

## 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 (69% of *Salmonella* submissions from chickens, turkeys and ducks resulted from voluntary surveillance activities). 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 41, 42, 51, 52, 56, 57, 62 and 63. 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 rose by 2.8% in 2003 (1,825 submissions) compared to 2002 (1,775 submissions), but was still below the 2001 level of 1,974.

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

#### Chickens

There were 142.7 million chickens in GB reported in the June 2003 census, compared with 130.5 million in 2002. Table 41 shows that the number of reported incidents of *Salmonella* in chickens in 2003 (796) was slightly lower than the number in 2002 (869). The majority of incidents arose from private surveillance of broiler flocks by the poultry industry. Because the amount of private testing has increased by an unknown quantity in recent years it is difficult to interpret long term trends.

Approximately 60,491 *Salmonella* tests were performed under the monitoring requirements of the PBFHO 1993 and 141 (0.23%) were positive for *Salmonella*. This compares to 0.22% positive in 2002. The organism was isolated most frequently from day old chick carcasses and was isolated from three out of 2923 composite faeces samples (0.1%) collected when the chicks were four weeks of age.

The number of reports of *Salmonella* from statutory monitoring of chicken breeding flocks continued to decline and only 15 incidents were reported in 2003 (Table 1). In contrast to 2002, there was a decrease in reports associated with voluntary surveillance activities, which in 2002 represented 94% of all reports from chickens but in 2003 represented 65% of reports, and there was a marked increase in reports associated with clinical disease (from 5.6 to 28.6% of all reports) (Table 1). The reasons for this increase are being investigated, but may in part be due to changes in data recording which have occurred with the new *Salmonella* database.

### ***Salmonella* Enteritidis**

Numbers of reports of this serovar had been declining steadily since 1996, except for a small increase in reports in 1997 (Fig 33). In 2002, only 11 incidents were reported; but this rose to 36 in 2003. These represented 4.5% of all *Salmonella* incident reports in chickens. The reported phage types were: PT4 (20 incidents), PT6 (seven incidents), PT6a (five incidents), and one incident each of PTs 1, 7 and 12. One isolate was not phage-typed. These incidents included two incidents in breeding flocks (PTs 6 and 6a), four incidents in broiler flocks (two each of PTs 4 and 6) and 23 incidents in laying flocks (14 of PT 4, 3 of PT 6 and 6 others).

### ***Salmonella* Typhimurium**

There were 17 reported incidents of *Salmonella* Typhimurium in 2003 (from a total of 17 flocks), a decrease of 53% compared with 2002. Reports of *S. Typhimurium* represented 2% of all reports, a decrease compared with recent years (Fig 33). The most common phage type was DT104 (7 incidents: 41%), but other definitive types reported were: DT193 (two incidents), DT193a (two incidents), U302 (two incidents) and single incidents of DTs 2, 49, U317 and RDNC. There was one report of DT104 from a layer flock in 2003, one from a breeding flock, and the remainder were isolated from broiler flocks.

Most reports of *S. Typhimurium* arise from voluntary surveillance of broiler flocks. There was one report of Typhimurium (DT104) in a breeding flock in 2003.

## Other Serovars

The most common serovar isolated from chickens in 2003 was *S. Livingstone* (15.6% of all chicken incidents). In addition there were 112 reports of *S. 6,7:-*, which are likely to be *S. Livingstone* (these are not shown separately in Table 41, but are included under “structure only”). Reports of this serovar have risen in recent years. Most reports were from broiler flocks, but there were 7 incidents reported in broiler breeder flocks.

The number of reports of *S. Virchow* rose by 57% compared with 2002, making it the second most commonly reported serovar (9.3% of incidents). Of 74 reports, the most common phage types were PT2 (68%) and PT4 (22%). There were 43 reports of *S. Virchow* from broiler breeder flocks and the remaining 31 incidents were from broilers; most reports were associated with a single poultry company. The number and proportion of reports of *S. Senftenberg* fell in 2003; it was the third most commonly reported serovar. Other common serovars (~5-6% of total each) were *S. Kedougou*, *S. Montevideo*, *S. Ohio* and *S. Mbandaka*. There were 28 reports of *S. 4,12:d-* compared with none in 2002. These are possibly a variant of monomorphic *S. Schwarzengrund* and were largely associated with investigations in one company. There was a decrease in reports of *S. Binza*, *S. Heidelberg*, *S. Give*, *S. Hadar* and *S. Thompson* compared with 2002.

There were 6 reports of *S. Hadar* (PT's 2, 10, 14 and 22) in 2002, five from broilers and one from a broiler breeder flock. There were two reports of *S. Pullorum*, both from backyard flocks of traditional British laying hens. There were 7 reports of *S. Newport* in 2003, five from broiler flocks and two from broiler breeders; none were associated with multiple antibiotic resistant strains (resistance to  $\geq 4$  antibiotics) and there was no evidence of resistance to third generation cephalosporins.

*Salmonella* *Carno*, *S. Reading*, *S. Stourbridge* and *S. Meleagridis* were isolated from chickens for the first time in the last 10 years. *Salmonella* *Braenderup* was isolated for the first time since 1999. There was an increase in reports of *S. Agama*, *S. Anatum*, *S. Havana*, *S. Infantis* and isolates for which structure only was obtained. These serovars were isolated from broiler breeder flocks as well as broiler flocks in 2003 and none were as a result of monitoring in any one particular poultry company.

National trends in *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 private environmental sampling of broiler farms when the birds were two to five weeks of age.

## Turkeys

Table 51 shows a large increase (150%) in the number of incidents of *Salmonella* reported in turkey flocks in 2003. 15% of reports were associated with clinical disease; the remainder arose through voluntary surveillance activities. This increase may possibly reflect increased monitoring within companies. The most common serovar reported in 2003 was *S. Montevideo* (18.5% of incidents). The number of reports of *S. Indiana* increased from 9 in 2002 to 37 in 2003, and it became the second most commonly reported serovar (12% of incidents). *Salmonella* Typhimurium, the most common serovar reported in turkeys in 2002, was the third most commonly reported serovar in 2003. All but one of the 32 incidents (74%) involved DT104. There were no reports of DT104b for the second consecutive year; this previously common definitive type was also not reported from chickens in 2002 or 2003. U288 was reported for the first time in 2003. This strain has been reported with increasing frequency from pig herds in recent years.

There were no reports of *S. Enteritidis* from turkey flocks in 2003.

There was an increase in the number of reports of *S. Newport*, but a decrease in the proportion from 2002 (from 18% to 10% of reports). There is little evidence for any trend over the last five years and no reported resistance to 3<sup>rd</sup> generation cephalosporins. Other common serovars reported were *S. Agona*, *S. Derby*, and *S. Kottbus*. *Salmonella* *Corvallis*, *S. Manhattan*, *S. Menston* and *S. Virchow* were reported for the first time in turkeys since 1995. The latter serovar also increased markedly in chicken flocks in 2003.. There were no further reports of *S. Anatum*, *S. Taksony* or *S. Stanley*, which were isolated for the first time in recent years in 2002; however, there was one report of *S. Meleagridis*.

## Ducks and Geese

There were no reports of *Salmonella* from geese in 2003.

The increase in reports of *Salmonella* from ducks seen in 2002 was sustained in 2003 – the number of reports increased by 54% compared with 2002. These represented 1.5% of all reports in 2001 compared with 8.3% in 2002 and 10.4% in 2003. This is the result of enhanced voluntary surveillance activities by the duck industry (Table 1). Only a third of incidents were reported to be associated with clinical disease. However, this proportion has increased in 2003 from 7% in 2002. As with the chicken data, the reasons for this increase are being investigated, but may in part be due to changes in data recording which have occurred with the new *Salmonella* database.

The most common serovars reported were *S. Indiana* (29%), *S. Binza* (15%), *S. Livingstone* (12%), *S. Orion* (11%), and *S. Hadar* (8%) . The relative proportion of these serovars changed slightly from 2002, with incidents of *S. Livingstone* increasing from 15 (6% of incidents) to 41 (12%). The number, but not proportion, of isolates of *S. Hadar* remained relatively constant; the most common phage types were PT11 and PT22. A variety of other serovars were reported, the number of incidents of *S. Give* and *S. Kedougou* had increased compared with 2002. There were no new serovars reported in ducks in 2003.

There were 13 reports of *S. Typhimurium*, a slight increase over previous years. The most common phage type was DT8 (10 reports) and there were three reports of DT30. There were no reports of DT104 or DT104b. There were 6 reports of *S. Enteritidis* in ducks, decrease of 45% compared to 2002; all were PT9b.

### **Game Birds**

Reports of *Salmonella* in game birds decreased by 33% in 2003, continuing a long term trend. Most reports were associated with clinically diseased pheasants and, as in previous years, most reports were associated with *S. Binza* or *S. Orion* (63%). There were two incidents of *S. Enteritidis* PT13a in pheasants. There was only one report of *S. Typhimurium* (DT104b) which was from pheasants. There were three reported incidents of *S. Pullorum* associated with clinical disease in pheasants.

**Table 41: *Salmonella* in chickens on all premises**

<i>Salmonella</i> Incidents (Isolations)	1999		2000		2001*		2002		2003	
ENTERICA ENTERICA										
Agama	1	( 1)	4	( 4)	2	( 2)	1	( 1)	6	( 6)
Agona	17	( 21)	18	( 18)	14	( 15)	3	( 3)	4	( 4)
Ajiobo	-	( -)	-	( -)	-	( -)	1	( 1)	1	( 1)
Anatum	5	( 5)	4	( 4)	7	( 7)	1	( 1)	6	( 6)
Bardo	2	( 4)	-	( -)	-	( -)	-	( -)	-	( -)
Binza	4	( 4)	8	( 9)	24	( 26)	54	( 57)	6	( 6)
Braenderup	9	( 12)	-	( -)	-	( -)	1	( 1)	2	( 2)
Brandenburg	1	( 1)	-	( -)	-	( -)	-	( -)	8	( 18)
Bredeney	47	( 55)	53	( 58)	6	( 6)	12	( 13)	11	( 11)
Carmel	1	( 2)	-	( -)	-	( -)	-	( -)	-	( -)
Carno	-	( -)	-	( -)	-	( -)	-	( -)	1	( 1)
Champaign	-	( -)	1	( 1)	-	( -)	-	( -)	-	( -)
Cubana	2	( 2)	-	( -)	1	( 1)	-	( -)	1	( 1)
Derby	-	( -)	-	( -)	3	( 4)	3	( 4)	2	( 2)
Dublin	-	( -)	1	( 1)	-	( -)	-	( -)	-	( -)
Ealing	2	( 2)	-	( -)	1	( 1)	-	( -)	-	( -)
Eimsbuettel	4	( 4)	-	( -)	6	( 7)	1	( 1)	-	( -)
Enteritidis	44	( 60)	11	( 23)	7	( 7)	11	( 15)	36	( 48)
Give	34	( 44)	144	( 160)	18	( 18)	18	( 18)	6	( 6)
Goldcoast	-	( -)	-	( -)	1	( 1)	10	( 11)	9	( 9)
Hadar	35	( 42)	39	( 53)	6	( 8)	17	( 17)	6	( 7)
Havana	1	( 1)	1	( 1)	2	( 2)	2	( 2)	10	( 10)
Heidelberg	41	( 47)	63	( 83)	50	( 57)	23	( 23)	2	( 2)
Idikan	6	( 6)	-	( -)	1	( 1)	1	( 1)	-	( -)
Indiana	13	( 25)	8	( 12)	7	( 12)	7	( 8)	4	( 4)
Infantis	7	( 7)	-	( -)	3	( 5)	3	( 3)	9	( 9)
Kedougou	103	( 119)	81	( 86)	42	( 49)	60	( 70)	47	( 48)
Kentucky	5	( 13)	12	( 19)	10	( 15)	2	( 3)	-	( -)
Kottbus	1	( 1)	6	( 7)	2	( 2)	1	( 1)	5	( 5)
Larochelle	33	( 35)	16	( 18)	2	( 2)	2	( 2)	-	( -)
Lexington	1	( 1)	-	( -)	1	( 1)	1	( 1)	-	( -)
Lille	-	( -)	-	( -)	1	( 1)	-	( -)	-	( -)
Liverpool	29	( 33)	31	( 31)	60	( 73)	31	( 35)	26	( 27)
Livingstone	86	( 109)	47	( 61)	75	( 90)	122	( 200)	124	( 147)
Manhattan	3	( 10)	2	( 3)	-	( -)	-	( -)	-	( -)
Mbandaka	126	( 151)	42	( 50)	58	( 78)	51	( 58)	44	( 49)
Meleagridis	-	( -)	-	( -)	-	( -)	-	( -)	1	( 1)
Montevideo	99	( 134)	74	( 121)	56	( 94)	56	( 112)	45	( 48)

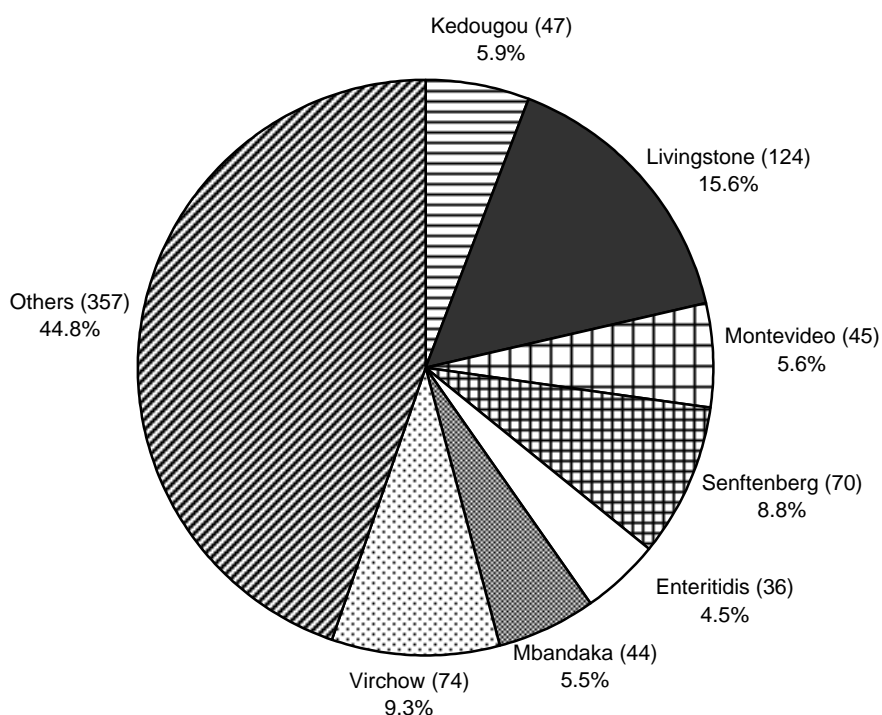
**Table 41: *Salmonella* in chickens on all premises**

<i>Salmonella</i> Incidents (Isolations)	1999		2000		2001*		2002		2003	
ENTERICA ENTERICA										
New Brunswick	1	( 1)	-	( -)	1	( 1)	-	( -)	-	( -)
Newport	17	( 22)	13	( 14)	5	( 5)	8	( 10)	7	( 7)
Ohio	74	( 103)	35	( 65)	23	( 27)	38	( 49)	32	( 32)
Orion	2	( 2)	-	( -)	-	( -)	15	( 15)	3	( 3)
Panama	1	( 1)	1	( 1)	-	( -)	-	( -)	-	( -)
Poona	-	( -)	1	( 1)	1	( 1)	-	( -)	-	( -)
Pullorum	6	( 6)	2	( 2)	1	( 1)	1	( 1)	2	( 2)
Reading	-	( -)	-	( -)	-	( -)	-	( -)	1	( 1)
Redhill	1	( 1)	-	( -)	-	( -)	-	( -)	-	( -)
Senftenberg	169	( 235)	256	( 351)	146	( 263)	107	( 150)	70	( 72)
Stanley	-	( -)	-	( -)	-	( -)	1	( 1)	1	( 1)
Stourbridge	-	( -)	-	( -)	-	( -)	-	( -)	1	( 1)
Taksony	1	( 1)	-	( -)	-	( -)	1	( 1)	-	( -)
Tennessee	2	( 2)	-	( -)	1	( 1)	4	( 4)	7	( 7)
Thomasville	1	( 1)	-	( -)	1	( 1)	-	( -)	-	( -)
Thompson	73	( 84)	74	( 76)	57	( 57)	31	( 31)	11	( 12)
Typhimurium	92	( 152)	41	( 56)	54	( 64)	36	( 44)	17	( 20)
Virchow	29	( 36)	30	( 33)	23	( 24)	47	( 48)	74	( 77)
Wangata	-	( -)	-	( -)	-	( -)	1	( 1)	-	( -)
Worthington	1	( 1)	3	( 3)	1	( 1)	-	( -)	1	( 1)
UNSPECIFIED										
untypeable	-	( -)	1	( 1)	-	( -)	-	( -)	-	( -)
structure only	130	( 158)	52	( 52)	90	( 113)	82	( 92)	142	( 158)
rough strain	7	( 7)	6	( 6)	3	( 3)	2	( 2)	5	( 5)
Untyped	5	( 5)	5	( 5)	-	( -)	-	( -)	-	( -)
TOTAL	1374	( 1769)	1186	( 1489)	873	( 1147)	869	( 1111)	796	( 877)

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

+ antigenic structure not stated

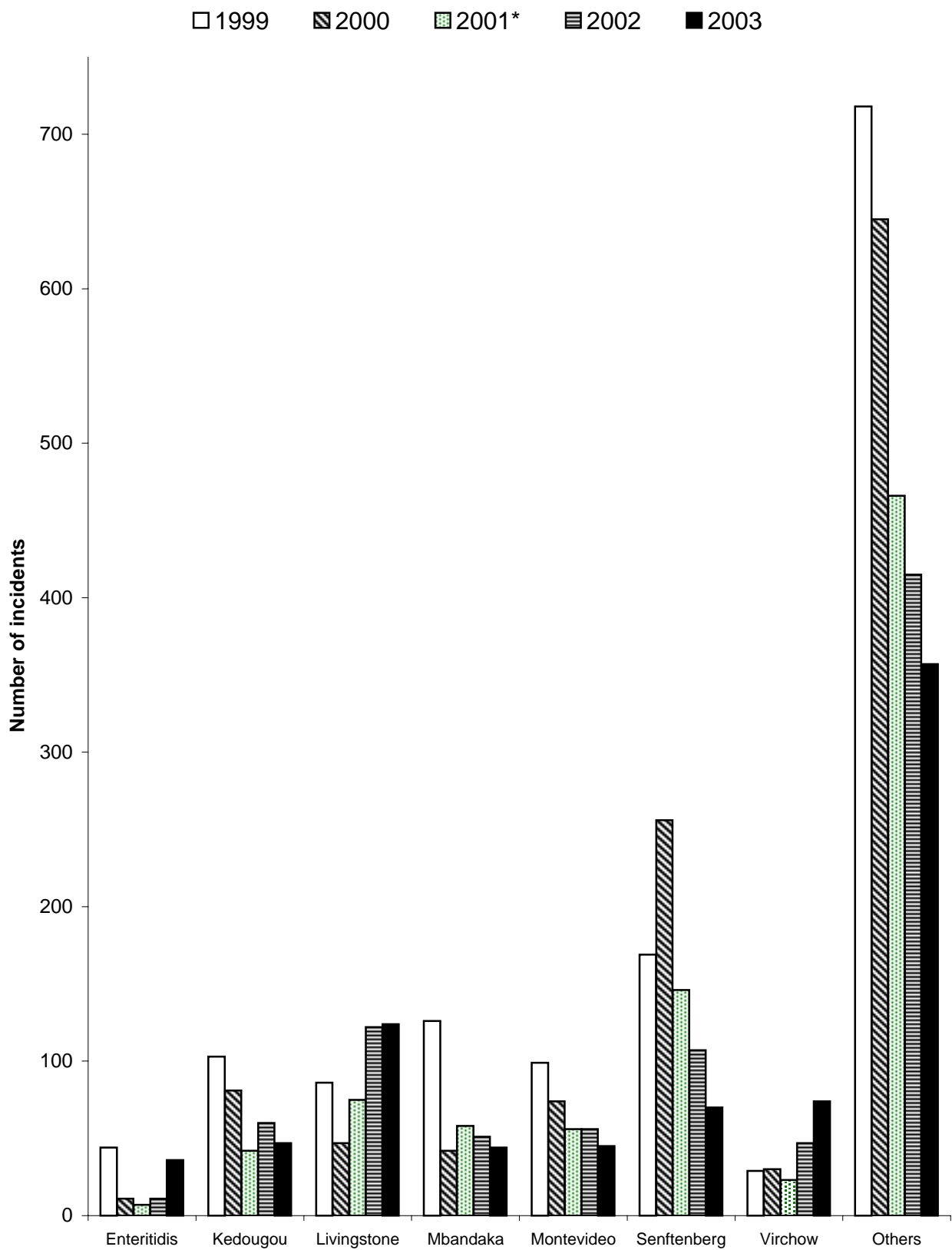
**Fig 28: Incidents in *Salmonella* serotypes in chickens in 2003**



**Table 42: Incidents of the top 5 *Salmonella* serotypes in chickens in 2003 as a % of all incidents compared to previous years**

Serotype	1999	2000	2001	2002	2003
S. Livingstone %	6.3	4.0	8.6	14.0	15.6
S. Virchow %	2.1	2.5	2.6	5.4	9.3
S. Senftenberg %	12.3	21.6	16.7	12.3	8.8
S. Kedougou %	7.5	6.8	4.8	6.9	5.9
S. Montevideo %	7.2	6.2	6.4	6.4	5.6
Total no. incidents	1374	1186	873	869	796

**Fig 29: Incidents of *Salmonella* serotypes in chickens (1999 - 2003)**



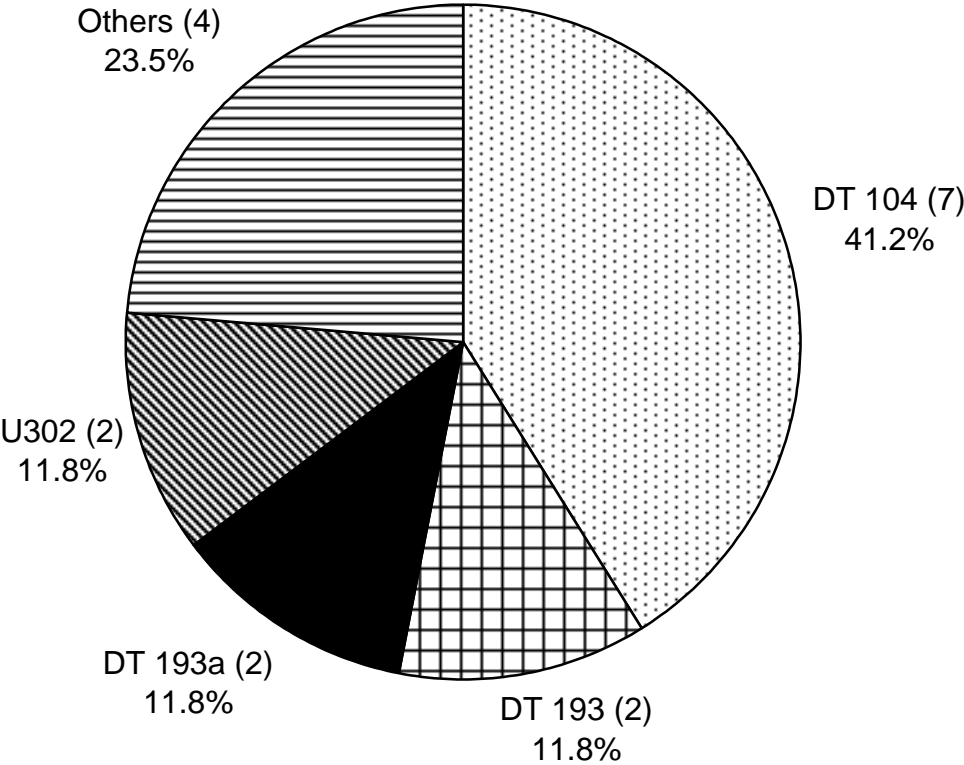
\* 2001 data may not be comparable due to uncertain impact of FMD epidemic

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

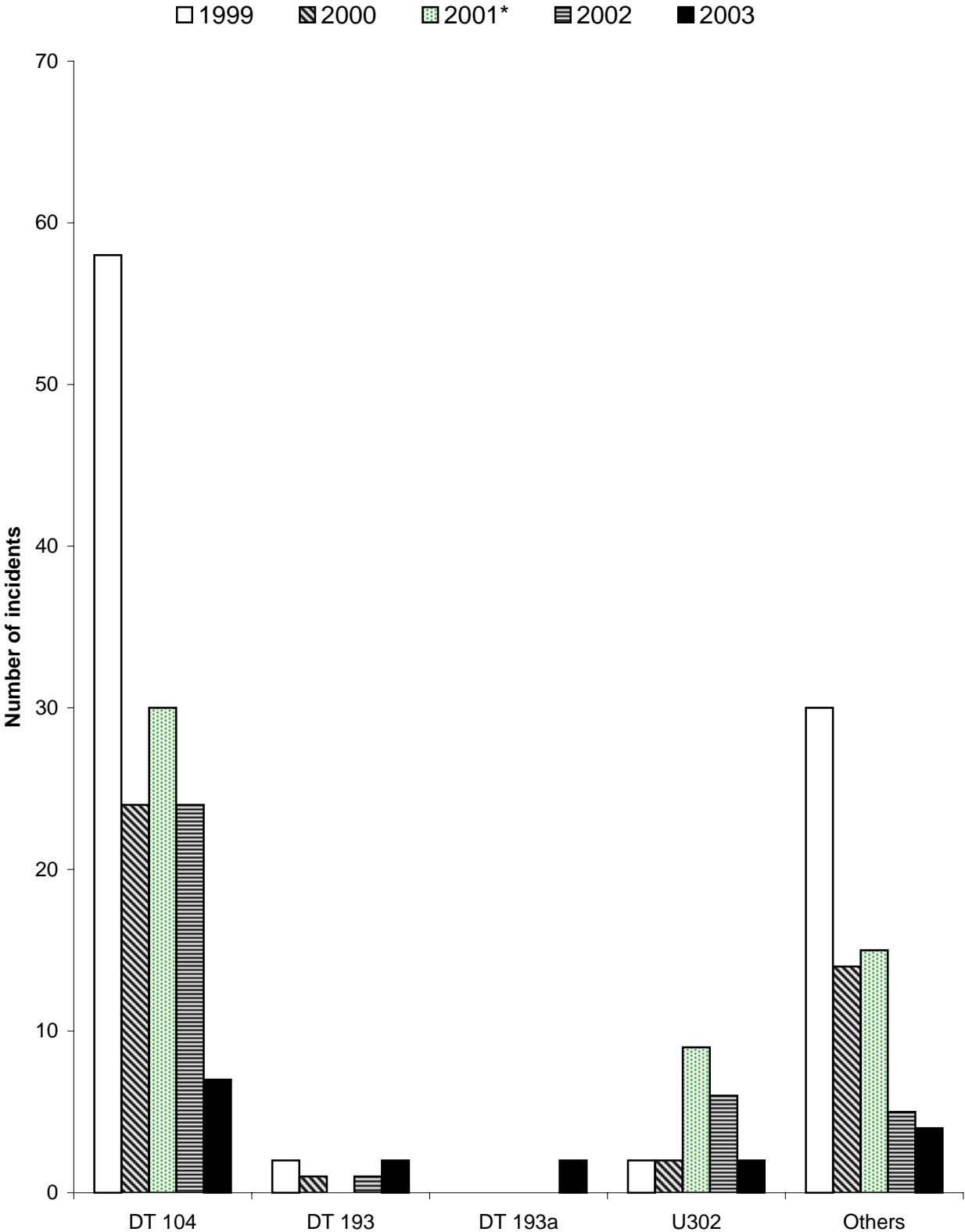
Definitive Types Incidents (Isolations)	1999	2000	2001*	2002	2003
2	1 ( 1)	- ( -)	- ( -)	- ( -)	1 ( 1)
3	1 ( 6)	- ( -)	- ( -)	- ( -)	- ( -)
8	- ( -)	- ( -)	- ( -)	- ( -)	- ( -)
12	2 ( 2)	- ( -)	- ( -)	- ( -)	- ( -)
40	- ( -)	1 ( 1)	- ( -)	- ( -)	- ( -)
49	1 ( 1)	- ( -)	- ( -)	- ( -)	1 ( 1)
49b	- ( -)	- ( -)	- ( -)	- ( -)	- ( -)
85	2 ( 3)	1 ( 1)	- ( -)	1 ( 1)	- ( -)
99	1 ( 1)	- ( -)	- ( -)	- ( -)	- ( -)
104	58 ( 93)	24 ( 33)	30 ( 34)	24 ( 30)	7 ( 8)
104b	9 ( 14)	7 ( 10)	5 ( 6)	- ( -)	- ( -)
120	1 ( 1)	- ( -)	2 ( 2)	- ( -)	- ( -)
141	- ( -)	- ( -)	- ( -)	- ( -)	- ( -)
146	1 ( 2)	- ( -)	- ( -)	- ( -)	- ( -)
193	2 ( 3)	1 ( 1)	- ( -)	1 ( 1)	2 ( 2)
193a	- ( -)	- ( -)	- ( -)	- ( -)	2 ( 2)
208	1 ( 1)	2 ( 2)	- ( -)	1 ( 1)	- ( -)
3AER	3 ( 7)	- ( -)	- ( -)	- ( -)	- ( -)
U302	2 ( 3)	2 ( 5)	9 ( 12)	6 ( 8)	2 ( 2)
U317	- ( -)	- ( -)	- ( -)	- ( -)	1 ( 1)
RDNC	3 ( 3)	- ( -)	3 ( 3)	1 ( 1)	1 ( 2)
NOPT	- ( -)	- ( -)	- ( -)	- ( -)	- ( -)
UNTY	4 ( 11)	3 ( 3)	5 ( 7)	2 ( 2)	- ( 1)
Untyped	- ( -)	- ( -)	- ( -)	- ( -)	- ( -)
TOTAL	92 ( 152)	41 ( 56)	54 ( 64)	36 ( 44)	17 ( 20)

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

**Fig 30: Incidents of *Salmonella* Typhimurium definitive types in chickens in 2003**



**Fig 31: Incidents of *Salmonella* Typhimurium definitive types in chickens (1999 - 2003)**



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

**Table 44: Incidents of *S. Typhimurium* definitive types in chickens in 2003 by flock type**

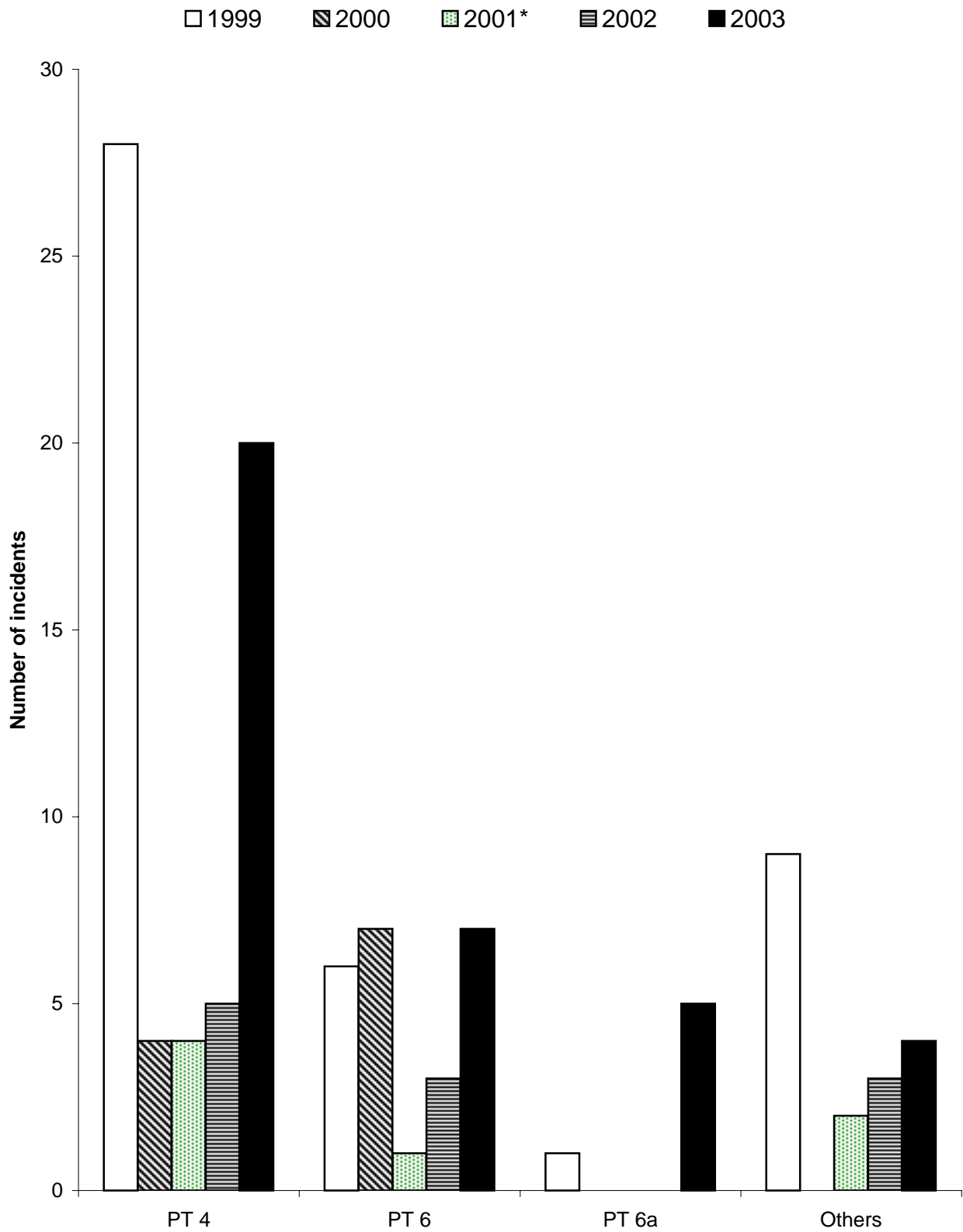
	Number of incidents by definitive type				Total
	DT 104	DT 193	U302	Others	
Breeding flocks	1	0	0	0	1
Broiler production flocks	3	0	0	1	4
Egg layer flocks	1	0	0	0	1

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

Phage Types Incidents (Isolations)	1999	2000	2001*	2002	2003
1	- ( -)	- ( -)	- ( -)	- ( -)	1 ( 1)
4	28 ( 40)	4 ( 6)	4 ( 4)	5 ( 5)	20 ( 32)
6	6 ( 9)	7 ( 17)	1 ( 1)	3 ( 7)	7 ( 7)
6a	1 ( 1)	- ( -)	- ( -)	- ( -)	5 ( 5)
7	3 ( 3)	- ( -)	- ( -)	- ( -)	1 ( 1)
7a	- ( -)	- ( -)	1 ( 1)	- ( -)	- ( -)
8	- ( -)	- ( -)	- ( -)	1 ( 1)	- ( -)
9	1 ( 1)	- ( -)	- ( -)	- ( -)	- ( -)
9b	2 ( 2)	- ( -)	- ( -)	- ( -)	- ( -)
12	- ( -)	- ( -)	- ( -)	- ( -)	1 ( 1)
29	- ( 1)	- ( -)	- ( -)	- ( -)	- ( -)
30	1 ( 1)	- ( -)	- ( -)	- ( -)	- ( -)
RDNC	- ( -)	- ( -)	- ( -)	1 ( 1)	- ( -)
NOPT	- ( -)	- ( -)	- ( -)	- ( -)	1 ( 1)
UNTY	2 ( 2)	- ( -)	- ( -)	1 ( 1)	- ( -)
<b>TOTAL</b>	<b>44 ( 60)</b>	<b>11 ( 23)</b>	<b>7 ( 7)</b>	<b>11 ( 15)</b>	<b>36 ( 48)</b>

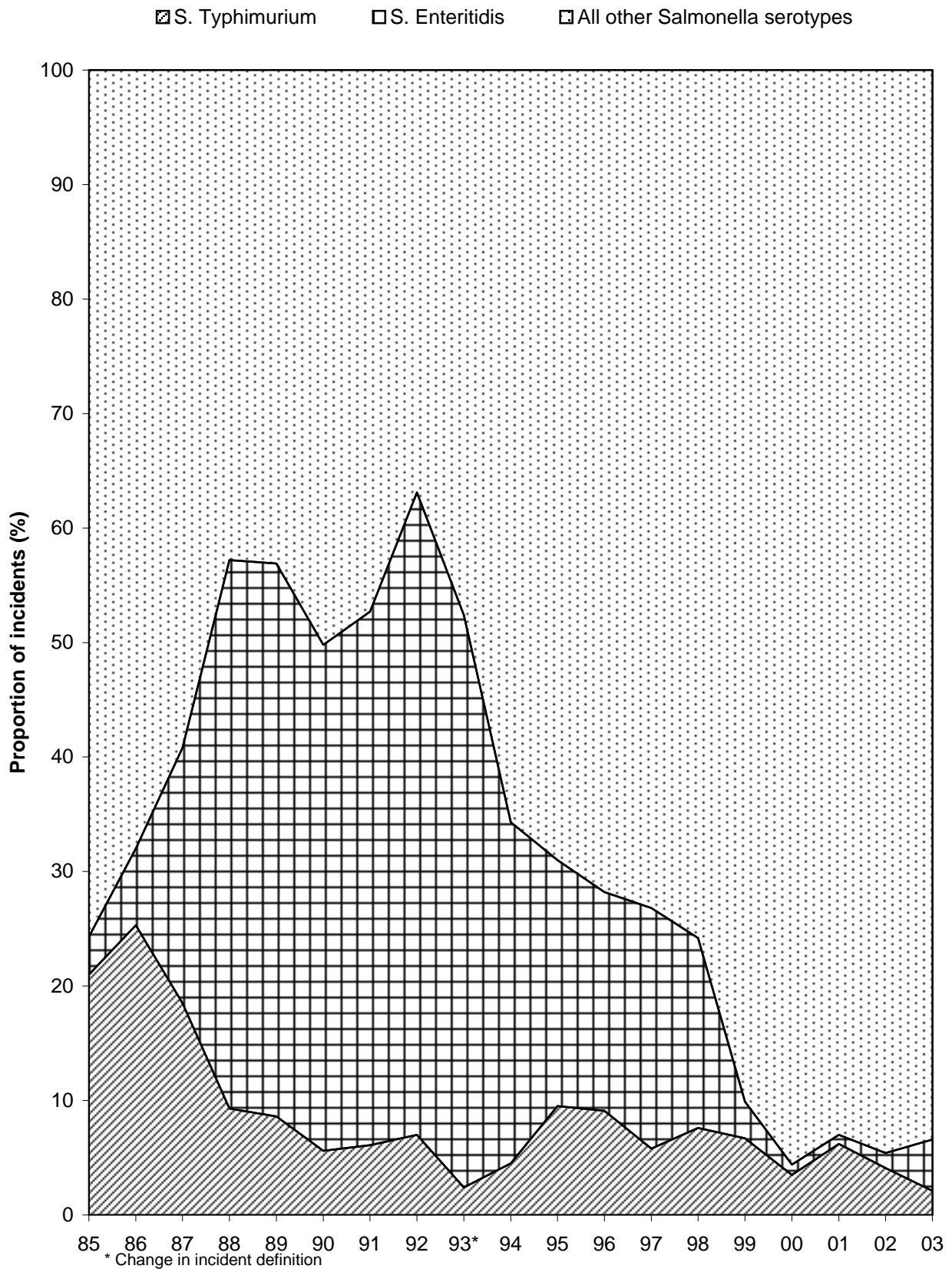
\* 2001 data may not be comparable due to impact of FMD epidemic

**Fig 32: Incidents of *Salmonella* Enteritidis phage types in chickens (1999 - 2003)**



\* 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 - 2003)**



**Table 46: Incidents of *S. Enteritidis* phage types in chickens in 2003 by flock type**

	Number of incidents by phage type			Total
	PT 4	PT 6	Others	
Breeding flocks	0	1	1	2
Broiler production flocks	2	2	0	4
Egg layer flocks	14	3	6	23

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

Phage Types Incidents (Isolations)	1999	2000	2001*	2002	2003
2	2 ( 3)	1 ( 1)	1 ( 1)	1 ( 1)	- ( -)
5	7 ( 7)	13 ( 15)	- ( -)	- ( -)	- ( -)
9	- ( -)	- ( -)	- ( -)	- ( -)	2 ( 2)
10	1 ( 1)	1 ( 1)	1 ( 1)	1 ( 1)	1 ( 2)
11	- ( -)	1 ( 1)	- ( -)	- ( -)	- ( -)
14	- ( -)	1 ( 1)	- ( -)	1 ( 1)	- ( -)
17	- ( -)	1 ( 1)	- ( -)	- ( -)	- ( -)
22	16 ( 16)	7 ( 7)	1 ( 1)	3 ( 3)	- ( -)
23	1 ( 1)	- ( -)	- ( -)	- ( -)	- ( -)
41	2 ( 8)	10 ( 22)	3 ( 5)	- ( -)	- ( -)
50	- ( -)	1 ( 1)	- ( -)	- ( -)	- ( -)
58a	- ( -)	- ( -)	- ( -)	- ( -)	3 ( 3)
RDNC	- ( -)	- ( -)	- ( -)	6 ( 6)	- ( -)
NOPT	6 ( 6)	3 ( 3)	- ( -)	5 ( 5)	- ( -)
<b>TOTAL</b>	<b>35 ( 42)</b>	<b>39 ( 53)</b>	<b>6 ( 8)</b>	<b>17 ( 17)</b>	<b>6 ( 7)</b>

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

Phage Types Incidents (Isolations)	1999	2000	2001*	2002	2003
1	- ( -)	2 ( 2)	- ( -)	- ( -)	1 ( 1)
7	- ( -)	- ( -)	1 ( 1)	- ( -)	- ( -)
15	- ( -)	- ( -)	- ( -)	- ( -)	1 ( 1)
NOPT	6 ( 6)	- ( -)	- ( -)	1 ( 1)	- ( -)
<b>TOTAL</b>	<b>6 ( 6)</b>	<b>2 ( 2)</b>	<b>1 ( 1)</b>	<b>1 ( 1)</b>	<b>2 ( 2)</b>

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

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

Phage Types Incidents (Isolations)	1999	2000	2001*	2002	2003
1	- ( -)	1 ( 1)	1 ( 1)	2 ( 2)	1 ( 1)
1a	- ( -)	14 ( 14)	24 ( 24)	6 ( 6)	4 ( 4)
3	- ( -)	1 ( 1)	1 ( 1)	1 ( 1)	- ( -)
6	- ( -)	1 ( 1)	4 ( 4)	9 ( 9)	6 ( 8)
14	- ( -)	- ( -)	1 ( 1)	- ( -)	1 ( 1)
23	- ( -)	- ( -)	1 ( 1)	- ( -)	- ( -)
49	1 ( 1)	- ( -)	- ( -)	- ( -)	- ( -)
RDNC	- ( -)	1 ( 1)	2 ( 2)	1 ( 1)	- ( -)
NOPT	71 ( 82)	55 ( 57)	23 ( 23)	12 ( 12)	- ( -)
Untyped	1 ( 1)	1 ( 1)	- ( -)	- ( -)	- ( -)
<b>TOTAL</b>	<b>73 ( 84)</b>	<b>74 ( 76)</b>	<b>57 ( 57)</b>	<b>31 ( 31)</b>	<b>12 ( 14)</b>

**Table 50: S. Virchow in chickens on all premises**

Phage Types Incidents (Isolations)	1999	2000	2001*	2002	2003
2	2 ( 2)	6 ( 6)	8 ( 8)	22 ( 22)	50 ( 53)
4	- ( -)	1 ( 2)	3 ( 3)	9 ( 9)	16 ( 17)
19	1 ( 3)	- ( -)	- ( -)	- ( -)	- ( -)
26	3 ( 4)	4 ( 5)	5 ( 6)	- ( -)	4 ( 4)
30	- ( -)	- ( -)	- ( -)	- ( -)	- ( -)
31	- ( -)	- ( -)	1 ( 1)	- ( -)	- ( -)
35	- ( -)	6 ( 7)	2 ( 2)	- ( -)	1 ( 1)
37	1 ( 1)	- ( -)	1 ( 1)	- ( -)	- ( -)
47	- ( -)	- ( -)	- ( -)	- ( -)	- ( -)
57	- ( -)	- ( -)	- ( -)	- ( -)	1 ( 1)
RDNC	- ( -)	- ( -)	1 ( 1)	- ( -)	1 ( 1)
NOPT	22 ( 26)	13 ( 13)	2 ( 2)	16 ( 17)	2 ( 2)
<b>TOTAL</b>	<b>29 ( 36)</b>	<b>30 ( 33)</b>	<b>23 ( 24)</b>	<b>47 ( 48)</b>	<b>75 ( 79)</b>

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

**Table 51: *Salmonella* in turkeys on all premises**

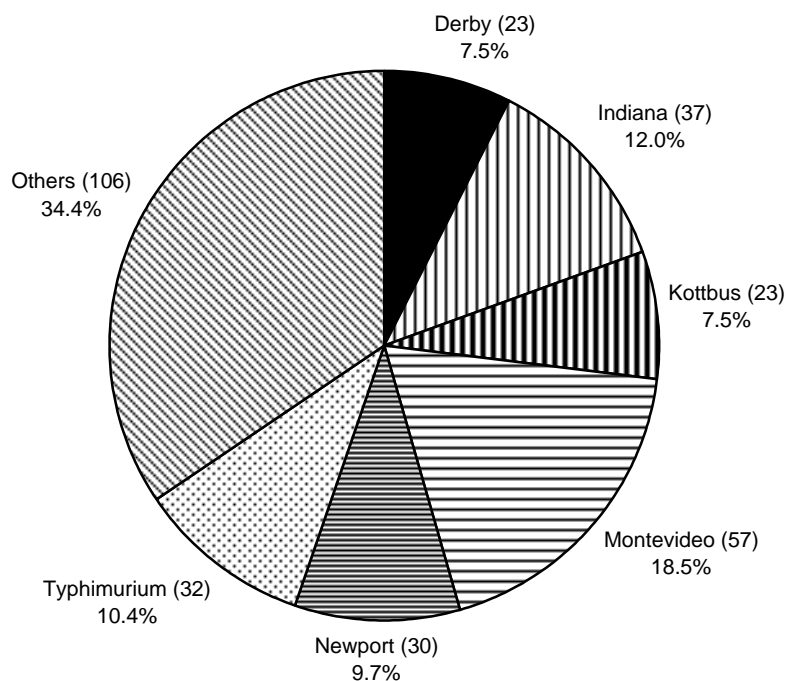
<i>Salmonella</i> Incidents (Isolations)	1999	2000	2001*	2002	2003
ENTERICA ENTERICA					
Agama	3 ( 10)	2 ( 3)	1 ( 3)	- ( -)	- ( -)
Agona	7 ( 12)	30 ( 38)	46 ( 58)	9 ( 10)	21 ( 22)
Ajiobo	1 ( 1)	- ( -)	- ( -)	- ( -)	- ( -)
Anatum	- ( -)	- ( -)	- ( -)	2 ( 2)	- ( -)
Binza	8 ( 11)	15 ( 24)	11 ( 13)	2 ( 2)	- ( -)
Braenderup	- ( -)	2 ( 2)	- ( -)	- ( -)	- ( -)
Bredeney	4 ( 6)	1 ( 1)	- ( -)	1 ( 2)	6 ( 6)
Champaign	- ( -)	1 ( 1)	- ( -)	- ( -)	- ( -)
Corvallis	- ( -)	- ( -)	- ( -)	- ( -)	3 ( 3)
Derby	39 ( 56)	39 ( 69)	36 ( 50)	18 ( 22)	23 ( 41)
Dublin	- ( -)	1 ( 1)	- ( -)	- ( -)	- ( -)
Enteritidis	5 ( 6)	- ( -)	1 ( 1)	- ( -)	- ( -)
Fischerkietz	2 ( 2)	17 ( 21)	2 ( 3)	1 ( 1)	- ( -)
Goldcoast	- ( -)	2 ( 8)	2 ( 4)	- ( -)	1 ( 1)
Hadar	2 ( 2)	7 ( 7)	1 ( 1)	4 ( 4)	12 ( 14)
Hato	- ( -)	- ( -)	1 ( 1)	- ( -)	- ( -)
Heidelberg	5 ( 6)	8 ( 11)	- ( -)	- ( -)	- ( -)
Indiana	11 ( 13)	9 ( 12)	20 ( 22)	9 ( 11)	37 ( 39)
Infantis	- ( -)	- ( -)	- ( -)	- ( -)	1 ( 1)
Kedougou	1 ( 1)	4 ( 4)	4 ( 5)	- ( -)	6 ( 6)
Kentucky	3 ( 4)	1 ( 1)	- ( -)	- ( -)	- ( -)
Kottbus	6 ( 9)	10 ( 10)	15 ( 16)	5 ( 5)	23 ( 31)
Larochelle	- ( -)	5 ( 6)	- ( -)	- ( -)	1 ( 1)
Manhattan	- ( -)	- ( -)	- ( -)	- ( -)	1 ( 1)
Mbandaka	- ( -)	2 ( 2)	- ( -)	1 ( 1)	- ( -)
Meleagridis	- ( -)	- ( -)	- ( -)	1 ( 1)	1 ( 1)
Menston	- ( -)	- ( -)	- ( -)	- ( -)	1 ( 1)
Montevideo	2 ( 2)	14 ( 20)	32 ( 36)	14 ( 16)	57 ( 65)
Muenster	4 ( 4)	- ( -)	- ( -)	- ( -)	- ( -)
Newport	30 ( 39)	21 ( 28)	15 ( 16)	22 ( 22)	30 ( 33)
Ohio	1 ( 1)	- ( -)	- ( -)	- ( -)	- ( -)
Orion	3 ( 3)	1 ( 1)	- ( -)	- ( -)	- ( -)
Poona	- ( -)	1 ( 1)	- ( -)	- ( -)	- ( -)

**Table 51: *Salmonella* in turkeys on all premises**

<i>Salmonella</i> Incidents (Isolations)	1999		2000		2001*		2002		2003	
ENTERICA ENTERICA										
Saint Paul	-	( - )	2	( 2 )	-	( - )	2	( 2 )	-	( - )
Schwarzengrund	-	( - )	5	( 6 )	3	( 4 )	1	( 2 )	2	( 2 )
Senftenberg	17	( 26 )	12	( 15 )	7	( 10 )	2	( 2 )	-	( - )
Stanley	-	( - )	-	( - )	-	( - )	1	( 1 )	-	( - )
Taksony	-	( - )	-	( - )	-	( - )	1	( 1 )	-	( - )
Teddington	-	( - )	-	( - )	1	( 1 )	-	( - )	-	( - )
Tennessee	1	( 1 )	-	( - )	-	( - )	-	( - )	-	( - )
Typhimurium	53	( 83 )	30	( 47 )	35	( 40 )	23	( 34 )	32	( 39 )
Virchow	-	( - )	-	( - )	-	( - )	-	( - )	13	( 13 )
UNSPECIFIED										
structure only	-	( - )	8	( 13 )	1	( 3 )	1	( 1 )	29	( 29 )
rough strain	1	( 1 )	3	( 4 )	2	( 2 )	1	( 1 )	8	( 8 )
Untyped	1	( 1 )	-	( - )	1	( 1 )	1	( 1 )	-	( - )
<b>TOTAL</b>	<b>210</b>	<b>( 300 )</b>	<b>253</b>	<b>( 358 )</b>	<b>237</b>	<b>( 290 )</b>	<b>123</b>	<b>( 145 )</b>	<b>308</b>	<b>( 357 )</b>

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

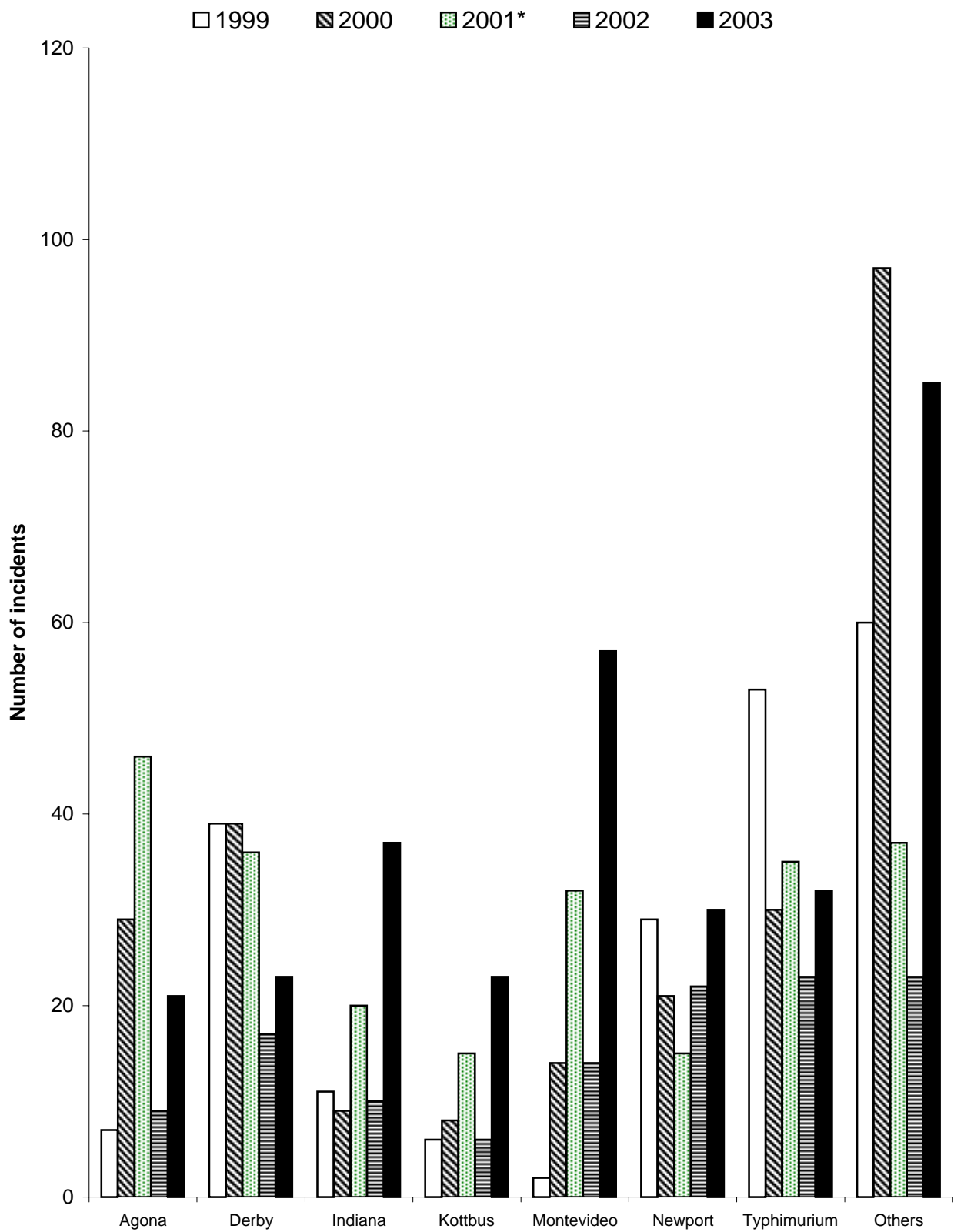
**Fig 34: Incidents of *Salmonella* serotypes in turkeys in 2003**



**Table 52: Incidents of the top 5 *Salmonella* serotypes in turkeys in 2003 as a % of all incidents compared to previous years**

Serotype	1999	2000	2001	2002	2003
S. Montevideo %	1.0	5.5	13.5	11.4	18.5
S. Indiana %	5.2	3.6	8.4	7.3	12.0
S. Typhimurium %	25.2	11.9	14.8	18.7	10.4
S. Newport %	14.3	8.3	6.3	17.9	9.7
S. Derby %	18.6	15.4	15.2	14.6	7.5
S. Kottbus %	2.9	4.0	6.3	4.1	7.5
Total no. incidents	210	253	237	123	308

**Fig 35: Incidents of *Salmonella* serotypes in turkeys (1999 - 2003)**



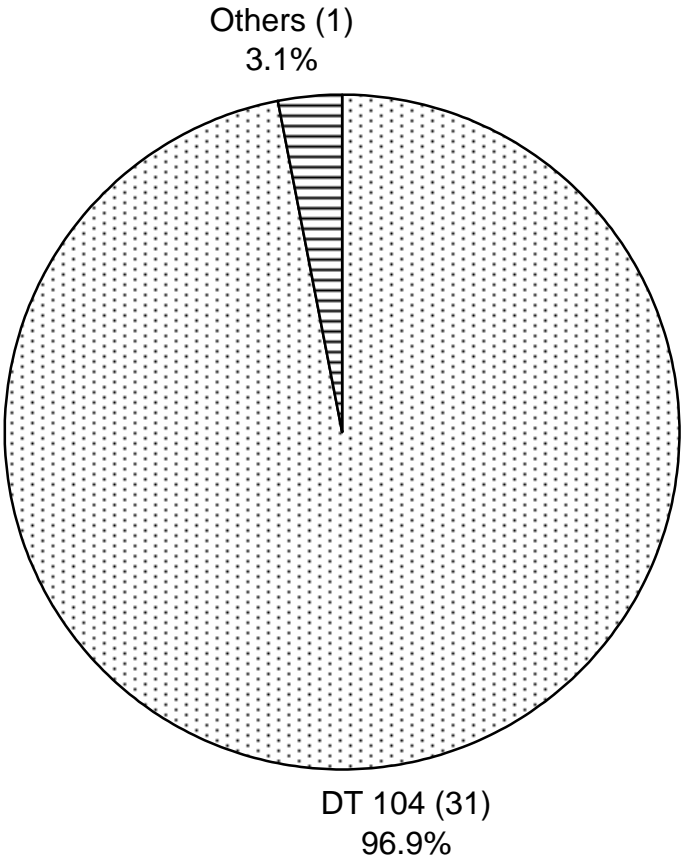
\* 2001 data may not be comparable due to uncertain impact of FMD epidemic

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

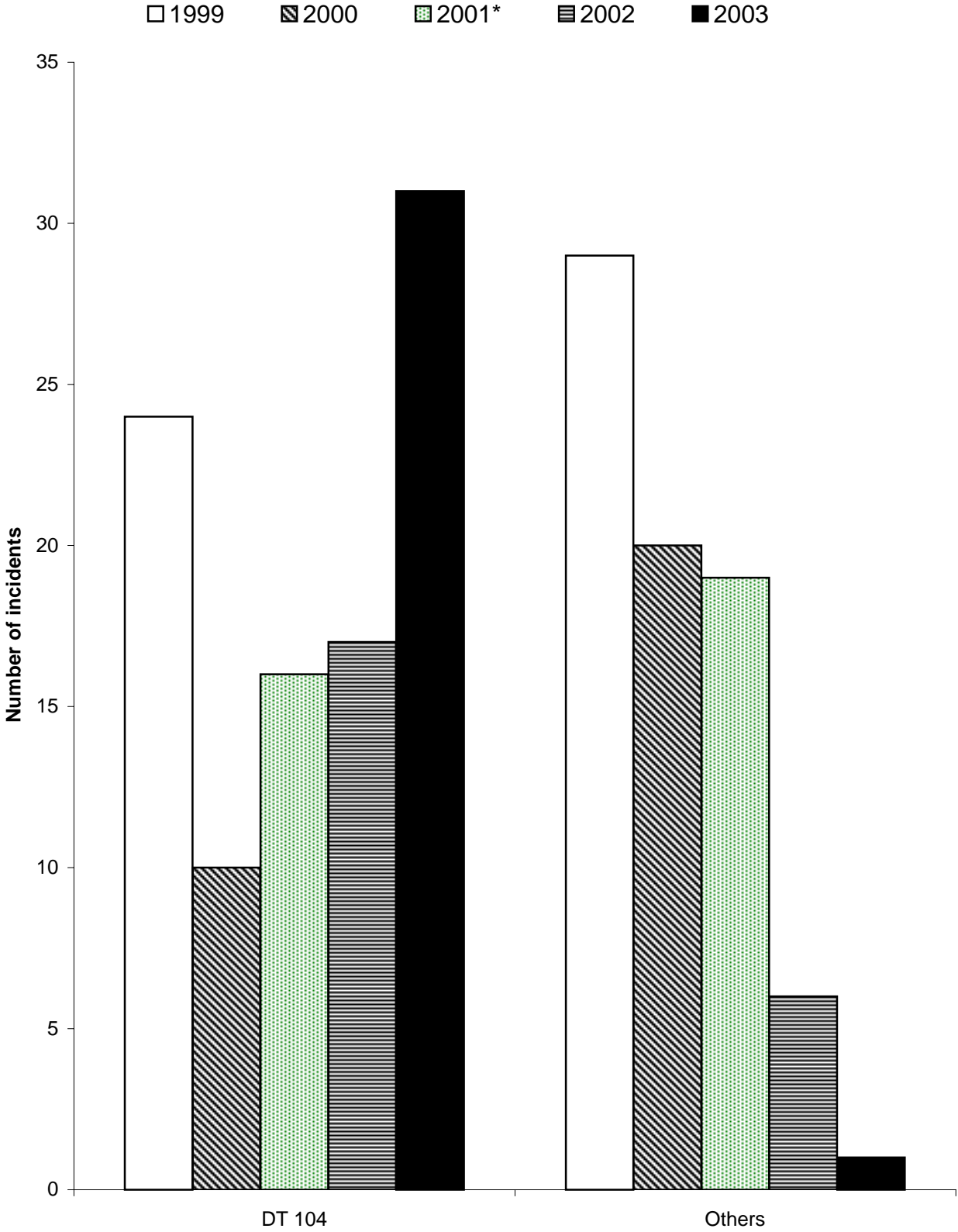
Definitive Types Incidents (Isolations)	1999	2000	2001*	2002	2003
2	- ( -)	- ( -)	1 ( 1)	- ( -)	- ( -)
30	- ( -)	1 ( 1)	1 ( 1)	- ( -)	- ( -)
40	- ( -)	1 ( 3)	- ( -)	- ( -)	- ( -)
56	- ( -)	- ( -)	1 ( 1)	- ( -)	- ( -)
99	- ( -)	- ( -)	1 ( 1)	- ( -)	- ( -)
104	24 ( 33)	10 ( 13)	16 ( 18)	17 ( 28)	31 ( 38)
104b	27 ( 48)	11 ( 21)	7 ( 7)	- ( -)	- ( -)
120	- ( -)	- ( -)	- ( -)	1 ( 1)	- ( -)
193	- ( -)	2 ( 4)	1 ( 1)	- ( -)	- ( -)
U288	- ( -)	- ( -)	- ( -)	- ( -)	1 ( 1)
U302	- ( -)	- ( -)	6 ( 9)	1 ( 1)	- ( -)
U308a	- ( -)	- ( -)	- ( -)	1 ( 1)	- ( -)
NOPT	- ( -)	- ( -)	- ( -)	2 ( 2)	- ( -)
UNTY	2 ( 2)	5 ( 5)	1 ( 1)	1 ( 1)	- ( -)
TOTAL	53 ( 83)	30 ( 47)	35 ( 40)	23 ( 34)	32 ( 39)

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

**Fig 36: Incidents of *Salmonella* Typhimurium definitive types in turkeys in 2003**

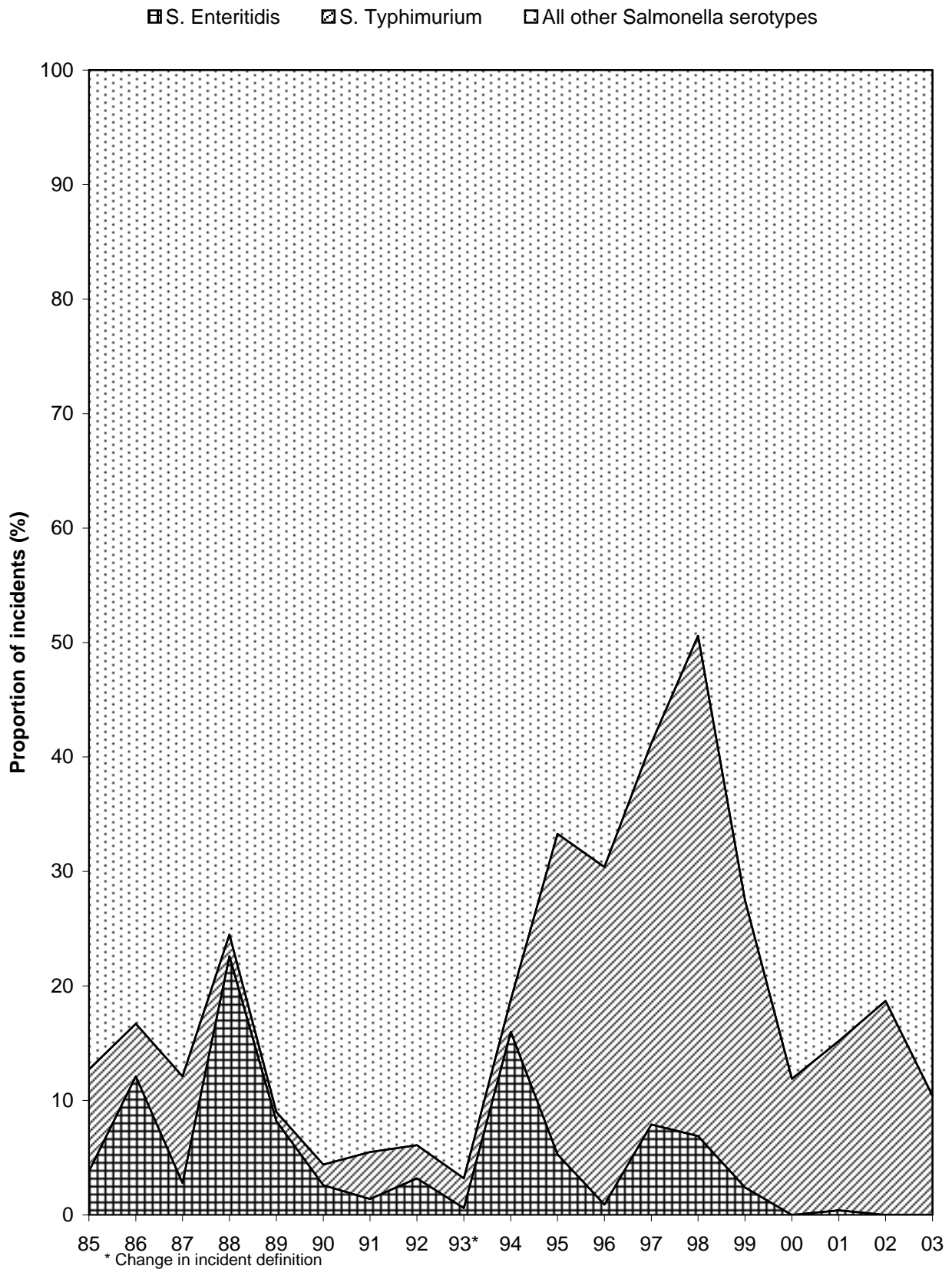


**Fig 37: Incidents of *Salmonella* Typhimurium definitive types in turkeys (1999 - 2003)**



\* 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 - 2003)**



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

Phage Types Incidents (Isolations)	1999	2000	2001*	2002	2003
1	1 ( 2)	- ( -)	- ( -)	- ( -)	- ( -)
4	2 ( 2)	- ( -)	1 ( 1)	- ( -)	- ( -)
9b	1 ( 1)	- ( -)	- ( -)	- ( -)	- ( -)
UNTY	1 ( 1)	- ( -)	- ( -)	- ( -)	- ( -)
TOTAL	5 ( 6)	- ( -)	1 ( 1)	- ( -)	- ( -)

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

Phage Types Incidents (Isolations)	1999	2000	2001*	2002	2003
2	- ( -)	3 ( 3)	- ( -)	1 ( 1)	1 ( 1)
4	- ( -)	1 ( 1)	- ( -)	- ( -)	- ( -)
10	- ( -)	1 ( 1)	1 ( 1)	1 ( 1)	10 ( 12)
16	1 ( 1)	- ( -)	- ( -)	- ( -)	- ( -)
18	- ( -)	- ( -)	- ( -)	- ( -)	1 ( 1)
NOPT	1 ( 1)	2 ( 2)	- ( -)	2 ( 2)	- ( -)
TOTAL	2 ( 2)	7 ( 7)	1 ( 1)	4 ( 4)	12 ( 14)

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

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

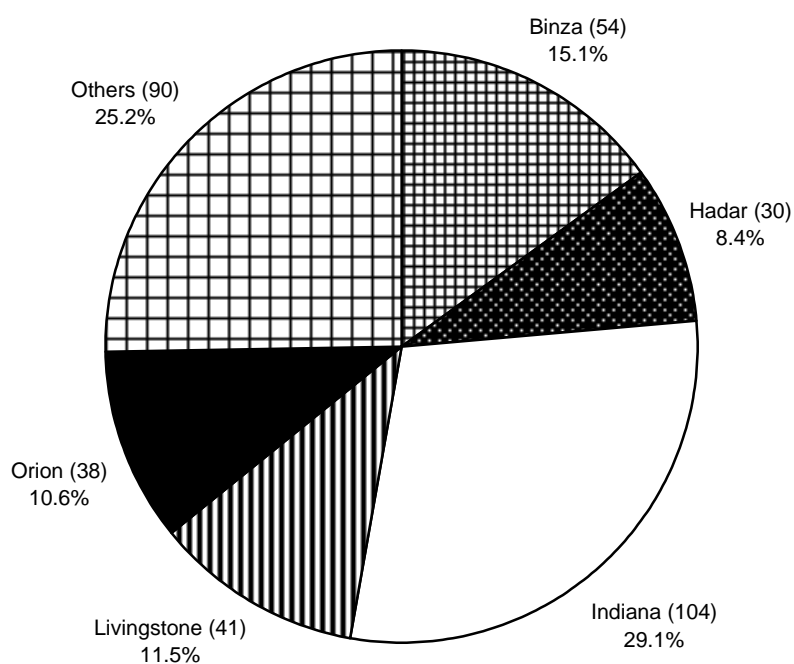
<i>Salmonella</i> Incidents (Isolations)	1999	2000	2001*	2002	2003
<b>ENTERICA ENTERICA</b>					
Agona	1 ( 1)	- ( -)	- ( -)	1 ( 1)	3 ( 3)
Anatum	- ( -)	- ( -)	- ( -)	1 ( 1)	- ( -)
Binza	1 ( 1)	- ( -)	3 ( 3)	30 ( 55)	54 ( 73)
Bredeney	- ( -)	- ( -)	- ( -)	1 ( 1)	- ( -)
Derby	1 ( 1)	- ( -)	- ( -)	1 ( 1)	2 ( 2)
Enteritidis	22 ( 29)	17 ( 18)	13 ( 14)	11 ( 14)	6 ( 6)
Give	- ( -)	- ( -)	- ( -)	13 ( 13)	21 ( 23)
Goldcoast	- ( -)	- ( -)	- ( -)	3 ( 3)	2 ( 2)
Hadar	6 ( 6)	- ( -)	1 ( 1)	27 ( 35)	30 ( 33)
Havana	- ( -)	- ( -)	- ( -)	2 ( 4)	5 ( 6)
Indiana	3 ( 3)	3 ( 3)	4 ( 4)	62 ( 89)	104 ( 133)
Kedougou	- ( -)	- ( -)	- ( -)	4 ( 4)	20 ( 22)
Kottbus	4 ( 4)	3 ( 3)	1 ( 2)	3 ( 3)	3 ( 4)
Livingstone	1 ( 1)	2 ( 2)	- ( -)	15 ( 20)	41 ( 47)
Muenchen	- ( -)	- ( -)	- ( -)	1 ( 1)	- ( -)
Newport	2 ( 2)	- ( -)	- ( -)	- ( -)	- ( -)
Orion	2 ( 2)	1 ( 1)	- ( -)	31 ( 52)	38 ( 40)
Paratyphi B var java	- ( -)	1 ( 1)	- ( -)	- ( -)	- ( -)
Saint Paul	1 ( 1)	2 ( 2)	4 ( 4)	3 ( 3)	2 ( 2)
Senftenberg	- ( -)	- ( -)	- ( -)	8 ( 8)	- ( -)
Typhimurium	7 ( 11)	11 ( 11)	10 ( 11)	11 ( 13)	13 ( 13)
Virchow	- ( -)	1 ( 1)	- ( -)	- ( -)	- ( -)
<b>ENTERICA DIARIZONAE</b>					
61:::1,5,7	1 ( 1)	- ( -)	- ( -)	- ( -)	- ( -)
<b>UNSPECIFIED</b>					
structure only	- ( -)	1 ( 1)	- ( -)	5 ( 6)	11 ( 11)
rough strain	- ( -)	- ( -)	1 ( 1)	2 ( 2)	1 ( 1)

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

<i>Salmonella</i> Incidents (Isolations)	1999	2000	2001*	2002	2003
untyped	- ( -)	- ( -)	- ( -)	1 ( 1)	- ( -)
untypable	- ( -)	- ( -)	- ( -)	- ( -)	1 ( 1)
TOTAL	52 ( 63)	42 ( 43)	37 ( 40)	236 ( 330)	357 ( 422)

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

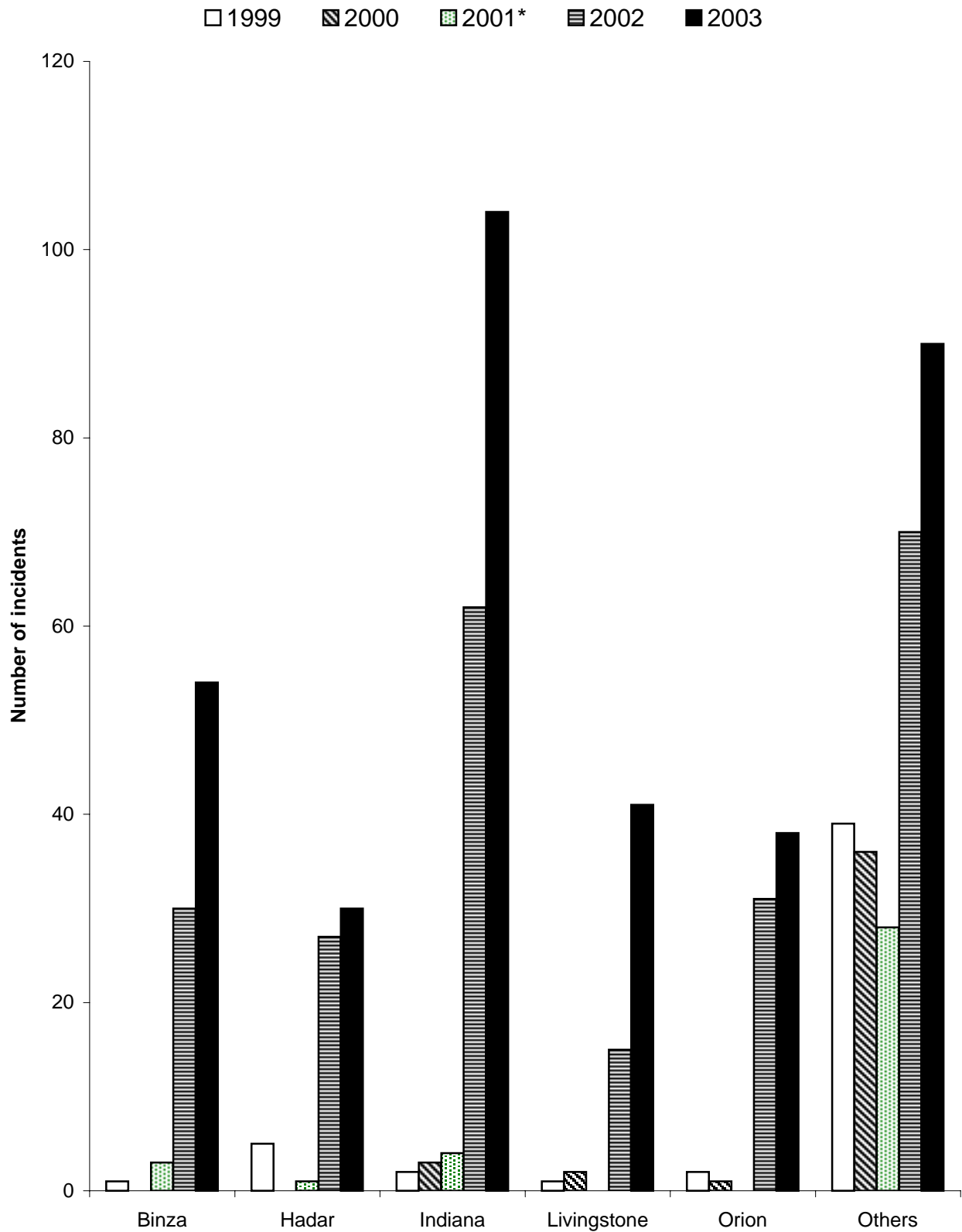
**Fig 39: Incidents of *Salmonella* serotypes in ducks and geese in 2003**



**Table 57: Incidents of the top 5 *Salmonella* serotypes in ducks & geese in 2002 as a % of all incidents compared to previous years**

Serotype	1999	2000	2001	2002	2003
S. Indiana %	5.8	7.1	10.8	26.3	29.1
S. Binza %	1.9	0	8.1	12.7	15.1
S. Livingstone %	1.9	4.8	0	6.4	11.5
S. Orion %	3.8	2.4	0	13.1	10.6
S. Hadar %	11.5	0	2.7	11.4	8.4
Total no. incidents	52	42	37	236	357

**Fig 40: Incidents of *Salmonella* serotypes in ducks and geese (1999 - 2003)**



\* 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)	1999	2000	2001*	2002	2003
1	- ( -)	- ( -)	- ( -)	- ( -)	- ( -)
8	5 ( 7)	6 ( 6)	6 ( 7)	8 ( 10)	10 ( 10)
9	- ( -)	- ( -)	1 ( 1)	- ( -)	- ( -)
30	1 ( 2)	2 ( 2)	1 ( 1)	2 ( 2)	3 ( 3)
40	- ( -)	1 ( 1)	- ( -)	- ( -)	- ( -)
104	1 ( 2)	1 ( 1)	- ( -)	- ( -)	- ( -)
104b	- ( -)	1 ( 1)	- ( -)	- ( -)	- ( -)
125	- ( -)	- ( -)	1 ( 1)	- ( -)	- ( -)
195	- ( -)	- ( -)	- ( -)	1 ( 1)	- ( -)
U310	- ( -)	- ( -)	1 ( 1)	- ( -)	- ( -)
TOTAL	7 ( 11)	11 ( 11)	10 ( 11)	11 ( 13)	13 ( 13)

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

Phage Types Incidents (Isolations)	1999	2000	2001*	2002	2003
4	7 ( 7)	7 ( 7)	2 ( 2)	- ( -)	- ( -)
5a	1 ( 2)	- ( -)	- ( -)	- ( -)	- ( -)
8	3 ( 6)	3 ( 3)	- ( -)	- ( -)	- ( -)
9a	1 ( 1)	2 ( 2)	- ( -)	- ( -)	- ( -)
9b	8 ( 11)	3 ( 3)	9 ( 10)	8 ( 11)	6 ( 6)
13a	- ( -)	- ( -)	- ( -)	1 ( 1)	- ( -)
21	- ( -)	1 ( 2)	- ( -)	- ( -)	- ( -)
RDNC	1 ( 1)	- ( -)	- ( -)	- ( -)	- ( -)
UNTY	1 ( 1)	1 ( 1)	2 ( 2)	2 ( 2)	- ( -)
TOTAL	22 ( 29)	17 ( 18)	13 ( 14)	11 ( 14)	6 ( 6)

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

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

Phage Types Incidents (Isolations)	1999	2000	2001*	2002	2003
2	2 ( 2)	- ( -)	- ( -)	10 ( 12)	3 ( 3)
4	- ( -)	- ( -)	1 ( 1)	1 ( 1)	- ( -)
5	- ( -)	- ( -)	- ( -)	- ( -)	1 ( 1)
10	- ( -)	- ( -)	- ( -)	1 ( 1)	3 ( 3)
11	- ( -)	- ( -)	- ( -)	2 ( 2)	7 ( 10)
16	2 ( 2)	- ( -)	- ( -)	- ( -)	- ( -)
22	- ( -)	- ( -)	- ( -)	5 ( 11)	12 ( 12)
46	- ( -)	- ( -)	- ( -)	1 ( 1)	- ( -)
51	- ( -)	- ( -)	- ( -)	- ( -)	1 ( 1)
58a	- ( -)	- ( -)	- ( -)	- ( -)	1 ( 1)
RDNC	1 ( 1)	- ( -)	- ( -)	3 ( 3)	2 ( 2)
NOPT	1 ( 1)	- ( -)	- ( -)	4 ( 4)	- ( -)
TOTAL	6 ( 6)	- ( -)	1 ( 1)	27 ( 35)	30 ( 33)

**Table 61: S. Virchow in ducks & geese on all premises**

Phage Types Incidents (Isolations)	1999	2000	2001*	2002	2003
26	- ( -)	1 ( 1)	- ( -)	- ( -)	- ( -)
TOTAL	- ( -)	1 ( 1)	- ( -)	- ( -)	- ( -)

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

**Table 62: *Salmonella* in game birds on all premises**

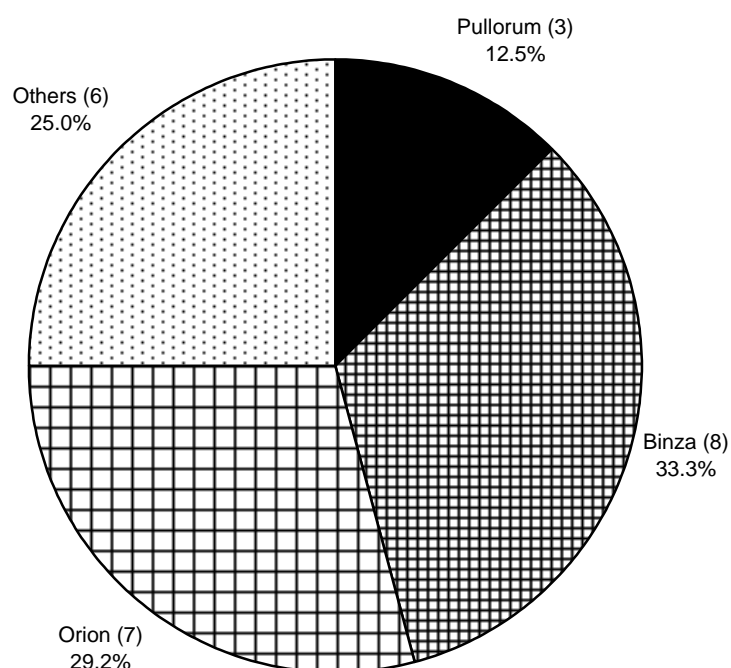
<i>Salmonella</i> Incidents (Isolations)	1999		2000		2001*		2002		2003	
ENTERICA ENTERICA										
Agona	4	( 4)	4	( 4)	1	( 1)	-	( -)	-	( -)
Ajiobo	-	( -)	2	( 2)	-	( -)	-	( -)	-	( -)
Binza	44	( 60)	26	( 32)	22	( 24)	14	( 20)	8	( 8)
Brandenburg	1	( 1)	-	( -)	-	( -)	-	( -)	-	( -)
Derby	-	( -)	2	( 2)	-	( -)	1	( 1)	-	( -)
Dublin	-	( -)	1	( 1)	-	( -)	1	( 1)	-	( -)
Enteritidis	7	( 7)	4	( 5)	1	( 1)	1	( 1)	2	( 2)
Goldcoast	-	( -)	1	( 1)	-	( -)	-	( -)	-	( -)
Hadar	1	( 1)	-	( -)	-	( -)	-	( -)	1	( 1)
Heidelberg	1	( 1)	-	( -)	-	( -)	-	( -)	-	( -)
Indiana	1	( 1)	3	( 3)	1	( 1)	1	( 1)	-	( -)
Infantis	-	( -)	1	( 1)	1	( 1)	-	( -)	-	( -)
Kedougou	2	( 4)	-	( -)	-	( -)	-	( -)	-	( -)
Kottbus	1	( 1)	1	( 1)	-	( -)	-	( -)	1	( 1)
Mbandaka	1	( 2)	1	( 1)	1	( 1)	-	( -)	-	( -)
Montevideo	-	( -)	-	( -)	1	( 1)	-	( -)	-	( -)
Newport	1	( 1)	-	( -)	-	( -)	1	( 1)	1	( 1)
Orion	10	( 10)	6	( 6)	11	( 14)	7	( 9)	7	( 7)
Pullorum	7	( 7)	1	( 1)	3	( 3)	3	( 3)	3	( 3)
Saint Paul	2	( 2)	1	( 1)	1	( 1)	-	( -)	-	( -)
Schwarzengrund	-	( -)	1	( 1)	-	( -)	-	( -)	-	( -)
Senftenberg	1	( 1)	1	( 1)	1	( 1)	-	( -)	-	( -)
Stanley	-	( -)	-	( -)	-	( -)	1	( 1)	-	( -)
Typhimurium	16	( 19)	16	( 18)	9	( 9)	3	( 3)	1	( 1)
Virchow	1	( 1)	-	( -)	-	( -)	-	( -)	-	( -)
ENTERICA HOUTENAE										
43:z4z23	-	( -)	-	( -)	1	( 1)	-	( -)	-	( -)
UNSPECIFIED										
structure only	6	( 6)	2	( 2)	1	( 1)	3	( 5)	-	( -)

**Table 62: *Salmonella* in game birds on all premises**

<i>Salmonella</i> Incidents (Isolations)	1999	2000	2001*	2002	2003
rough strain	- ( -)	- ( -)	1 ( 1)	- ( -)	- ( -)
Untyped	1 ( 1)	- ( -)	- ( -)	- ( -)	- ( -)
TOTAL	108 ( 130)	74 ( 83)	56 ( 61)	36 ( 46)	24 ( 24)

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

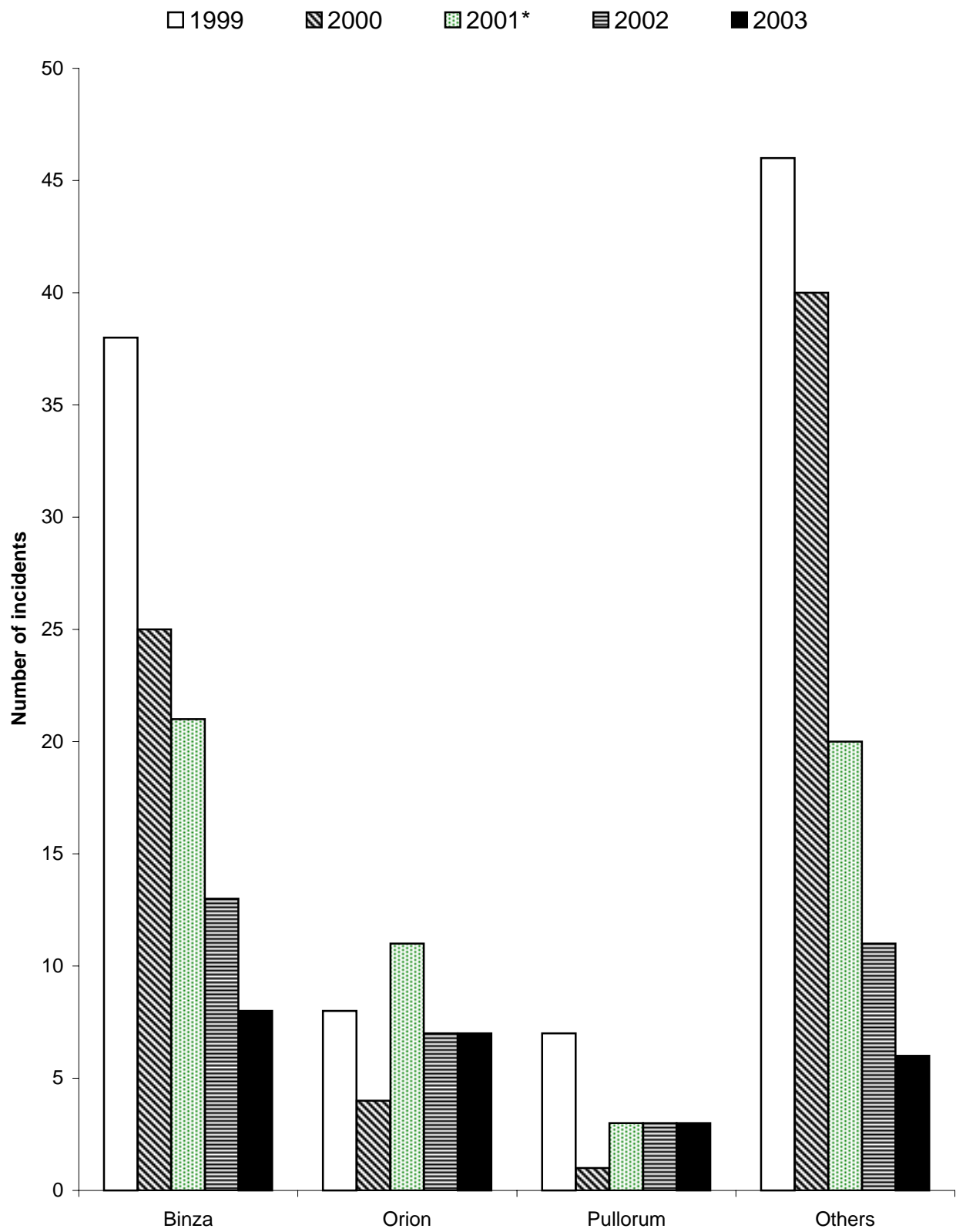
**Fig 41: Incidents of *Salmonella* serotypes in game birds in 2003**



**Table 63: Incidents of the top 4 *Salmonella* serotypes in game birds in 2002 as a % of all incidents compared to previous years**

Serotype	1999	2000	2001	2002	2003
S. Binza %	40.7	35.1	39.3	38.9	33.3
S. Orion %	9.3	8.1	19.6	19.4	29.2
S. Pullorum %	6.5	1.4	5.4	8.3	12.5
S. Enteritidis %	6.5	5.4	1.8	2.8	8.3
Total no. incidents	108	74	56	36	24

**Fig 42: Incidents of *Salmonella* serotypes in game birds (1999 - 2003)**



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

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

Definitive Types Incidents (Isolations)	1999	2000	2001*	2002	2003
2	1 ( 1)	- ( -)	- ( -)	- ( -)	- ( -)
8	2 ( 3)	2 ( 3)	3 ( 3)	- ( -)	- ( -)
40	1 ( 1)	1 ( 1)	- ( -)	- ( -)	- ( -)
56	- ( -)	- ( -)	- ( -)	1 ( 1)	- ( -)
86	- ( -)	1 ( 1)	- ( -)	- ( -)	- ( -)
99	2 ( 2)	- ( -)	- ( -)	- ( -)	- ( -)
104	2 ( 3)	8 ( 9)	2 ( 2)	1 ( 1)	- ( -)
104b	2 ( 2)	1 ( 1)	- ( -)	- ( -)	1 ( 1)
120	- ( -)	1 ( 1)	- ( -)	- ( -)	- ( -)
170	- ( -)	- ( -)	1 ( 1)	- ( -)	- ( -)
193	- ( -)	1 ( 1)	1 ( 1)	1 ( 1)	- ( -)
195	2 ( 3)	- ( -)	1 ( 1)	- ( -)	- ( -)
204c	1 ( 1)	- ( -)	- ( -)	- ( -)	- ( -)
208	- ( -)	- ( -)	1 ( 1)	- ( -)	- ( -)
RDNC	2 ( 2)	- ( -)	- ( -)	- ( -)	- ( -)
UNTY	1 ( 1)	1 ( 1)	- ( -)	- ( -)	- ( -)
<b>TOTAL</b>	<b>16 ( 19)</b>	<b>16 ( 18)</b>	<b>9 ( 9)</b>	<b>3 ( 3)</b>	<b>1 ( 1)</b>

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

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

Phage Types Incidents (Isolations)	1999	2000	2001*	2002	2003
4	5 ( 5)	- ( -)	1 ( 1)	- ( -)	- ( -)
5a	- ( -)	2 ( 2)	- ( -)	- ( -)	- ( -)
13a	2 ( 2)	1 ( 2)	- ( -)	1 ( 1)	2 ( 2)
UNTY	- ( -)	1 ( 1)	- ( -)	- ( -)	- ( -)
TOTAL	7 ( 7)	4 ( 5)	1 ( 1)	1 ( 1)	2 ( 2)

**Table 66: S. Pullorum in game birds on all premises**

Phage Types Incidents (Isolations)	1999	2000	2001*	2002	2002
1	1 ( 1)	- ( -)	- ( -)	- ( -)	- ( -)
7	- ( -)	- ( -)	- ( -)	- ( -)	3 ( 3)
11	- ( -)	- ( -)	- ( -)	1 ( 1)	- ( -)
NOPT	6 ( 6)	1 ( 1)	3 ( 3)	2 ( 2)	- ( -)
TOTAL	7 ( 7)	1 ( 1)	3 ( 3)	3 ( 3)	3 ( 3)

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