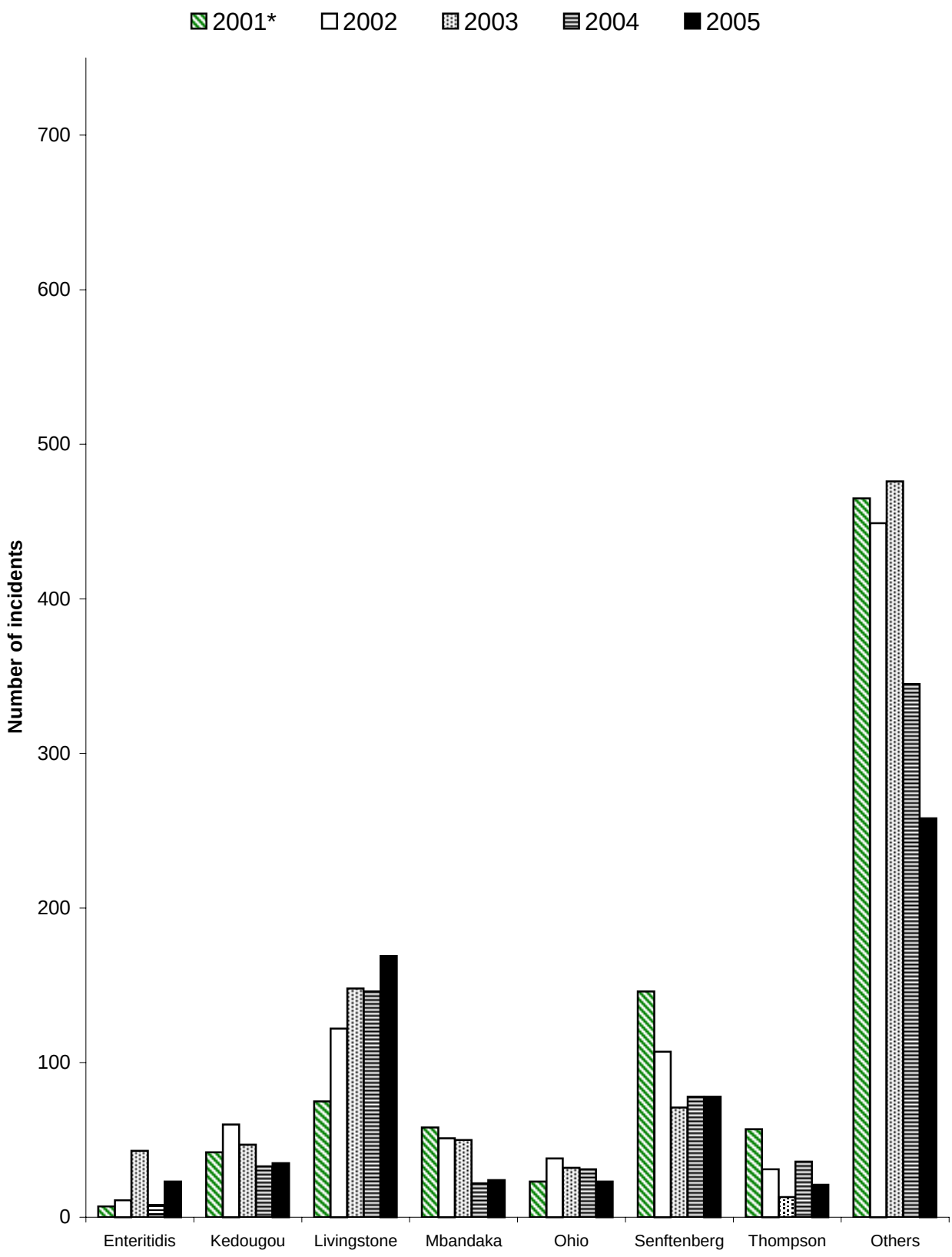


Table 41: Incidents of the top 5 *Salmonella* serotypes in chickens in 2005 as a % of all incidents compared to previous years

Serotype	2001	2002	2003	2004	2005
S. Livingstone %	8.6	14.0	16.8	20.9	26.8
S. Senftenberg %	16.7	12.3	8.1	11.2	12.4
S. Kedougou %	4.8	6.9	5.3	4.7	5.5
S. Mbandaka %	6.6	5.9	5.7	3.1	3.8
S. Enteritidis %	0.8	1.3	4.9	1.1	3.6
S. Ohio %	2.6	4.4	3.6	4.4	3.6
Total no. incidents	873	869	880	699	631

Fig 29: Incidents of *Salmonella* serotypes in chickens (2001 - 2005)



* 2001 data may not be comparable due to uncertain impact of FMD epidemic

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

Definitive Types Incidents (Isolations)	*2001**		2002		2003		2004		2005	
2	*-*	*(-)*	-	(-)	1	(1)	-	(-)	-	(-)
8	*-*	*(-)*	-	(-)	-	(-)	-	(-)	1	(1)
12	*-*	*(-)*	-	(-)	1	(1)	-	(-)	-	(-)
40	*-*	*(-)*	-	(-)	-	(-)	1	(1)	-	(-)
41	*-*	*(-)*	-	(-)	1	(1)	1	(1)	-	(-)
49	*-*	*(-)*	-	(-)	1	(1)	1	(1)	1	(1)
56	*-*	*(-)*	-	(-)	-	(-)	1	(1)	-	(-)
85	*-*	*(-)*	1	(1)	-	(-)	-	(-)	1	(1)
104	*30*	*(34)*	24	(30)	11	(13)	6	(6)	6	(6)
104b	*5*	*(6)*	-	(-)	-	(-)	-	(-)	-	(-)
120	*2*	*(2)*	-	(-)	-	(-)	1	(1)	-	(-)
193	*-*	*(-)*	1	(1)	2	(2)	1	(1)	-	(-)
193a	*-*	*(-)*	-	(-)	2	(2)	-	(-)	-	(-)
208	*-*	*(-)*	1	(1)	-	(-)	-	(-)	-	(-)
U302	*9*	*(12)*	6	(8)	2	(2)	-	(-)	-	(-)
U317	*-*	*(-)*	-	(-)	1	(1)	-	(-)	-	(-)
RDNC	*3*	*(3)*	1	(1)	-	(1)	-	(-)	-	(-)
UNTY	*5*	*(7)*	2	(2)	1	(1)	-	(-)	-	(-)
TOTAL	*54*	*(64)*	36	(44)	23	(26)	12	(12)	9	(9)

* 2001 data may not be comparable due to impact of FMD epidemic

Fig 30: Incidents of *Salmonella* Typhimurium definitive types in chickens in 2005

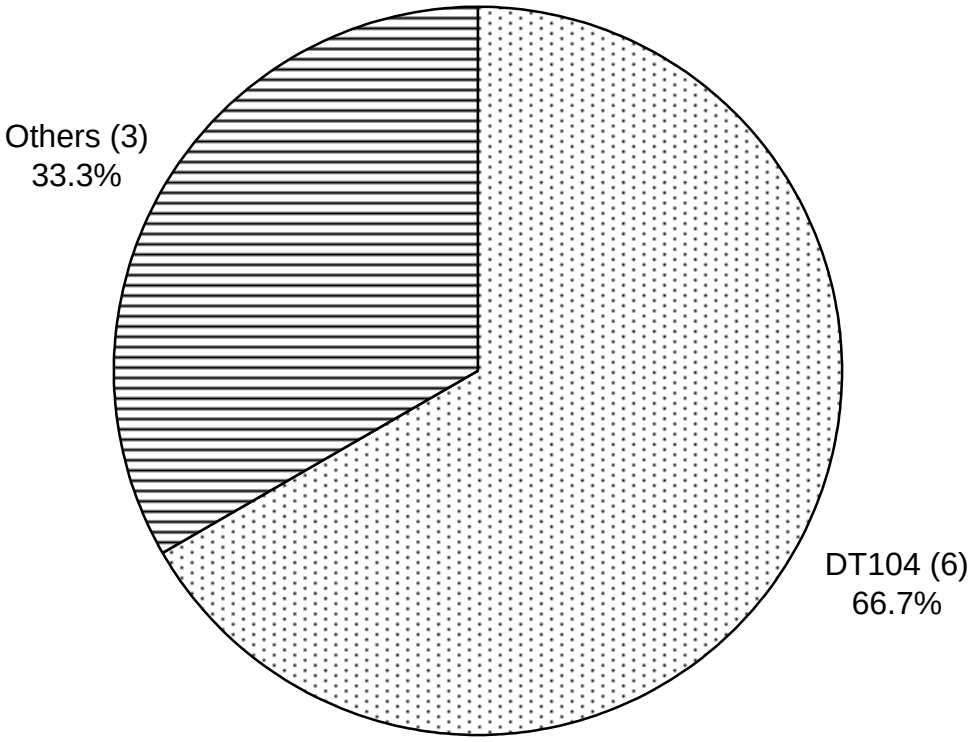
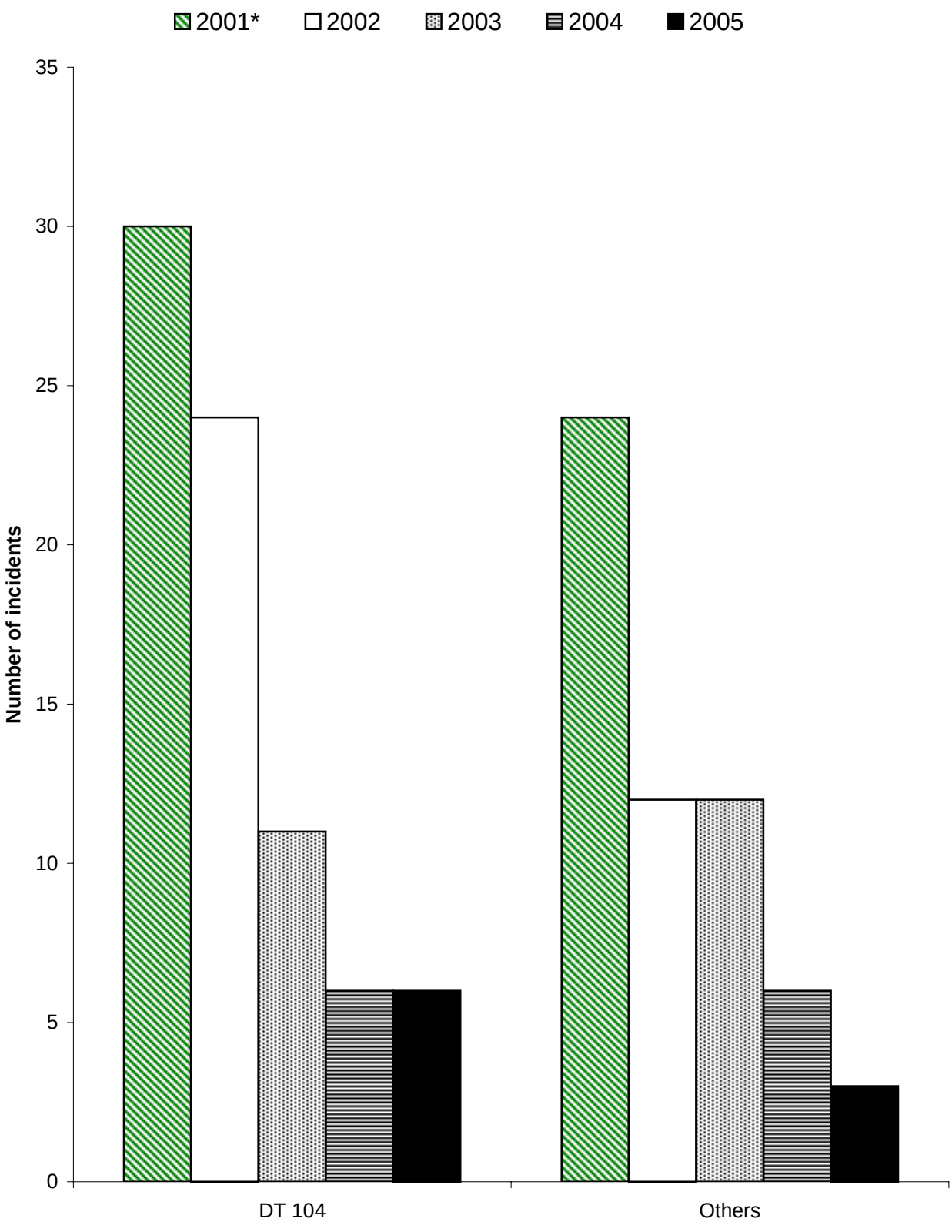


Fig 31: Incidents of *Salmonella* Typhimurium definitive types in chickens (2001 - 2005)



* 2001 data may not be comparable due to uncertain impact of FMD epidemic

Table 43: Incidents of *S.* Typhimurium definitive types in chickens in 2005 by flock type

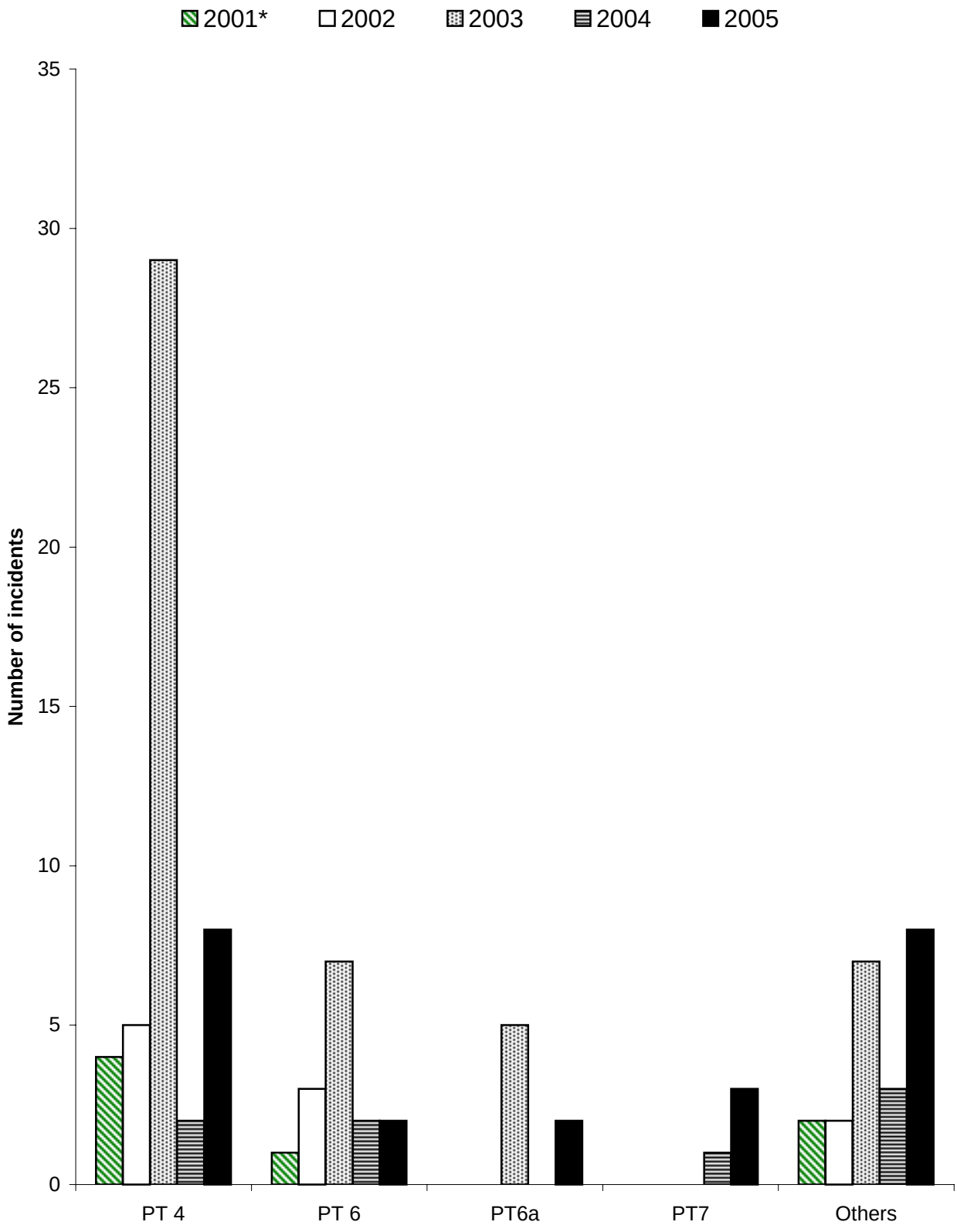
	Number of incidents by definitive type				
	DT 104	DT 8	DT 49	DT 85	Total
Broiler production flocks	5	1	0	0	6
Egg layer flocks	1	0	1	1	3

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

Phage Types	*2001**		2002		2003		2004		2005	
Incidents (Isolations)										
1	*-*	*(-)*	-	(-)	1	(1)	-	(-)	1	(1)
4	*4*	*(4)*	5	(5)	29	(32)	2	(7)	8	(15)
4b	*-*	*(-)*	-	(-)	-	(-)	-	(-)	2	(2)
5a	*-*	*(-)*	-	(-)	-	(-)	-	(-)	1	(1)
6	*1*	*(1)*	3	(7)	7	(7)	2	(2)	2	(2)
6a	*-*	*(-)*	-	(-)	5	(5)	-	(-)	2	(2)
7	*-*	*(-)*	-	(-)	-	(1)	1	(1)	3	(3)
7a	*1*	*(1)*	-	(-)	-	(-)	-	(-)	-	(-)
8	*-*	*(-)*	1	(1)	-	(-)	1	(1)	-	(-)
9b	*-*	*(-)*	-	(-)	-	(-)	-	(-)	1	(1)
11	*-*	*(-)*	-	(-)	-	(-)	1	(1)	-	(-)
12	*-*	*(-)*	-	(-)	1	(1)	-	(-)	2	(2)
21	*1*	*(1)*	-	(-)	-	(-)	-	(-)	-	(-)
35	*-*	*(-)*	-	(-)	-	(-)	1	(1)	-	(-)
RDNC	*-*	*(-)*	1	(1)	-	(-)	-	(-)	-	(-)
NOPT	*-*	*(-)*	-	(-)	-	(1)	-	(-)	-	(-)
UNTY	*-*	*(-)*	1	(1)	-	(-)	-	(-)	1	(1)
TOTAL	*7*	*(7)*	11	(15)	43	(48)	8	(13)	23	(30)

* 2001 data may not be comparable due to impact of FMD epidemic

Fig 32: Incidents of *Salmonella* Enteritidis phage types in chickens (2001 - 2005)



* 2001 data may not be comparable due to uncertain impact of FMD epidemic

Fig 33: *S*. Enteritidis and *S*. Typhimurium as a proportion of all incident reports in chickens (1985 - 2005)

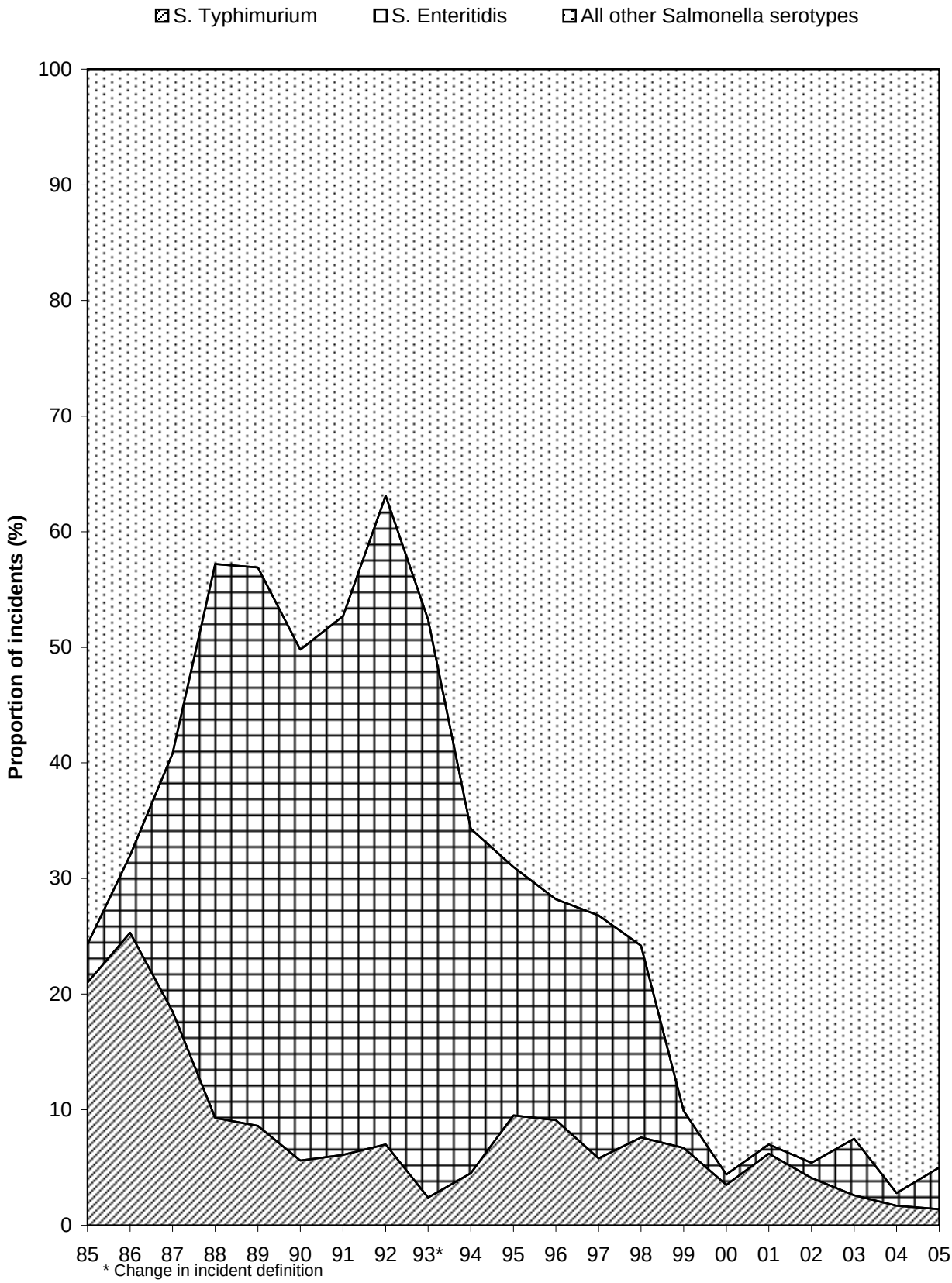


Table 45: Incidents of *S.* Enteritidis phage types in chickens in 2005 by flock type

	Number of incidents by phage type			
	PT 4	PT 7	Others	Total
Breeding flocks	1*	1*	1†	3
Broiler production flocks	0	0	3	3
Egg layer flocks	7	2	8	17

* Hatchery sample. Breeding flock in another member state

† PT9b isolated from hatchery debris

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

Phage Types	*2001**		2002		2003		2004		2005	
Incidents (Isolations)										
2	*1*	*(1)*	1	(1)	-	(-)	-	(-)	-	(-)
9	*-*	*(-)*	-	(-)	2	(2)	-	(-)	-	(-)
10	*1*	*(1)*	1	(1)	2	(2)	-	(-)	-	(-)
14	*-*	*(-)*	1	(1)	-	(-)	-	(-)	-	(-)
22	*1*	*(1)*	3	(3)	-	(-)	-	(-)	-	(-)
41	*3*	*(5)*	-	(-)	-	(-)	-	(-)	-	(-)
58a	*-*	*(-)*	-	(-)	3	(3)	-	(-)	-	(-)
RDNC	*-*	*(-)*	6	(6)	-	(-)	-	(-)	-	(-)
NOPT	*-*	*(-)*	5	(5)	-	(-)	-	(-)	-	(-)
TOTAL	*6*	*(8)*	17	(17)	7	(7)	-	(-)	-	(-)

Table 47: *S*. Pullorum in chickens on all premises

Phage Types	*2001**		2002		2003		2004		2005	
Incidents (Isolations)										
1	*-*	*(-)*	-	(-)	1	(1)	3	(3)	-	(-)
7	*1*	*(1)*	-	(-)	-	(-)	-	(-)	-	(-)
15	*-*	*(-)*	-	(-)	1	(1)	-	(-)	-	(-)
NOPT	*-*	*(-)*	1	(1)	-	(-)	-	(-)	-	(-)
TOTAL	*1*	*(1)*	1	(1)	2	(2)	3	(3)	-	(-)

* 2001 data may not be comparable due to impact of FMD epidemic

Table 48: *S*. Thompson in chickens on all premises

Phage Types Incidents (Isolations)	*2001**		2002		2003		2004		2005	
1	*1*	*(1)*	2	(2)	1	(1)	-	(-)	-	(-)
1a	*24*	*(24)*	6	(6)	4	(4)	12	(12)	10	(11)
3	*1*	*(1)*	1	(1)	-	(-)	-	(-)	-	(-)
6	*4*	*(4)*	9	(9)	7	(8)	22	(22)	9	(10)
11	*-*	*(-)*	-	(-)	-	(-)	1	(1)	-	(-)
14	*1*	*(1)*	-	(-)	1	(1)	-	(-)	2	(2)
23	*1*	*(1)*	-	(-)	-	(-)	-	(-)	-	(-)
RDNC	*2*	*(2)*	1	(1)	-	(-)	1	(1)	-	(-)
NOPT	*23*	*(23)*	12	(12)	-	(-)	-	(-)	-	(-)
TOTAL	*57*	*(57)*	31	(31)	13	(14)	36	(36)	21	(23)

Table 49: *S*. Virchow in chickens on all premises

Phage Types Incidents (Isolations)	*2001**		2002		2003		2004		2005	
2	*8*	*(8)*	22	(22)	50	(53)	20	(20)	10	(11)
4	*3*	*(3)*	9	(9)	16	(17)	7	(7)	-	(-)
26	*5*	*(6)*	-	(-)	4	(4)	2	(2)	-	(-)
31	*1*	*(1)*	-	(-)	-	(-)	-	(-)	1	(1)
35	*2*	*(2)*	-	(-)	1	(1)	2	(2)	-	(-)
37	*1*	*(1)*	-	(-)	-	(-)	-	(-)	-	(-)
57	*-*	*(-)*	-	(-)	1	(1)	-	(-)	1	(1)
RDNC	*1*	*(1)*	-	(-)	-	(1)	-	(-)	-	(-)
NOPT	*2*	*(2)*	16	(17)	2	(2)	1	(1)	-	(-)
TOTAL	*23*	*(24)*	47	(48)	74	(79)	32	(32)	12	(13)

* 2001 data may not be comparable due to impact of FMD epidemic

Table 50: *Salmonella* in turkeys on all premises

Salmonella Incidents (Isolations)	*2001**		2002		2003		2004		2005	
ENTERICA ENTERICA										
Agama	*1*	*(3)*	-	(-)	-	(-)	3	(3)	-	(-)
Agona	*46*	*(58)*	9	(10)	21	(22)	17	(17)	19	(19)
Ajiobo	*-*	*(-)*	-	(-)	-	(-)	3	(3)	-	(-)
Anatum	*-*	*(-)*	2	(2)	-	(-)	-	(-)	4	(4)
Binza	*11*	*(13)*	2	(2)	-	(-)	1	(1)	-	(-)
Bredeney	*-*	*(-)*	1	(2)	5	(6)	3	(3)	1	(1)
Corvallis	*-*	*(-)*	-	(-)	3	(3)	6	(6)	1	(1)
Derby	*36*	*(50)*	18	(22)	33	(42)	21	(21)	55	(59)
Dublin	*-*	*(-)*	-	(-)	-	(-)	2	(2)	-	(-)
Enteritidis	*1*	*(1)*	-	(-)	-	(-)	1	(1)	-	(-)
Fischerkietz	*2*	*(3)*	1	(1)	-	(-)	2	(2)	-	(-)
Goldcoast	*2*	*(4)*	-	(-)	1	(1)	-	(-)	-	(-)
Hadar	*1*	*(1)*	4	(4)	14	(14)	8	(9)	-	(-)
Hato	*1*	*(1)*	-	(-)	-	(-)	-	(-)	-	(-)
Indiana	*20*	*(22)*	9	(11)	33	(39)	23	(23)	30	(33)
Infantis	*-*	*(-)*	-	(-)	1	(1)	-	(-)	-	(-)
Kedougou	*4*	*(5)*	-	(-)	6	(6)	19	(19)	18	(18)
Kentucky	*-*	*(-)*	-	(-)	-	(-)	1	(1)	-	(-)
Kottbus	*15*	*(16)*	5	(5)	28	(31)	27	(28)	43	(46)
Larochelle	*-*	*(-)*	-	(-)	1	(1)	-	(-)	-	(-)
Manhattan	*-*	*(-)*	-	(-)	1	(1)	-	(-)	-	(-)
Mbandaka	*-*	*(-)*	1	(1)	-	(-)	1	(1)	1	(1)
Meleagridis	*-*	*(-)*	1	(1)	1	(1)	-	(-)	1	(1)
Menston	*-*	*(-)*	-	(-)	1	(1)	-	(-)	1	(1)
Montevideo	*32*	*(36)*	14	(16)	64	(65)	9	(9)	15	(15)
Newport	*15*	*(16)*	22	(22)	32	(33)	37	(37)	34	(35)
Orion	*-*	*(-)*	-	(-)	-	(-)	1	(1)	1	(1)
Poona	*-*	*(-)*	-	(-)	-	(-)	1	(1)	-	(-)
Rissen	*-*	*(-)*	-	(-)	-	(-)	2	(2)	2	(2)
Saint Paul	*-*	*(-)*	2	(2)	-	(-)	-	(-)	2	(2)
Schwarzengrund	*3*	*(4)*	1	(2)	2	(2)	-	(-)	-	(-)
Senftenberg	*7*	*(10)*	2	(2)	-	(-)	-	(-)	3	(3)
Stanley	*-*	*(-)*	1	(1)	-	(-)	-	(-)	-	(-)

Table 50: *Salmonella* in turkeys on all premises

Salmonella Incidents (Isolations)	*2001**		2002		2003		2004		2005	
ENTERICA ENTERICA										
Taksony	*-*	*(-)*	1	(1)	-	(-)	-	(-)	-	(-)
Teddington	*1*	*(1)*	-	(-)	-	(-)	-	(-)	-	(-)
Typhimurium	*35*	*(40)*	23	(34)	30	(39)	44	(47)	24	(26)
Virchow	*-*	*(-)*	-	(-)	13	(13)	11	(11)	5	(5)
UNSPECIFIED										
structure only	*1*	*(3)*	1	(1)	28	(28)	14	(14)	19	(19)
rough strain	*2*	*(2)*	1	(1)	8	(9)	1	(1)	1	(1)
Untyped	*1*	*(1)*	1	(1)	-	(-)	-	(-)	-	(-)
TOTAL	*237*	*(290)*	122	(144)	326	(358)	258	(263)	279	(292)

* 2001 data may not be comparable due to impact of FMD epidemic

Fig 34: Incidents of *Salmonella* serotypes in turkeys in 2005

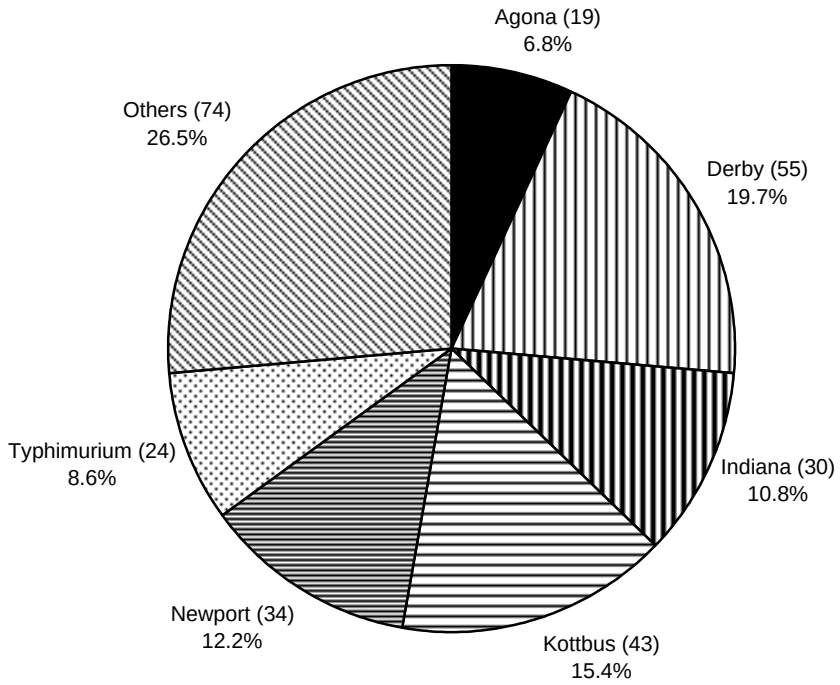
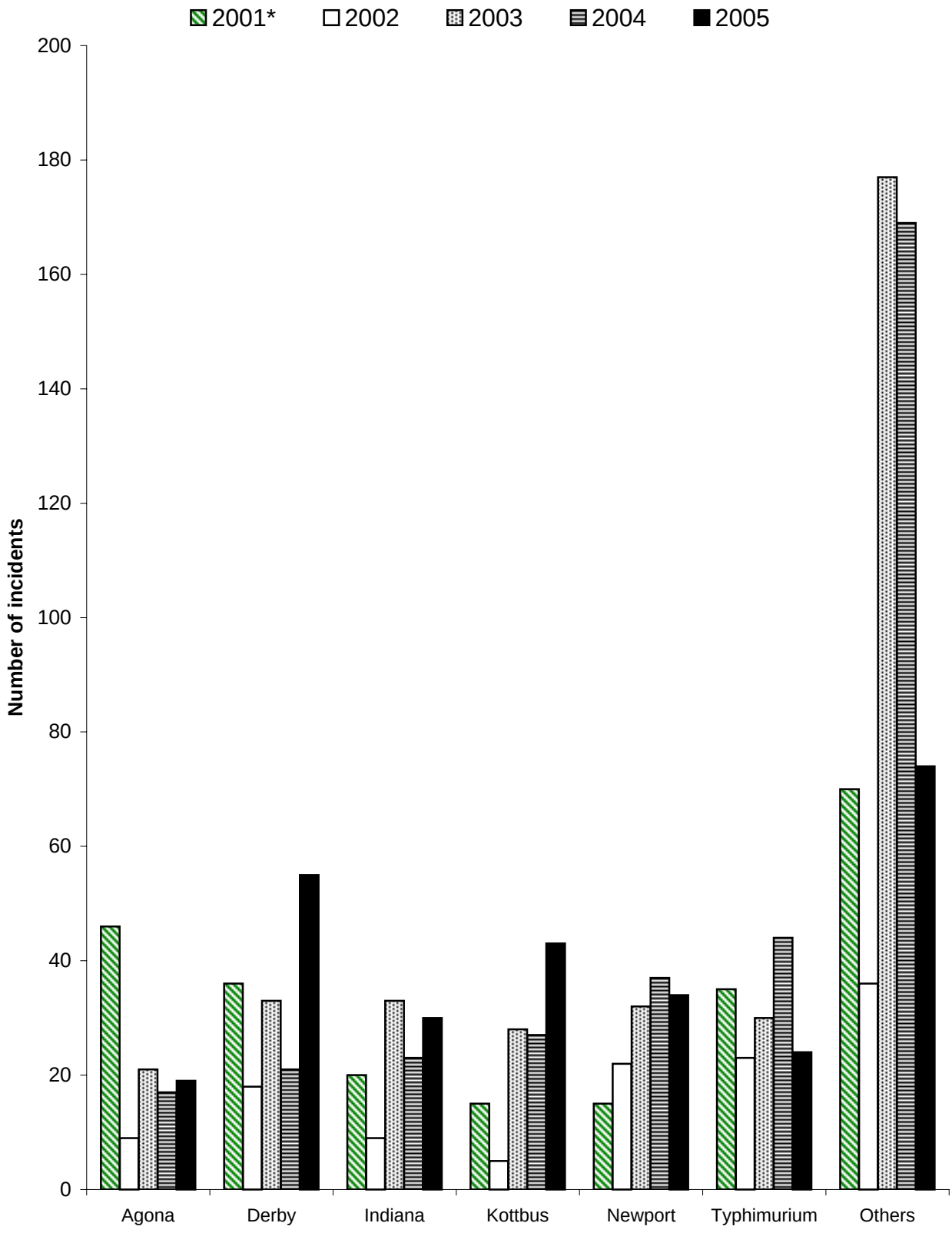


Table 51: Incidents of the top 5 *Salmonella* serotypes in turkeys in 2005 as a % of all incidents compared to previous years

Serotype	2001	2002	2003	2004	2005
S. Derby %	15.2	14.8	10.1	8.1	19.7
S. Kottbus %	6.3	4.1	8.6	10.5	15.4
S. Newport %	6.3	18.0	9.8	14.3	12.2
S. Indiana %	8.4	7.4	10.1	8.9	10.8
S. Typhimurium %	14.8	18.8	9.2	17.1	8.6
Total no. incidents	237	122	326	258	279

Fig 35: Incidents of *Salmonella* serotypes in turkeys (2001 - 2005)



* 2001 data may not be comparable due to uncertain impact of FMD epidemic

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

Definitive Types Incidents (Isolations)	*2001**		2002		2003		2004		2005	
2	*1*	*(1)*	-	(-)	-	(-)	-	(-)	-	(-)
30	*1*	*(1)*	-	(-)	-	(-)	-	(-)	-	(-)
41	*-*	*(-)*	-	(-)	-	(-)	1	(1)	-	(-)
56	*1*	*(1)*	-	(-)	-	(-)	1	(1)	1	(1)
99	*1*	*(1)*	-	(-)	-	(-)	5	(6)	-	(-)
104	*16*	*(18)*	17	(28)	29	(38)	31	(33)	20	(22)
104b	*7*	*(7)*	-	(-)	-	(-)	-	(-)	-	(-)
120	*-*	*(-)*	1	(1)	-	(-)	5	(5)	-	(-)
193	*1*	*(1)*	-	(-)	-	(-)	-	(-)	-	(-)
U288	*-*	*(-)*	-	(-)	1	(1)	-	(-)	1	(1)
U302	*6*	*(9)*	1	(1)	-	(-)	-	(-)	2	(2)
U308a	*-*	*(-)*	1	(1)	-	(-)	-	(-)	-	(-)
NOPT	*-*	*(-)*	2	(2)	-	(-)	-	(-)	-	(-)
UNTY	*1*	*(1)*	1	(1)	-	(-)	-	(1)	-	(-)
TOTAL	*35*	*(40)*	23	(34)	30	(39)	44	(47)	24	(26)

* 2001 data may not be comparable due to impact of FMD epidemic

Fig 36: Incidents of *Salmonella* Typhimurium definitive types in turkeys in 2005

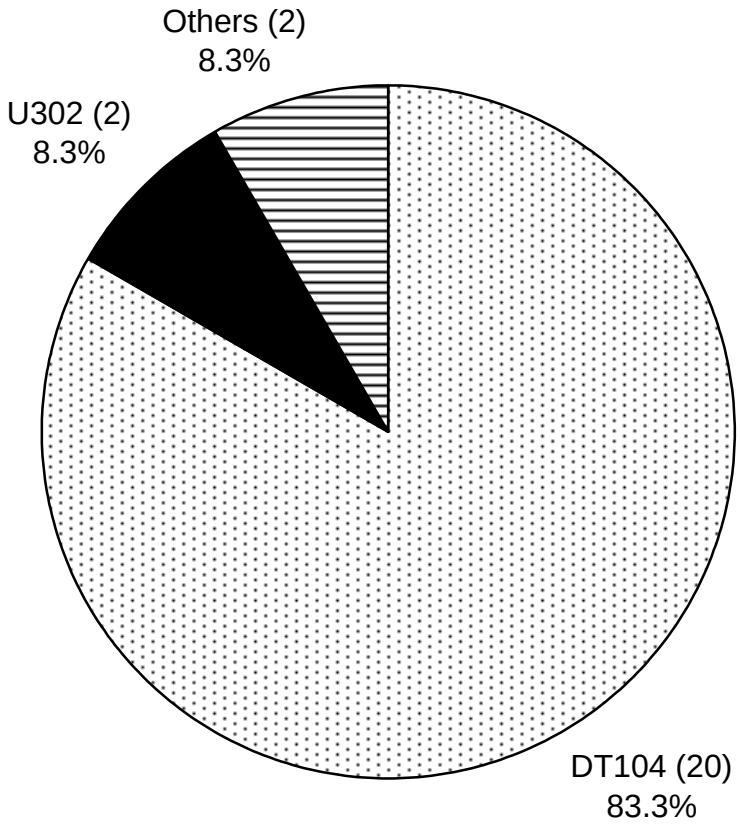
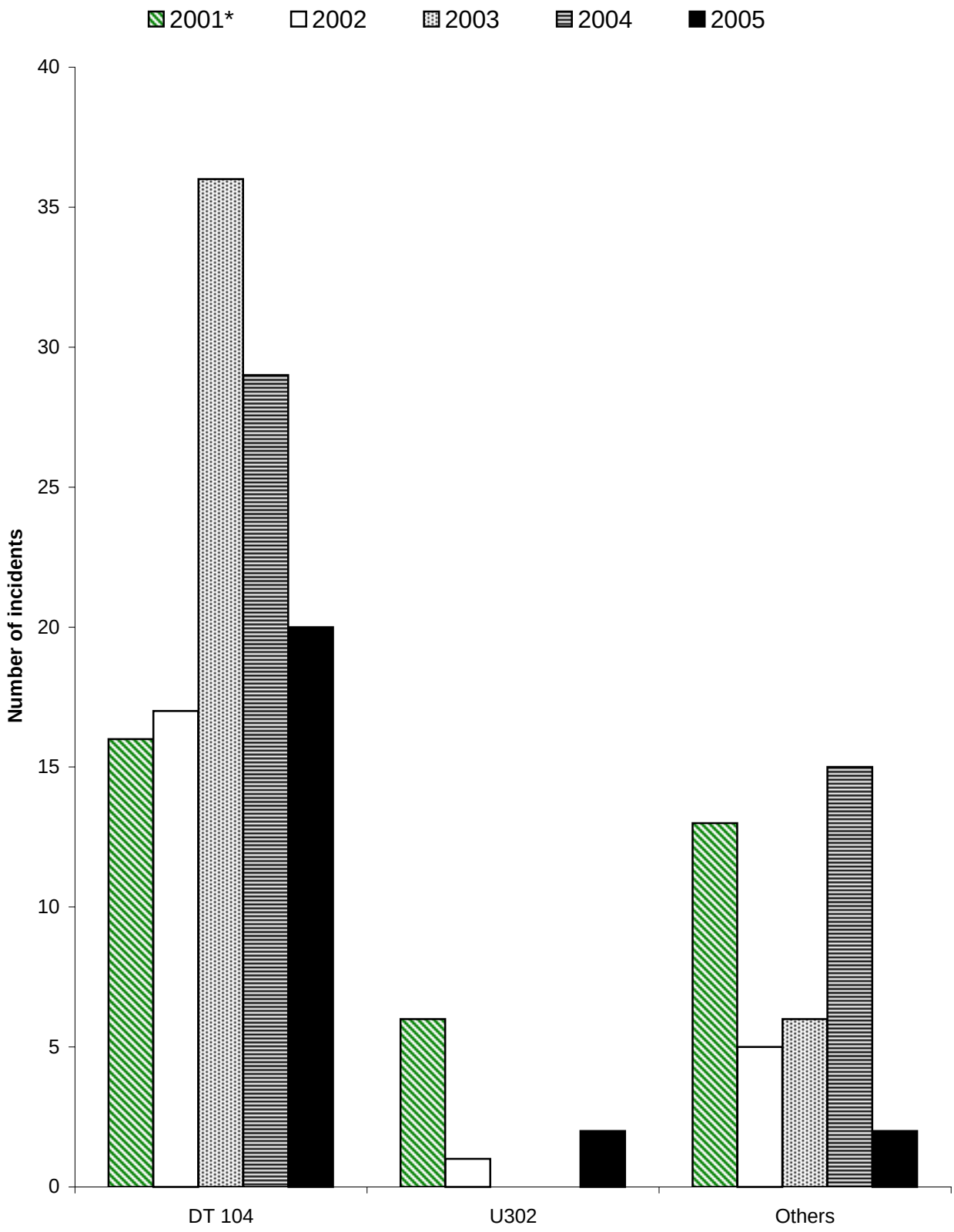


Fig 37: Incidents of *Salmonella* Typhimurium definitive types in turkeys (2001 - 2005)



* 2001 data may not be comparable due to uncertain impact of FMD epidemic

Fig 38 : *S*. Enteritidis and *S*. Typhimurium as a proportion of all reports in turkeys (1985 - 2005)

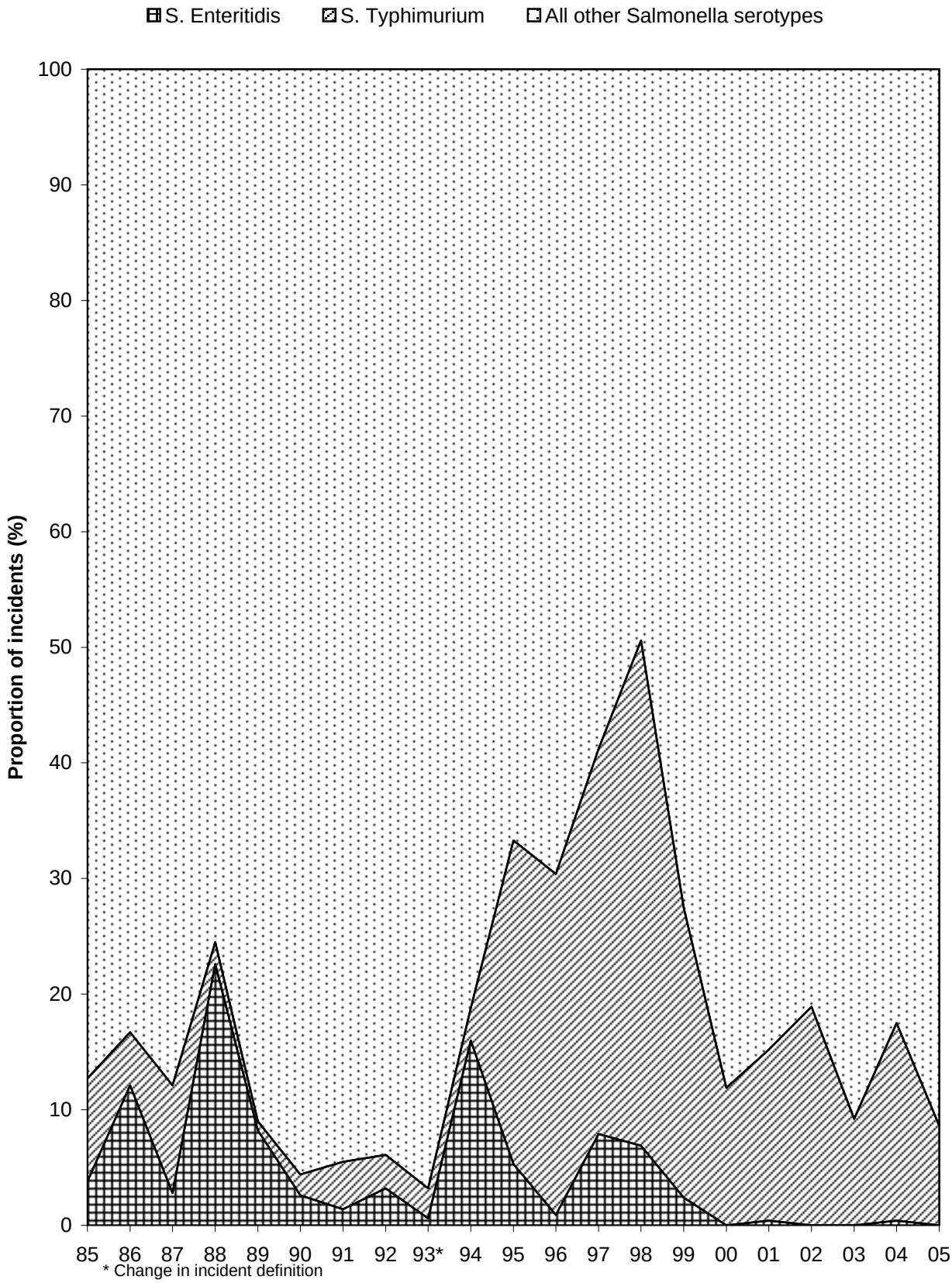


Table 53: *S*. Enteritidis in turkeys on all premises

Phage Types Incidents (Isolations)	*2001**	2002	2003	2004	2005
4	*1 (1)*	- (-)	- (-)	- (-)	- (-)
UNTY	*- (-)*	- (-)	- (-)	1 (1)	- (-)
TOTAL	*1 (1)*	- (-)	- (-)	1 (1)	- (-)

Table 54: *S*. Hadar in turkeys on all premises

Phage Types Incidents (Isolations)	*2001**	2002	2003	2004	2005
2	*- (-)*	1 (1)	1 (1)	- (-)	- (-)
10	*1 (1)*	1 (1)	12 (12)	8 (8)	- (-)
18	*- (-)*	- (-)	1 (1)	- (-)	- (-)
NOPT	*- (-)*	2 (2)	- (-)	- (-)	- (-)
untyped	*- (-)*	- (-)	- (-)	- (1)	- (-)
TOTAL	*1 (1)*	4 (4)	14 (14)	8 (9)	- (-)

Table 55: *S*. Virchow in turkeys on all premises

Phage Types Incidents (Isolations)	*2001**	2002	2003	2004	2005
19	*- (-)*	- (-)	- (-)	1 (1)	- (-)
26	*- (-)*	- (-)	13 (13)	10 (10)	3 (3)
31	*- (-)*	- (-)	- (-)	- (-)	2 (2)
TOTAL	*- (-)*	- (-)	13 (13)	11 (11)	5 (5)

* 2001 data may not be comparable due to impact of FMD epidemic

Table 56: *Salmonella* in ducks & geese on all premises

Salmonella Incidents (Isolations)	*2001**		2002		2003		2004		2005	
ENTERICA ENTERICA										
Agona	*-*	*(-)*	1	(1)	3	(3)	3	(3)	-	(-)
Anatum	*-*	*(-)*	1	(1)	-	(-)	3	(3)	1	(1)
Binza	*3*	*(3)*	30	(55)	67	(73)	84	(86)	45	(46)
Bredeney	*-*	*(-)*	1	(1)	-	(-)	-	(-)	-	(-)
Derby	*-*	*(-)*	1	(1)	2	(2)	2	(2)	5	(5)
Enteritidis	*13*	*(14)*	11	(14)	6	(6)	8	(8)	63	(65)
Give	*-*	*(-)*	13	(13)	23	(24)	15	(15)	14	(14)
Goldcoast	*-*	*(-)*	3	(3)	2	(2)	2	(2)	-	(-)
Hadar	*1*	*(1)*	27	(35)	30	(33)	52	(57)	27	(27)
Havana	*-*	*(-)*	2	(4)	6	(6)	5	(5)	2	(2)
Idikan	*-*	*(-)*	-	(-)	-	(-)	1	(1)	-	(-)
Indiana	*4*	*(4)*	62	(89)	128	(133)	136	(137)	171	(174)
Kedougou	*-*	*(-)*	4	(4)	21	(22)	33	(33)	26	(26)
Kottbus	*1*	*(2)*	3	(3)	3	(4)	5	(5)	41	(41)
Livingstone	*-*	*(-)*	15	(20)	44	(47)	98	(98)	12	(12)
Muenchen	*-*	*(-)*	1	(1)	-	(-)	-	(-)	-	(-)
Newport	*-*	*(-)*	-	(-)	-	(-)	1	(1)	-	(-)
Ohio	*-*	*(-)*	-	(-)	-	(-)	-	(-)	2	(2)
Orion	*-*	*(-)*	31	(52)	40	(40)	39	(40)	41	(42)
Poona	*-*	*(-)*	-	(-)	-	(-)	-	(-)	1	(1)
Reading	*-*	*(-)*	-	(-)	-	(-)	-	(-)	4	(4)
Saint Paul	*4*	*(4)*	3	(3)	2	(2)	3	(3)	24	(24)
Schwarzengrund	*-*	*(-)*	-	(-)	-	(-)	-	(-)	1	(1)
Senftenberg	*-*	*(-)*	8	(8)	-	(-)	1	(1)	56	(58)
Typhimurium	*10*	*(11)*	11	(13)	13	(13)	8	(9)	71	(71)
UNSPECIFIED										
structure only	*-*	*(-)*	5	(6)	11	(11)	19	(21)	22	(22)
rough strain	*1*	*(1)*	2	(2)	1	(1)	-	(-)	-	(-)

Table 56: *Salmonella* in ducks & geese on all premises

Salmonella Incidents (Isolations)	*2001**	2002	2003	2004	2005
untyped	*- (-)*	1 (1)	- (-)	- (-)	- (-)
untypable	*- (-)*	- (-)	1 (1)	- (-)	- (-)
TOTAL	*37 (40)*	236 (330)	403 (423)	518 (530)	629 (638)

* 2001 data may not be comparable due to impact of FMD epidemic

Fig 39: Incidents of *Salmonella* serotypes in ducks and geese in 2005

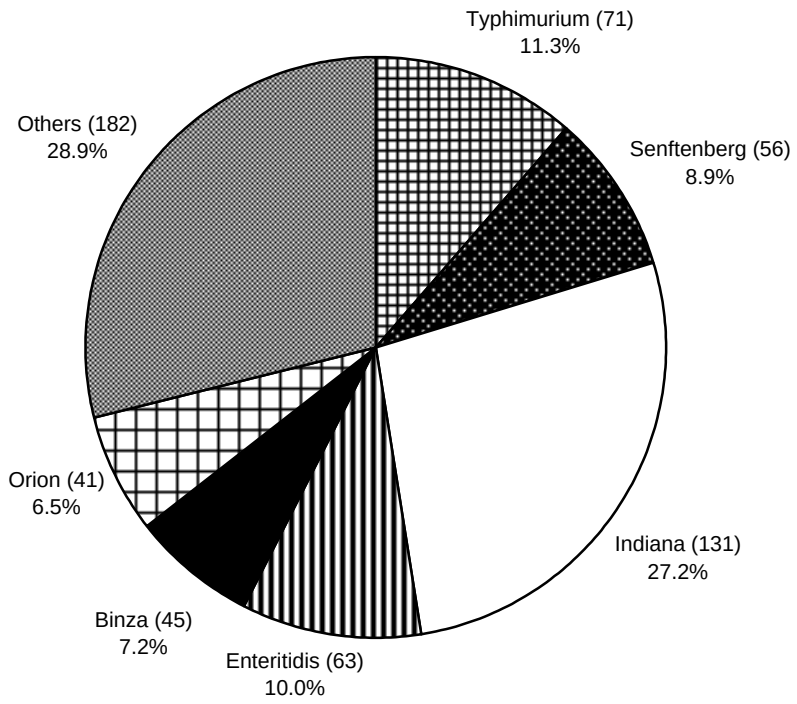
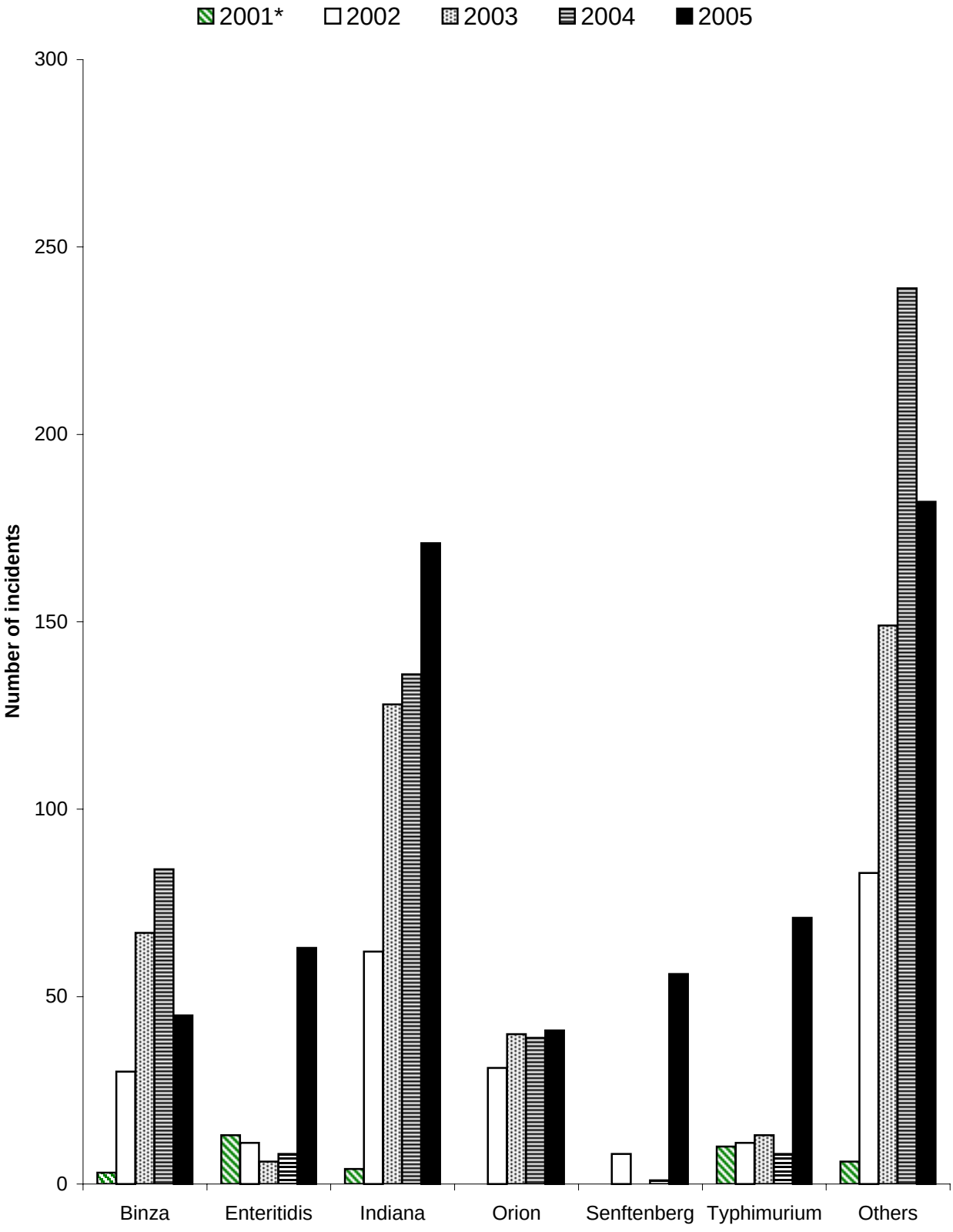


Table 57: Incidents of the top 5 *Salmonella* serotypes in ducks & geese in 2005 as a % of all incidents compared to previous years

Serotype	2001	2002	2003	2004	2005
S. Indiana %	10.8	26.3	31.8	26.3	27.2
S. Typhimurium %	27.0	4.7	3.2	1.5	11.3
S. Enteritidis %	35.1	4.7	1.5	1.5	10.0
S. Senftenberg %	0.0	3.4	0.0	0.2	8.9
S. Binza %	8.1	12.7	16.6	16.2	7.2
Total no. incidents	37	236	403	518	629

Fig 40: Incidents of *Salmonella* serotypes in ducks and geese (2001 - 2005)



* 2001 data may not be comparable due to uncertain impact of FMD epidemic

Table 58: *S*. Typhimurium in ducks & geese on all premises

Definitive Types Incidents (Isolations)	*2001**		2002		2003		2004		2005	
8	*6*	*(7)*	8	(10)	10	(10)	5	(5)	60	(60)
9	*1*	*(1)*	-	(-)	-	(-)	-	(-)	-	(-)
30	*1*	*(1)*	2	(2)	3	(3)	1	(1)	6	(6)
41	*-*	*(-)*	-	(-)	-	(-)	2	(2)	2	(2)
66	*-*	*(-)*	-	(-)	-	(-)	-	(-)	1	(1)
125	*1*	*(1)*	-	(-)	-	(-)	-	(-)	-	(-)
195	*-*	*(-)*	1	(1)	-	(-)	-	(-)	-	(-)
U310	*1*	*(1)*	-	(-)	-	(-)	-	(-)	-	(-)
RDNC	*-*	*(-)*	-	(-)	-	(-)	-	(1)	-	(-)
UNTY	*-*	*(-)*	-	(-)	-	(-)	-	(-)	2	(2)
TOTAL	*10*	*(11)*	11	(13)	13	(13)	8	(9)	71	(71)

Table 59: *S*. Enteritidis in ducks & geese on all premises

Phage Types Incidents (Isolations)	*2001**		2002		2003		2004		2005	
1	*-*	*(-)*	-	(-)	-	(-)	3	(3)	-	(-)
3	*-*	*(-)*	-	(-)	-	(-)	-	(-)	1	(1)
4	*2*	*(2)*	-	(-)	-	(-)	1	(1)	-	(-)
6	*-*	*(-)*	-	(-)	-	(-)	-	(-)	7	(7)
6a	*-*	*(-)*	-	(-)	-	(-)	-	(-)	29	(30)
9b	*9*	*(10)*	8	(11)	6	(6)	3	(3)	11	(11)
13a	*-*	*(-)*	1	(1)	-	(-)	-	(-)	-	(-)
14b	*-*	*(-)*	-	(-)	-	(-)	-	(-)	9	(9)
35	*-*	*(-)*	-	(-)	-	(-)	1	(1)	-	(-)
RDNC	*-*	*(-)*	-	(-)	-	(-)	-	(-)	-	(1)
NOPT	*-*	*(-)*	-	(-)	-	(-)	-	(-)	1	(1)
UNTY	*2*	*(2)*	2	(2)	-	(-)	-	(-)	5	(5)
TOTAL	*13*	*(14)*	11	(14)	6	(6)	8	(8)	63	(65)

* 2001 data may not be comparable due to impact of FMD epidemic

Table 60: *S*. Hadar in ducks & geese on all premises

Phage Types	*2001**		2002		2003		2004		2005	
Incidents (Isolations)										
2	*-*	*(-)*	10	(12)	3	(3)	7	(7)	3	(3)
4	*1*	*(1)*	1	(1)	-	(-)	-	(-)	-	(-)
5	*-*	*(-)*	-	(-)	1	(1)	-	(-)	-	(-)
9	*-*	*(-)*	-	(-)	-	(-)	1	(1)	-	(-)
10	*-*	*(-)*	1	(1)	3	(3)	5	(5)	6	(6)
11	*-*	*(-)*	2	(2)	9	(10)	8	(8)	3	(3)
18	*-*	*(-)*	-	(-)	-	(-)	1	(1)	-	(-)
22	*-*	*(-)*	5	(11)	12	(12)	26	(28)	8	(8)
46	*-*	*(-)*	1	(1)	-	(-)	-	(-)	-	(-)
51	*-*	*(-)*	-	(-)	1	(1)	1	(1)	-	(-)
58a	*-*	*(-)*	-	(-)	1	(1)	-	(-)	-	(-)
62	*-*	*(-)*	-	(-)	-	(-)	2	(2)	5	(5)
RDNC	*-*	*(-)*	3	(3)	-	(1)	-	(1)	-	(-)
NOPT	*-*	*(-)*	4	(4)	-	(-)	-	(-)	-	(-)
UNTY	*-*	*(-)*	-	(-)	-	(-)	1	(1)	2	(2)
untyped	*-*	*(-)*	-	(-)	-	(1)	-	(2)	-	(-)
TOTAL	*1*	*(1)*	27	(35)	30	(33)	52	(57)	27	(27)

Table 61: *Salmonella* in game birds on all premises

Salmonella Incidents (Isolations)	*2001**		2002		2003		2004		2005	
ENTERICA ENTERICA										
Agona	*1*	*(1)*	-	(-)	2	(2)	-	(-)	-	(-)
Binza	*22*	*(24)*	14	(20)	7	(10)	6	(7)	10	(13)
Derby	*-*	*(-)*	1	(1)	1	(1)	1	(1)	-	(-)
Dublin	*-*	*(-)*	1	(1)	-	(-)	1	(1)	-	(-)
Enteritidis	*1*	*(1)*	1	(1)	2	(2)	-	(-)	-	(-)
Hadar	*-*	*(-)*	-	(-)	1	(1)	-	(-)	-	(-)
Indiana	*1*	*(1)*	1	(1)	-	(-)	-	(-)	1	(1)
Infantis	*1*	*(1)*	-	(-)	-	(-)	-	(1)	-	(-)
Kottbus	*-*	*(-)*	-	(-)	1	(1)	-	(-)	-	(-)
Mbandaka	*1*	*(1)*	-	(-)	-	(-)	-	(-)	-	(-)
Montevideo	*1*	*(1)*	-	(-)	-	(-)	-	(-)	-	(-)
Newport	*-*	*(-)*	1	(1)	1	(1)	-	(-)	-	(-)
Orion	*11*	*(14)*	7	(9)	8	(8)	2	(2)	3	(4)
Pullorum	*3*	*(3)*	3	(3)	2	(3)	-	(1)	-	(1)
Saint Paul	*1*	*(1)*	-	(-)	-	(-)	-	(-)	-	(-)
Senftenberg	*1*	*(1)*	-	(-)	1	(1)	-	(-)	-	(-)
Stanley	*-*	*(-)*	1	(1)	-	(-)	-	(-)	-	(-)
Tennessee	*-*	*(-)*	-	(-)	-	(-)	-	(-)	1	(1)
Typhimurium	*9*	*(9)*	3	(3)	2	(2)	3	(3)	1	(4)
ENTERICA HOUTENAE										
43:z4z23	*1*	*(1)*	-	(-)	-	(-)	-	(-)	-	(-)
UNSPECIFIED										
structure only	*1*	*(1)*	3	(5)	1	(1)	-	(-)	1	(1)
rough strain	*1*	*(1)*	-	(-)	-	(-)	-	(-)	-	(-)
untypable	*-*	*(-)*	-	(-)	-	(1)	-	(-)	-	(-)
TOTAL	*56*	*(61)*	36	(46)	29	(34)	13	(16)	17	(25)

* 2001 data may not be comparable due to impact of FMD epidemic

Fig 41: Incidents of *Salmonella* serotypes in game birds in 2005

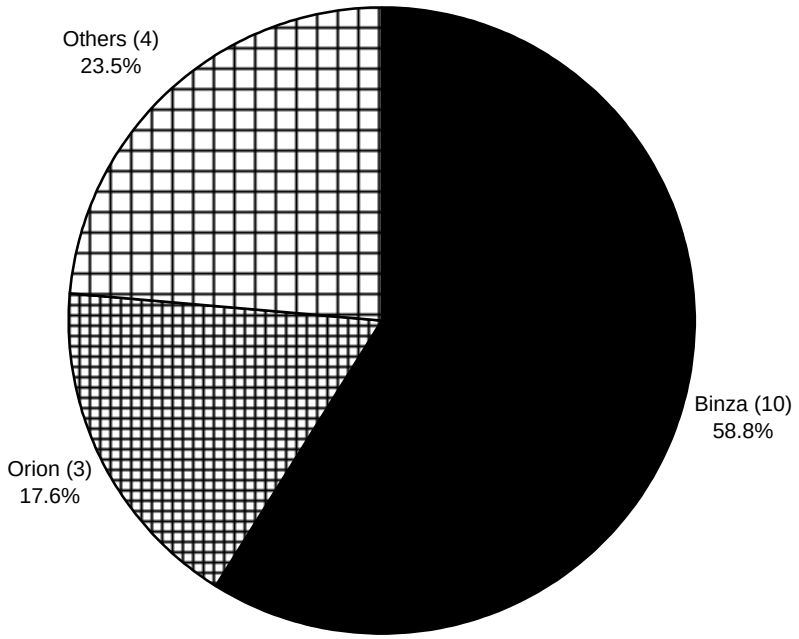
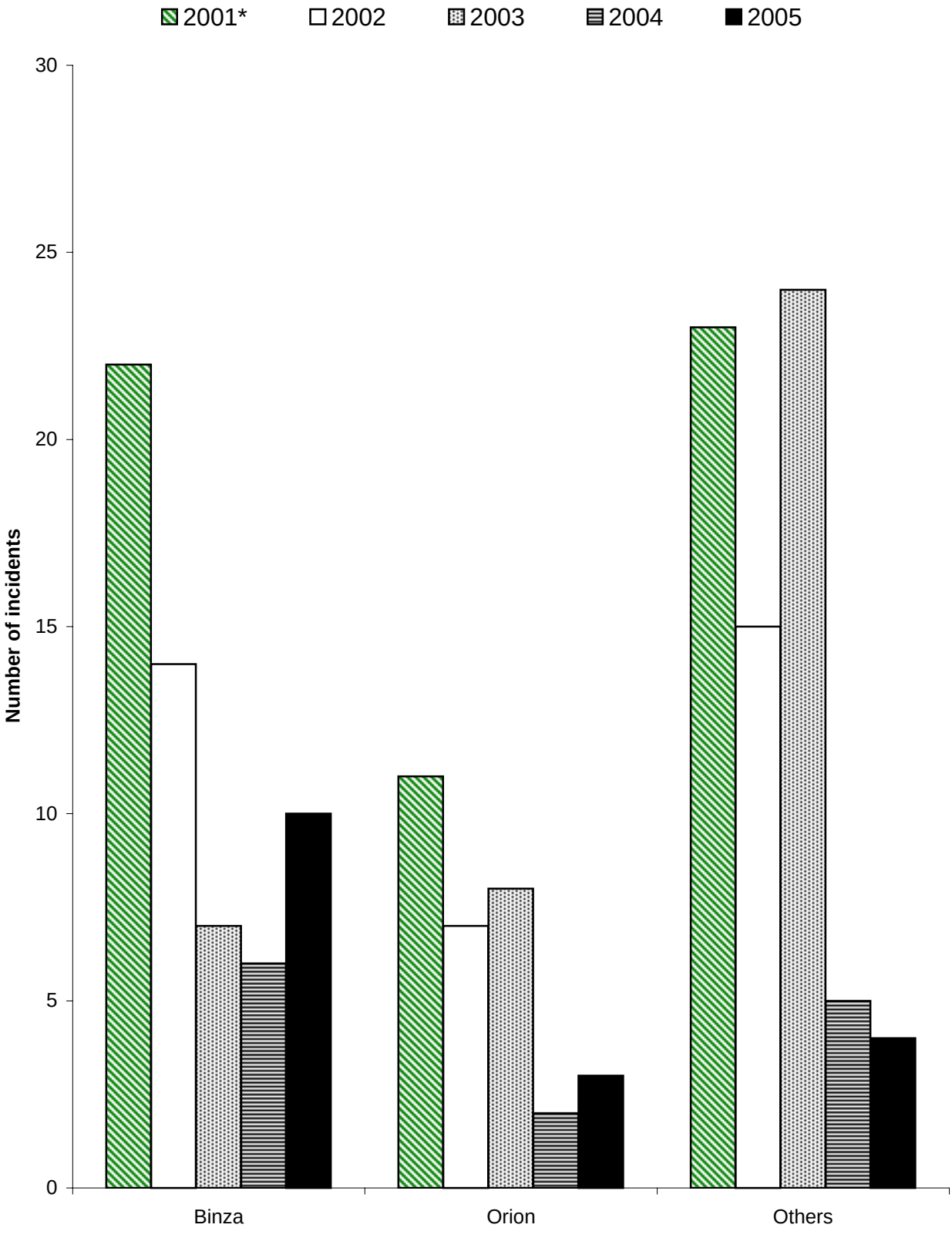


Table 62: Incidents of the top 2 *Salmonella* serotypes in game birds in 2005 as a % of all incidents compared to previous years

Serotype	2001	2002	2003	2004	2005
S. Binza %	39.3	38.9	24.1	46.2	58.8
S. Orion %	19.6	19.4	27.6	15.4	17.6
Total no. incidents	56	36	29	13	17

Fig 42: Incidents of *Salmonella* serotypes in game birds (2001 - 2005)



* 2001 data may not be comparable due to uncertain impact of FMD epidemic

Table 63: *S*. Typhimurium in game birds on all premises

Definitive Types Incidents (Isolations)	*2001**		2002		2003		2004		2005	
2	*-*	*(-)*	-	(-)	-	(-)	-	(-)	-	(1)
8	*3*	*(3)*	-	(-)	-	(-)	-	(-)	-	(-)
41	*-*	*(-)*	-	(-)	-	(-)	-	(-)	-	(1)
56	*-*	*(-)*	1	(1)	-	(-)	-	(-)	-	(-)
104	*2*	*(2)*	1	(1)	1	(1)	1	(1)	-	(1)
170	*1*	*(1)*	-	(-)	-	(-)	-	(-)	-	(-)
193	*1*	*(1)*	1	(1)	-	(-)	1	(1)	1	(1)
195	*1*	*(1)*	-	(-)	1	(1)	-	(-)	-	(-)
208	*1*	*(1)*	-	(-)	-	(-)	-	(-)	-	(-)
U310	*-*	*(-)*	-	(-)	-	(-)	1	(1)	-	(-)
TOTAL	*9*	*(9)*	3	(3)	2	(2)	3	(3)	1	(4)

* 2001 data may not be comparable due to impact of FMD epidemic

Table 64: *S*. Enteritidis in game birds on all premises

Phage Types	*2001**	2002	2003	2004	2005
Incidents (Isolations)					
4	*1 (1)*	- (-)	- (-)	- (-)	- (-)
13a	*- (-)*	1 (1)	2 (2)	- (-)	- (-)
TOTAL	*1 (1)*	1 (1)	2 (2)	- (-)	- (-)

Table 65: *S*. Pullorum in game birds on all premises

Phage Types	*2001**	2002	2003	2004	2005
Incidents (Isolations)					
7	*- (-)*	- (-)	2 (3)	- (-)	- (-)
11	*- (-)*	1 (1)	- (-)	- (-)	- (-)
NOPT	*3 (3)*	2 (2)	- (-)	- (-)	- (-)
Untyped	*- (-)*	- (-)	- (-)	- (1)	- (1)
TOTAL	*3 (3)*	3 (3)	2 (3)	- (1)	- (1)

* 2001 data may not be comparable due to impact of FMD epidemic