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Salmonella enteritidis Serotype $50_{1,2,3}:z_4, z_{24}:-$

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Characteristics of a new *Salmonella* serotype, subgenus IV, are reported. Culture 5534-68 was recovered from the intestinal tract of *Anolis biporcatus*, an arboreal lizard found in deep forest tracts in Panama Province, Republic of Panama. The antigenic composition of this new serotype was found to be $50_{1,2,3}:z_4, z_{24}:-$.

The present report deals with the recovery of a new *Salmonella* serotype. The organism described here, NCDC culture 5534-68, was isolated from a lizard, *Anolis biporcatus*, which abounds in primary and mature secondary forest throughout Central and Northern South America. This lizard is completely arboreal and is usually found several meters above the ground rather than in low bushes.

The specimen from which culture 5534-68 was isolated was collected 4 September 1968 at El Aguacate, a tiny isolated village located at the base of the north slope of Cerro Trinidad in Panamá Province, Republic of Panama, during a current survey of *Enterobacteriaceae* in amphibians and reptiles of this region. The host specimen was brought alive to Gorgas Memorial Laboratory. After autopsy, the intestine and its contents were removed aseptically and cultured for enteric bacteria following the procedures described elsewhere (3). After the preliminary biochemical and serological examinations, culture 5534-68 was sent to the National Communicable Disease Center, Atlanta, Ga., for final determination.

TABLE 1. *Biochemical reactions of a new Salmonella serotype*

Substrate or test	Reaction[a]	Substrate or test	Reaction[a]
Indole	−	Adonitol	−
Methyl red	+	Inositol	−
Voges-Proskauer	−	Sorbitol	++
Simmons' citrate	+	Arabinose	++
H_2S (Triple Sugar Iron agar)	+	Raffinose	−
Urease	−	Rhamnose	++
KCN	+	Maltose	++
Motility	+	Trehalose	++
Kohn's gelatine	+ (9-11)	Xylose	++
Lysine decarboxylase	+	D-Tartrate[b]	+ (6)
Arginine dihydrolase	+ (3)	L-Tartrate[b]	− (14)
Ornithine decarboxylase	+	I-tartrate[b]	− (14)
Phenylalanine deaminase	−	Cellobiose	+ (7)
Glucose	++	Glycerol	+ (4-6)
Lactose	−	Mucate	−
Sucrose	−	Malonate	−
Mannitol	++	Potassium citrate[b]	+ (2)
Dulcitol	−	ONPG[c]	−
Salicin	−	Oxidase	−

[a] Symbols: +, positive in 1 to 2 days; ++, acid and gas; −, negative. Figures in parentheses indicate day of incubation on which reaction was observed.
[b] Method of Kauffmann and Petersen (7).
[c] Method of LeMinor and Ben Hamida (8).

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The system of nomenclature used for the genus *Salmonella* is that proposed by Ewing (4), which is based on the three-species concept suggested by Kauffmann and Edwards (6) and Borman, Stuart, and Wheeler (2). The species *Salmonella enteritidis* includes all salmonellae other than *S. typhi* and *S. cholera-suis*. According to this system of nomenclature, serotypes of *S. enteritidis* are written as follows: *S. enteritidis* serotype (ser.) Anatum, *S. enteritidis* ser. Typhimurium, etc. The infrasubspecific designations are capitalized for reasons of clarity only. As proposed by the International Enterobacteriaceae Subcommittee (5), only serotypes of subgenus I are named, whereas serotypes belonging to subgenera II and IV are designated by their antigenic formulas only.

The organism possessed the usual cultural and biochemical characteristics of *Salmonella* subgenus IV. This organism grew in KCN medium but failed to ferment salicin, even after prolonged incubation. The biochemical properties characteristic of the salmonellae and distinctive of this new serotype are listed in Table 1.

TABLE 2. *Results of sensitivity testing of new Salmonella serotype*

Antimicrobial agent[a]	Amt (μg)	Susceptibility[b]
Ampicillin	10	S
Furadantin	100	S
Terramycin	5	R
Streptomycin	10	R
Dihydrostreptomycin[c]	10	R
Penicillin	10[d]	R
Cephalothin	30	S
Kanamycin	5	R
Erythromycin	2	R
Chloromycetin	5	S
Gantrisin	1[e]	R
Nalidixic acid	5	S
Neomycin	30	R
Gentamycin	10	R
Colymicin	1[e]	S
Cloxacillin	1	R
Aureomycin	30	R
Tetracyline[c]	30	S
Furoxone	100	S
Furacine	100	S
Elkosine[c]	300	R
Sulfadiazine[c]	300	R
Sulfamerazine[c]	300	R
Sulfamethoxypyridazine[c]	300	R
Sulfathiozole[c]	300	R
Thiosulfil[c]	300	R
Triple sulfa[c]	300	R

[a] Paper discs (BBL) impregnated with indicated concentrations of drugs.
[b] S = susceptible; R, resistant.
[c] Manufactured by Difco.
[d] Units.
[e] Milligrams.

The O antigens of culture 5534-68 were agglutinated to the titers of *S. enteritidis* ser. Wassenaar ($50_{1,2,3}$) and *Arizona* 9ab O antisera, and, in subsequent absorption tests, all O agglutinins were removed from these antisera. Further, agglutination was obtained when tested in single-factor antisera for factors 50_2 and 50_3, thus characterizing the O antigen as $50_{1,2,3}$.

The flagellar antigens of this culture were agglutinated to the titer of H antiserum for *S. enteritidis* ser. Duesseldorf (z_4, z_{24}). Moreover, these antigens reacted in specific factor z_{24} antiserum. Absorption experiments removed all H agglutinins from this antiserum. Attempts to show the phase 2 flagellar antigen employing z_4, z_{24} antiserum in phase reversal semisolid medium were not successful. Thus, the antigenic composition of this serotype was found to be $50_{1,2,3}:z_4, z_{24}:-$.

Culture 5534-68 was tested for its sensitivity to antimicrobial agents. A standardized paper disc-agar plate technique (1) for estimating in vitro susceptibility was employed. Commercially prepared dehydrated antimicrobial paper discs manufactured by BBL, except where indicated (Table 2), were used. The sensitivity of the new serotype to the various antibiotics and agents employed is summarized in Table 2.

In vitro susceptibility was observed in 33% of the agents tested. The organism was resistant to all of the sulfa derivatives examined as well as to a number of broad-spectrum antibiotics used such as Terramycin, Kanamycin, Erythromycin, and Cloxacillin (Table 2). The nitrofurans, Furadantine, Furoxone, and Furacine, were effective against the organism at the concentration tested.

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