

References

1. ADESIYUN (A.A.), LOMBIN (L.H.), KWAGA (J.K.P.), AGBONLAHOR (D.E.). Some features of the first isolate of *Yersinia enterocolitica* serogroup O:8 from a piglet in Nigeria. *Niger. J. Microbiol.*, 1984, **4** : 97-100.
2. AGBONLAHOR (D.E.), ODUGBEMI (T.O.), DOSUNMU-OGUNBI (O.). Isolation of species of *Yersinia* from patients with gastroenteritis in Nigeria. *J. Med. Microbiol.*, 1983, **16** : 93-96.
3. BAUER (A.W.), KIRBY (W.M.M.), SHERRIS (J.C.), TURCK (M.). Antibiotic susceptibility testing by single disc method. *Am. J. clin. Pathol.*, 1966, **45** : 493-496.
4. CHRISTENSEN (S.G.). *Yersinia enterocolitica* in Danish pigs. *J. Appl. Bacteriol.*, 1980, **48** : 377-382.
5. ESSEVELD (H.), GOUDZWAARD (C.). On the epidemiology of *Yersinia enterocolitica* infection : Pig as a source of infection in man. *Contr. Microbiol. Immun.*, 1973, **2** : 99-101.
6. FROE (D.L.), WILLIAMS (B.J.). An evaluation of antimicrobial sensitivity testing. *Mod. vet. Pract.*, 1971, **4** : 45-48.
7. KWAGA (J.K.P.), AGBONLAHOR (D.E.), LOMBIN (L.H.), ADESIYUN (A.A.), OLATUNDE (A.O.). Isolation of species of *Yersinia* from cattle and milk in Zaria : A preliminary report. In : Proceedings of the National Conference on Disease in Ruminants, Vom, Nigeria, 1984. P. 149-158.
8. LOMBIN (L.H.), ADESIYUN (A.A.), AGBONLAHOR (D.E.), KWAGA (J.K.P.). Isolation of *Yersinia* species from pigs in Nigeria. *Vet. Rec.*, 1985, **117** : 364.
9. OKOROAFOR (E.), ADESIYUN (A.A.), AGBONLAHOR (D.E.). Prevalence and characteristics of *Yersinia enterocolitica* strains isolated from pigs in Jos, Nigeria. *Br. Vet. J.*, 1988, **144** : 131-138.
10. PAI (C.K.), SORGER (S.), LAFLEUR (L.), LACKMAN (L.), MARKS (M.I.). Efficacy of cold enrichment techniques for recovery of *Yersinia enterocolitica* from human stools. *J. Clin. Microbiol.*, 1979, **9** : 712-715.
11. PEDERSEN (K.B.), WINBLAD (S.). Studies of *Yersinia enterocolitica* isolated from swine and dogs. *Acta path. microbiol. scand.*, 1979, **87B** (2) : 141-148.
12. SCHIEMANN (D.A.). Synthesis of a selective medium for *Yersinia enterocolitica*. *Can. J. Microbiol.*, 1979, **25** : 1298-1304.
13. SWAMINATHAN (B.), HARMON (M.C.), MEHLMAN (I.J.). A review : *Yersinia enterocolitica*. *J. Appl. Bacteriol.*, 1982, **52** : 151-183.
14. WAUTERS (G.), KANDOLO (K.), JANSSENS (M.). Revised biogrouping scheme of *Yersinia enterocolitica*. *Contr. Microbiol. Immun.*, 1987, **9** : 14-21.
15. WEISSFELD (A.S.), SONNENWIRTH (A.C.). Rapid isolation of *Yersinia* spp. from faeces. *J. Clin. Microbiol.*, 1982, **15** : 508-510.
16. ZEN-YOJI (T.), MOMOSE (T.). An outbreak of enteritis due to *Yersinia enterocolitica* occurring at a junior high school. *Jap. J. microbiol.*, 1973, **17** : 220-222.

Salmonella enteritidis infection in the Sudan

I.E. Mamoun ¹A.I. Khalafalla ¹M.R. Bakhiet ¹H.A.M. Agab ¹Y.A. Sabiel ¹H. el J. Ahmed ¹

MAMOUN (I.E.), KHALAFALLA (A.I.), BAKHIET (M.R.), AGAB (H.A.M.), SABIEL (Y.A.), AHMED (H. el J.). Infection à *Salmonella enteritidis* au Soudan. *Revue Elev. Méd. vét. Pays trop.*, 1992, **45** (2) : 137-138

Sur une période de 18 mois, 21 isolats de *Salmonella enteritidis* ont été obtenus à partir de plusieurs élevages de volailles dans trois États du Soudan. L'infection a eu pour origine une centrale de distribution ayant importé des oeufs fertilisés et des effectifs parentaux contaminés. L'épidémie de *S. enteritidis*, qui a dévasté un grand nombre d'élevages de volailles durant l'année 1990, pourrait être attribuée à celle ayant sévi au même moment en Europe en particulier, et dans le monde en général. *Mots clés* : Volaille - Élevage de volailles - *Salmonella enteritidis* - Soudan.

Introduction

In recent years there has been a global increase in *Salmonella enteritidis* infections (3). Since 1987, the number of cases of salmonellosis caused by *S. enteritidis* has increased in Western Europe (2). A great increase in both human and poultry infections with *S. enteritidis* was also recorded in Eastern Europe (1). Several studies in some countries lead to the suggestion that the reason for this global increase is related to the consumption of contaminated eggs and/or poultry meat (3). Import of eggs was incriminated as a source of infection in man (4). The *S. enteritidis* epidemic which devastated many poultry farms in the Sudan during 1990 was concurrent with the global pandemic. This work provides some data on the scope and source of *S. enteritidis* epidemic in the Sudan during 1990.

Materials and Methods

A poultry distributing company with no known history of salmonellosis imported a significant shipment of European fertilized eggs and parent stock in early 1990. On subsequent incubation of the fertilized eggs in the distributing company hatcheries, candling revealed a considerable percentage of dead-in-shell embryos. Four

1. Central Veterinary Research Laboratories, POB 8067, El-Amarat, Khartoum, Sudan.

Reçu le 17.3.1992, accepté le 26.4.1992.

Communication

embryonated eggs were received for investigation. At hatching time, at the company hatcheries, a high mortality rate was observed among one-day old chicks from which 16 birds were submitted to investigation. It was also observed that high mortality and morbidity rates occurred among the imported parent stock from which 8 chicks were also submitted to investigation. A single mouse caught at the company quarters and samples of the poultry ration consumed by the infected birds were also received for investigation. Several poultry farms in three states with no known history of salmonellosis got one-day old chicks from the distributing company. Heavy losses were observed over an eighteen month period in those farms. Losses included a poor hatchability reaching 0 % in one farm, a mortality rate of up to 88 % in another farm and stunted growth. Pericarditis was almost a constant finding at necropsy. A random selection of 22 birds of different eggs from this farms were submitted to investigation.

Selenite broth media were inoculated with liver, intestinal content, egg content or ingredients of the poultry ration and incubated at 42 °C for 48 h. Subcultures were made from the selenite broth onto deoxycholate citrate agar after 24 and 48 h, respectively. Isolates were identified as *S. enteritidis* and confirmed at the Food and Environment Centre*.

Results

The mouse specimens and the ingredients of the poultry ration were negative for *S. enteritidis* while the four embryonated eggs were positive.

Discussion

Since in the present work *S. enteritidis* had been isolated from imported fertilized eggs and chicks, with no known salmonellosis history at the distribution company, it may be assumed that both imported eggs and/or chicks were the source of the infection. In recent years *S. enteritidis* infection has increased in Europe (1, 2) from which the

Sudan imports fertilized eggs and parent stock. Thus, the *S. enteritidis* epidemic which devastated the poultry industry in the country during 1990 is attributable and concurrent with that of Europe. YAGOUB and MOHAMED (5) attributed the isolation of 16 salmonella serotypes for the first time in the Sudan between 1969 and 1987 to imported products. Since consumption of *S. enteritidis* contaminated eggs and/or poultry meat could infect man (3) and since import of infected eggs was incriminated as a source of infection in man (4), public health authorities should be alert to these two factors.

Acknowledgements

The authors are grateful to the Director of the Food and Environment Centre of Abu Dhabi, and to his staff for identification of the isolates.

MAMOUN (I.E.), KHALAFALLA (A.I.), BAKHIET (M.R.), AGAB (H.A.M.), SABIEL (Y.A.), AHMED (H.e.l J.). *Salmonella enteritidis* infection in the Sudan. *Revue Elev. Méd. vét. Pays trop.*, 1992, **45** (2) : 137-138

Twenty-one *Salmonella enteritidis* isolates were recovered from several poultry farms in three states in the Sudan over an eighteen-month period. The infection was disseminated from a distributing company which had imported infected fertilized eggs and parent stock. The Sudan *S. enteritidis* epidemic which devastated many poultry farms during 1990 was attributable and concurrent to that in Europe in particular and throughout the world in general. *Key words* : Poultry - Poultry rearing - *Salmonella enteritidis* - Sudan.

References

1. NILAKOVIC-NOVAK (L.), MATIC (B.), PRUCKNER-RADOCIC (E.). Human and poultry *Salmonella enteritidis* infections-Croatia (1986-1989). *Vet. Stanica*, 1990, **21**(2) : 129-135.
2. PHOL (P.), LINTERMANS (P.), MARTIN (M.), COUTURIER (M.). Epidemiological study of *Salmonella enteritidis* strains of animal origin in Belgium. *Epidem. Infect.*, 1991, **106** (1) : 11-16.
3. RODRIGUE (D.C.), TAUXE (R.V.), ROWE (B.). International increase in *Salmonella enteritidis* : A new pandemic. *Epidem. Infect.*, 1990, **105** (1) : 21-27.
4. STEVENS (A.), JOSEPH (C.), BRUCE (J.) *et al.* A large outbreak of *Salmonella enteritidis* phage type 4 associated with eggs from overseas. *Epidem. Infect.*, 1989, **103** (3) : 425-433.
5. YAGOUB (I.A.), MOHAMED (T.E.). Isolation and identification of *Salmonella* from chickens in Khartoum Province of the Sudan. *Br. Vet. J.*, 1987, **143** : 537-540.

* POB 27411, Abu Dhabi.