

Chapter 2.3

REPORTS OF *SALMONELLA* IN PIGS

The British pig industry continued to decline, with the June 2002 census reporting a total of approximately 5.2 million pigs compared to 5.5 million in June 2001 and 6 million in 2000. Pressures included low prices for pigs, pressures from imports and from the spread and persistence of post-weaning multi-systemic wasting syndrome (PMWS). During 2002 there were 4,368 clinical submissions to VLA's Regional Laboratories for investigation of disease on pig farms.

There were 146 incidents of clinical disease associated with *Salmonella* infection. Multiple serovars were isolated from an outdoor farm that was near to a sewage works and a landfill site. The farm had an active rodent population and was visited by large numbers of birds, including corvids, starlings and herring gulls. *Salmonella* Enteritidis PT8 was isolated from pneumonic pigs on this farm. A multi-resistant *Salmonella* Typhimurium DT193 was isolated from a farm where ill-thrift affected approximately 15% of weaners with a 50% case fatality rate but reportedly in the absence of PMWS. There were further incidents where *S. Typhimurium*, *S. Derby* or *S. Panama* infection was observed in pigs with evidence of PMWS.

During 2002, an industry-led control programme was launched. The Zoonoses Action Plan (ZAP) *Salmonella* monitoring programme is based upon detection of antibodies in a mix-ELISA system, using meat juice as a test substrate. It is anticipated that farms will be allocated a "ZAP" score in 2003 and will be expected to act if this is above a defined level.

The number of incidents and isolations of *Salmonella* reported from pigs is shown in Table 31. Table 32 gives the proportion of the five most frequently isolated serotypes in 2002 and of these serotypes in the preceding four years. *Salmonella* Typhimurium remains the most frequent isolate and was detected in 147 incidents (71%). *Salmonella* Derby was the second most frequent serotype (16 incidents), which also follows the pattern seen in previous years.

Four serotypes have not been isolated from pigs since 1997 and therefore have been dropped from Table 31. These were *S. Cambridge*, *S. Eimsbuettel*, *S. Idikan* and *S. Llandoff*. *S. Ajiobo* was isolated in one incident, the first time it has been identified through routine surveillance although a single isolate was identified in 2000 from samples taken for a research project.

Table 33 reports the definitive phage types of *Salmonella* Typhimurium that were isolated from pigs between 1998 and 2002. Three definitive types have not been isolated since 1997 and are not listed. These were DT4, DT167 and DT185. The most frequently isolated serotype was *Salmonella* Typhimurium DT193, as shown in Figure 25.

Table 31: *Salmonella* in pigs on all premises

<i>Salmonella</i> Incidents (Isolations)	1998		1999		2000		2001*		2002	
ENTERICA ENTERICA										
Agama	-	(-)	-	(-)	2	(2)	-	(-)	-	(-)
Agona	-	(-)	2	(2)	2	(2)	-	(-)	1	(1)
Ajiobo	-	(-)	-	(-)	-	(-)	-	(-)	1	(1)
Anatum	3	(3)	-	(-)	1	(4)	-	(-)	1	(1)
Bovis morbificans	1	(1)	1	(1)	-	(-)	1	(1)	1	(1)
Brandenburg	3	(3)	2	(2)	-	(-)	2	(2)	-	(-)
Bredeney	-	(-)	-	(-)	1	(1)	-	(-)	-	(-)
Carno	1	(1)	-	(-)	-	(-)	-	(-)	-	(-)
Cerro	-	(-)	-	(-)	1	(1)	-	(-)	-	(-)
Cholerae-suis	1	(1)	-	(-)	1	(1)	-	(-)	-	(-)
Cholerae-suis-vk	4	(5)	2	(2)	-	(-)	1	(1)	-	(-)
Derby	40	(41)	33	(44)	34	(44)	26	(27)	16	(16)
Dublin	-	(-)	2	(2)	-	(-)	1	(1)	2	(2)
Enteritidis	-	(-)	1	(1)	-	(-)	2	(2)	1	(1)
Give	2	(2)	-	(-)	-	(-)	-	(-)	-	(-)
Goldcoast	6	(6)	8	(11)	5	(5)	3	(3)	4	(4)
Hadar	-	(-)	1	(1)	-	(-)	-	(-)	-	(-)
Havana	-	(-)	1	(1)	-	(-)	-	(-)	-	(-)
Heidelberg	1	(1)	-	(-)	2	(2)	1	(1)	-	(-)
Indiana	1	(1)	-	(-)	1	(1)	-	(-)	-	(-)
Infantis	-	(-)	-	(-)	1	(1)	1	(1)	2	(2)
Kedougou	8	(8)	6	(6)	12	(12)	14	(14)	10	(11)
Kentucky	2	(3)	-	(-)	-	(-)	-	(-)	-	(-)
Kimuenza	1	(1)	-	(-)	-	(-)	-	(-)	1	(1)
Kissi	-	(-)	1	(1)	-	(-)	-	(-)	-	(-)
Lille	-	(-)	1	(1)	-	(-)	-	(-)	-	(-)
Livingstone	-	(-)	-	(-)	2	(2)	-	(-)	-	(-)
London	5	(5)	-	(-)	2	(2)	1	(1)	5	(5)
Manhattan	2	(2)	6	(8)	-	(-)	-	(-)	-	(-)
Mbandaka	4	(4)	1	(1)	-	(-)	1	(1)	1	(1)
Montevideo	1	(1)	-	(-)	-	(-)	-	(-)	-	(-)
Muenchen	-	(-)	-	(-)	1	(1)	-	(-)	-	(-)
Newington	3	(3)	-	(-)	-	(-)	-	(-)	-	(-)
Newport	-	(-)	1	(1)	2	(2)	3	(3)	-	(-)
Panama	8	(10)	4	(5)	3	(4)	1	(1)	2	(2)
Poona	-	(-)	1	(1)	-	(-)	-	(-)	-	(-)

Table 31: *Salmonella* in pigs on all premises

<i>Salmonella</i> Incidents (Isolations)	1998	1999	2000	2001*	2002
ENTERICA ENTERICA					
Reading	1 (1)	2 (3)	2 (2)	1 (1)	5 (5)
Schwarzengrund	1 (1)	- (-)	- (-)	- (-)	- (-)
Senftenberg	- (-)	- (-)	1 (1)	- (-)	- (-)
Stanley	- (-)	1 (1)	- (-)	- (-)	- (-)
Stanleyville	- (-)	1 (1)	- (-)	- (-)	- (-)
Taksony	- (-)	- (-)	- (-)	2 (2)	- (-)
Thompson	- (-)	- (-)	1 (1)	- (-)	- (-)
Typhimurium	161 (202)	189 (223)	248 (287)	134 (152)	147 (156)
Virchow	1 (1)	- (-)	- (-)	1 (1)	- (-)
ENTERICA DIARIZONAE					
unspecified "arizona" +	1 (1)	- (-)	- (-)	- (-)	- (-)
UNSPECIFIED					
structure only	6 (6)	8 (9)	2 (2)	5 (5)	5 (5)
rough strain	2 (2)	2 (2)	1 (1)	1 (1)	2 (2)
Untyped	2 (2)	- (-)	2 (2)	- (-)	- (-)
TOTAL	272 (318)	277 (330)	330 (383)	202 (221)	207 (217)

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

+ antigenic structure not stated

Fig 23: Incidents of *Salmonella* serotypes in pigs in 2002

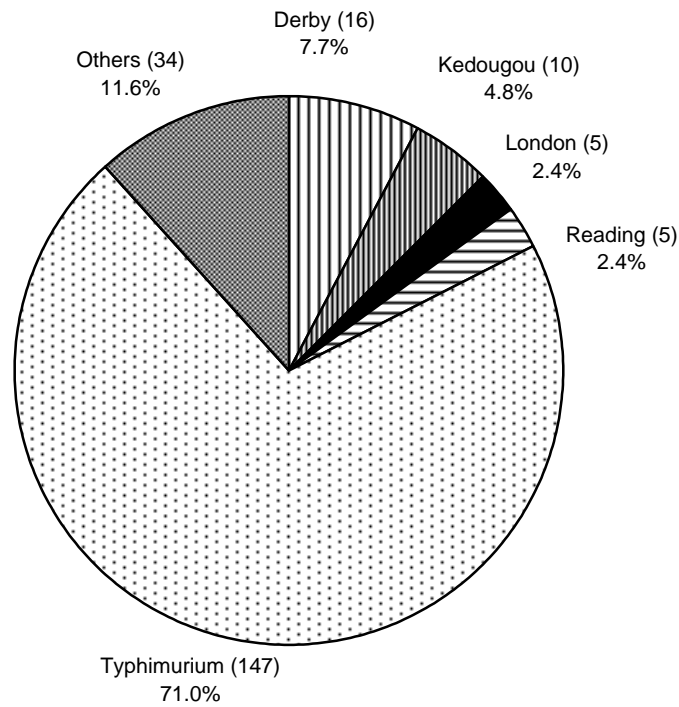
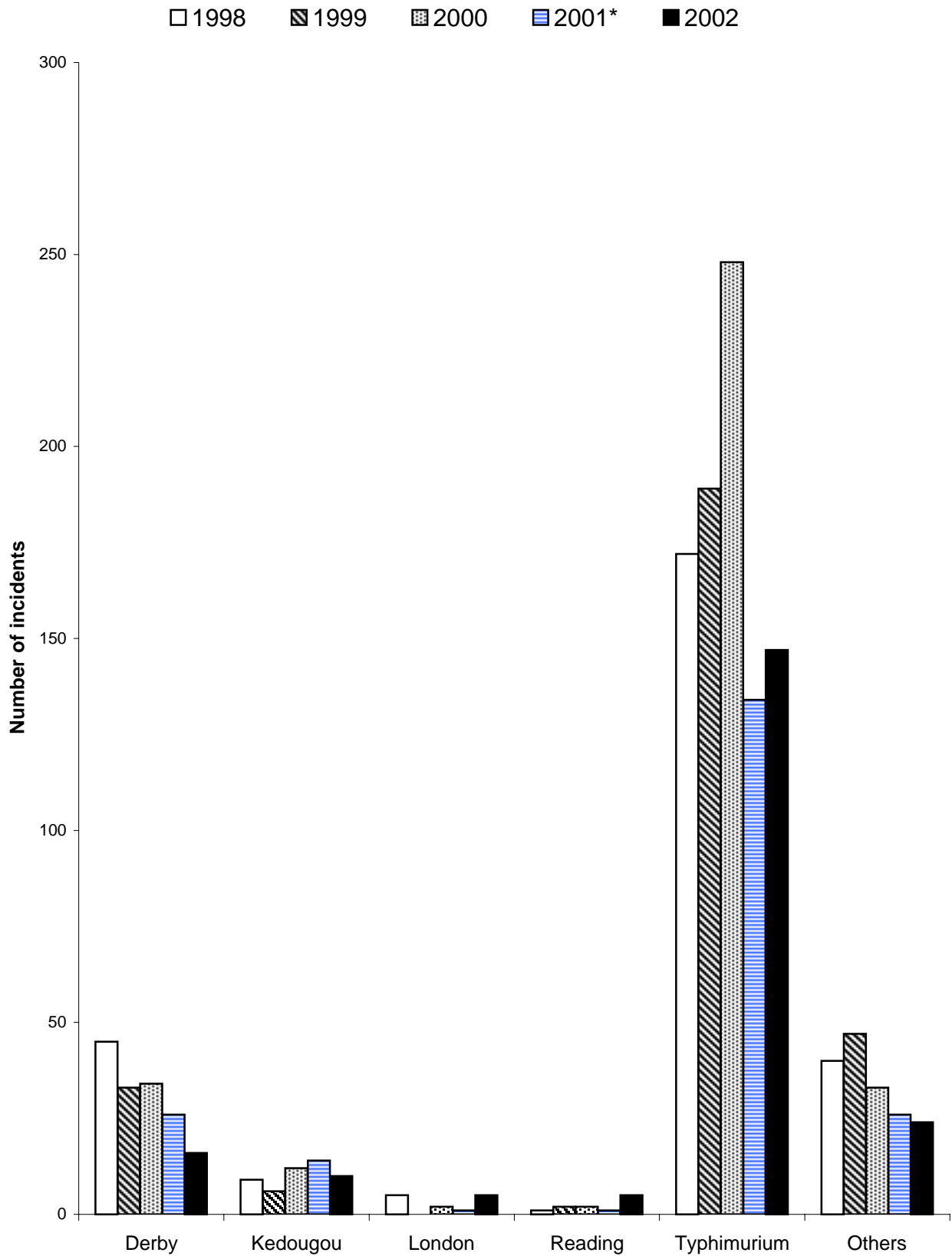


Table 32: Incidents of the top 5 *Salmonella* serotypes in pigs in 2002 as a % of all incidents compared to previous years

Serotype	1998	1999	2000	2001	2002
S. Typhimurium %	59.2	68.2	75.2	66.3	71.0
S. Derby %	14.7	11.9	10.3	12.9	7.7
S. Kedougou %	2.9	2.2	3.6	6.9	4.8
S. London %	1.8	0.0	0.6	1.5	2.4
S. Reading %	0.4	0.7	0.6	0.5	2.4
Total no. incidents	272	277	330	202	207

Fig 24: Incidents of *Salmonella* serotypes in pigs (1998 - 2002)



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

Table 33: S. Typhimurium in pigs on all premises

Definitive Types Incidents (Isolations)	1998	1999	2000	2001*	2002
2	- (-)	- (-)	1 (1)	1 (1)	1 (1)
12	2 (2)	2 (2)	4 (7)	2 (2)	2 (2)
20	- (-)	1 (1)	- (-)	- (-)	- (-)
29	1 (1)	- (-)	- (-)	- (-)	- (-)
30	1 (1)	- (-)	- (-)	- (-)	- (-)
104	61 (81)	54 (68)	53 (72)	13 (15)	19 (22)
104B	9 (11)	6 (7)	6 (7)	4 (4)	2 (2)
108	- (-)	- (-)	1 (1)	1 (1)	- (-)
120	2 (2)	2 (2)	- (-)	2 (2)	- (-)
126A	1 (3)	- (-)	1 (1)	- (-)	- (-)
170	- (-)	- (-)	4 (4)	- (-)	- (-)
193	22 (25)	40 (44)	28 (34)	17 (19)	20 (23)
193A	- (-)	1 (1)	- (-)	- (-)	3 (3)
195	1 (1)	- (-)	- (-)	- (-)	- (-)
203	- (-)	- (-)	2 (3)	- (-)	- (-)
204	1 (1)	- (-)	- (-)	- (-)	- (-)
206	- (-)	- (-)	- (-)	1 (1)	- (-)
208	17 (19)	26 (32)	33 (35)	14 (15)	9 (9)
U288	- (-)	- (-)	- (-)	- (-)	8 (9)
U302	23 (31)	13 (15)	38 (41)	16 (17)	13 (13)
U308	- (-)	6 (8)	20 (21)	10 (13)	8 (8)
U308A	- (-)	5 (5)	8 (9)	17 (21)	16 (17)
U310	- (-)	- (-)	1 (1)	11 (13)	7 (7)
RDNC	4 (5)	8 (8)	10 (10)	5 (5)	5 (5)
NOPT	- (-)	- (-)	- (-)	- (-)	1 (1)
UNTY	16 (19)	25 (30)	37 (40)	19 (22)	13 (13)
Untyped	- (-)	- (-)	- (-)	1 (1)	20 (21)
TOTAL	161 (202)	189 (223)	248 (287)	134 (152)	148 (156)

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

Fig 25: Incidents of *Salmonella* Typhimurium definitive types in pigs in 2002

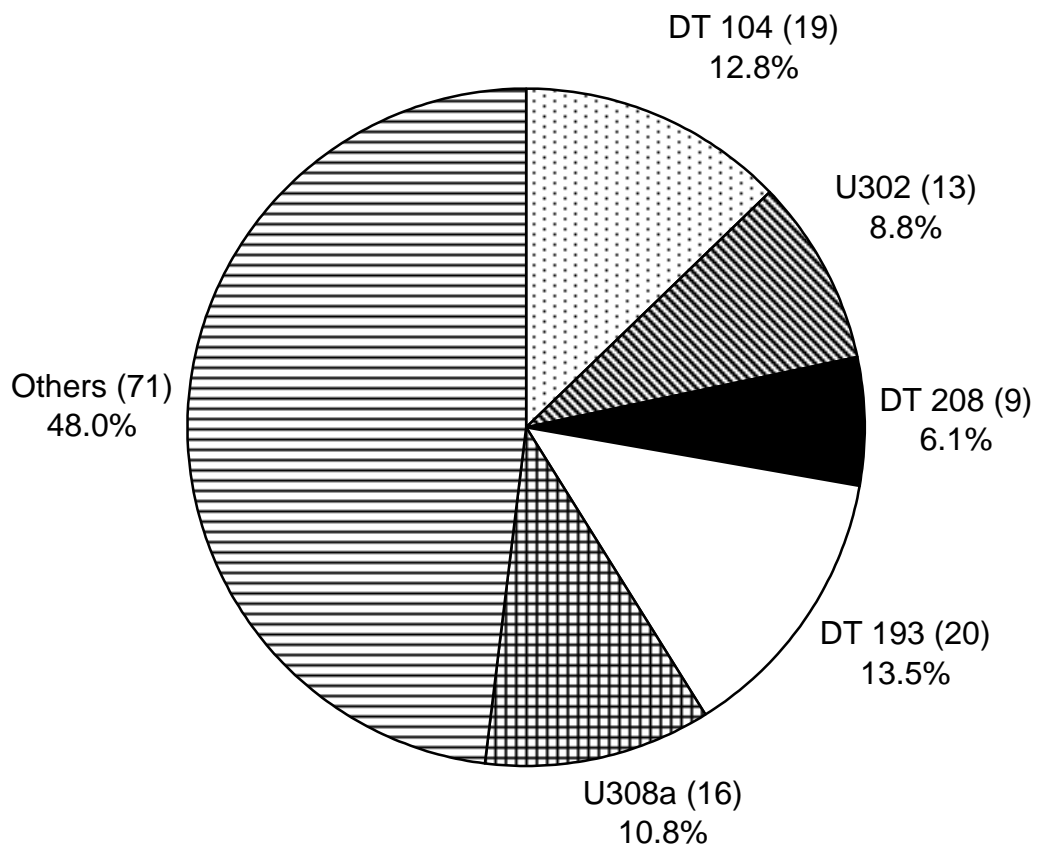
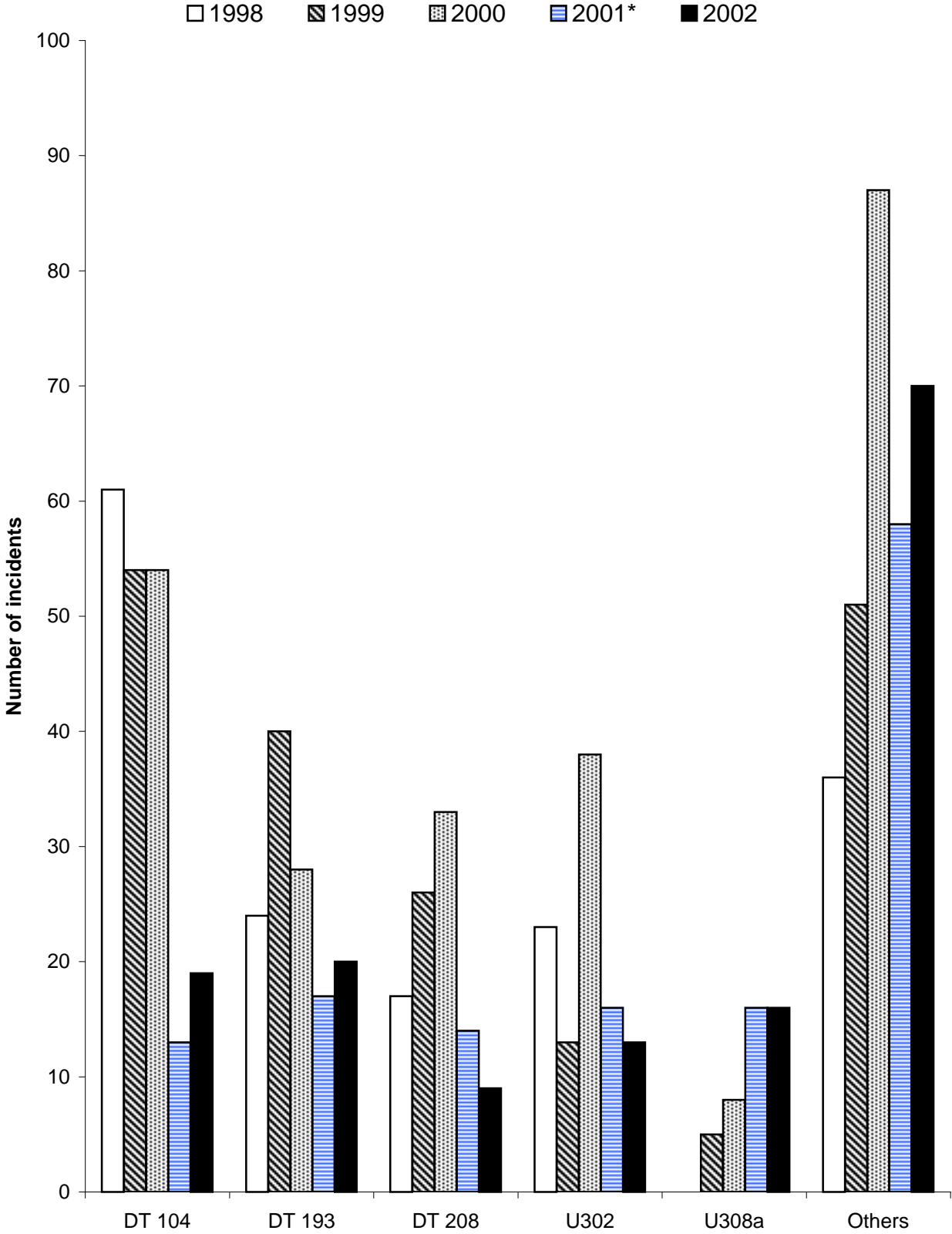


Fig 26: Incidents of *Salmonella* Typhimurium definitive types in pigs (1998 - 2002)



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

Fig 27: *S. Enteritidis* and *S. Typhimurium* as a proportion of all incident reports in pigs (1985 - 2002)

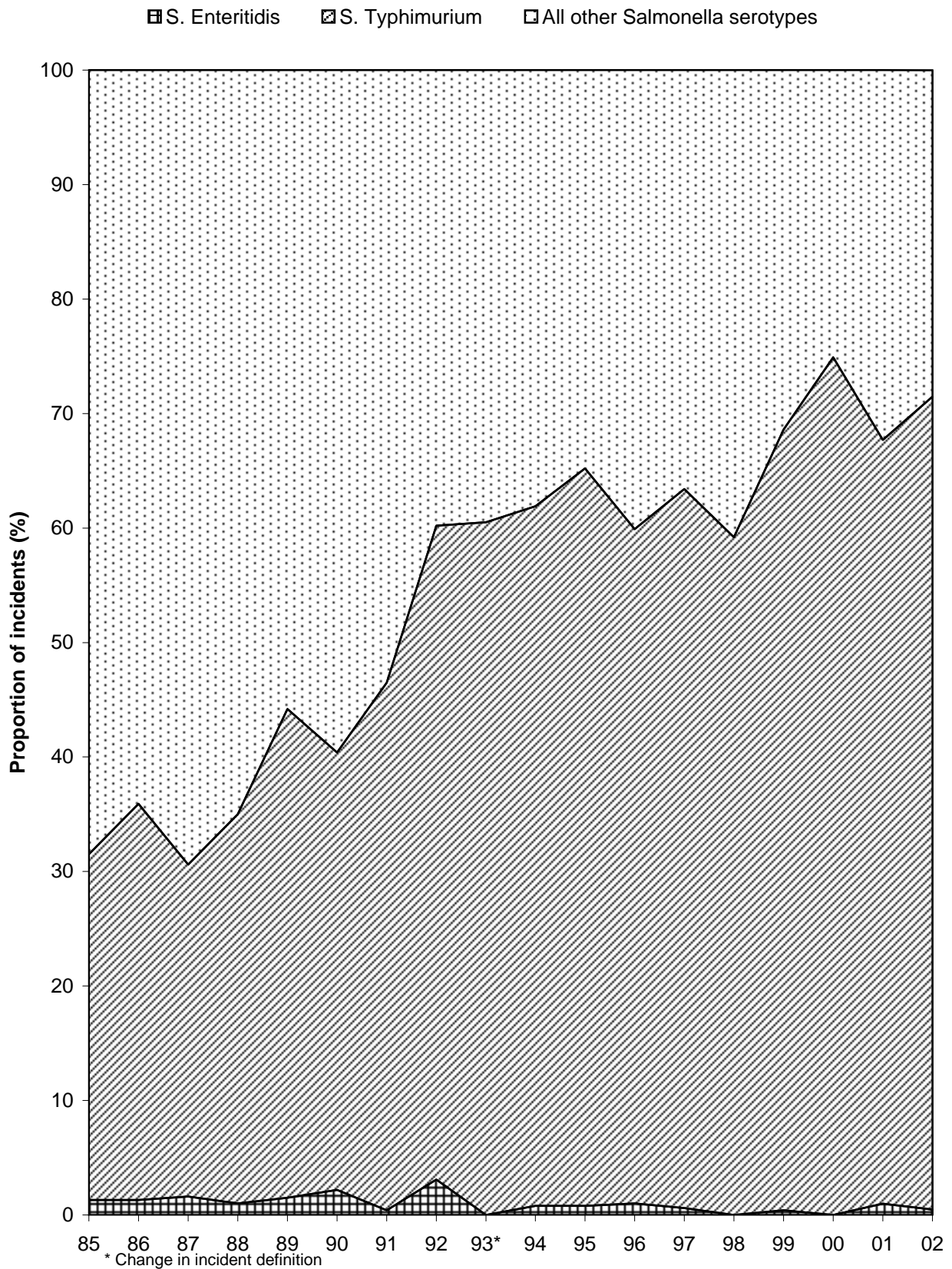


Table 34: S. Enteritidis in pigs on all premises

Phage Types Incidents (Isolations)	1998	1999	2000	2001*	2002
4	- (-)	- (-)	- (-)	1 (1)	- (-)
8	- (-)	1 (1)	- (-)	1 (1)	1 (1)
TOTAL	- (-)	1 (1)	- (-)	2 (2)	1 (1)

Table 35: S. Hadar in pigs on all premises

Phage Types Incidents (Isolations)	1998	1999	2000	2001*	2002
2	- (-)	1 (1)	- (-)	- (-)	- (-)
TOTAL	- (-)	1 (1)	- (-)	- (-)	- (-)

Table 36: S. Virchow in pigs on all premises

Phage Types Incidents (Isolations)	1998	1999	2000	2001*	2002
26	1 (1)	- (-)	- (-)	1 (1)	- (-)
TOTAL	1 (1)	- (-)	- (-)	1 (1)	- (-)

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