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TWO NEW DIPHASIC ARIZONA TYPES

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The organisms to be described were isolated in the Belgian Congo. Culture 466–52 was found in the feces of a healthy duck in Kasenyi while culture 557–52 was isolated from the intestine of a serpent (*Bitis arietans*).

Both cultures were motile rods which possessed the morphological, tinctorial, and cultural properties of the family *Enterobacteriaceae*. Both produced hydrogen sulfide, failed to form indol or to hydrolyze urea, were methyl red positive and Voges-Proskauer negative, acidified Jordan's tartrate agar, alkalinized Simmons' citrate agar, and liquefied gelatin in 10 to 14 days at 25 C. Both fermented glucose with gas formation but failed to ferment sucrose, salicin, dulcitol, or adonitol. Culture 466–52 fermented lactose with the production of gas within 48 hours, but culture 557–52 acidified lactose broth only after 11 days incubation. The biochemical reactions of the organisms were characteristic of the *Arizona* group of paracolon bacteria (*Edwards, West,* and *Bruner,* 1947).

Upon serologic examination, culture 466–52 was found to possess O antigens 1,4 of the *Arizona* group. As shown in Table 1, reciprocal agglutination to the titers of their respective sera occurred between 466–52 and the test strain of O group 1,4. Reciprocal absorption tests revealed that each culture possessed minor O antigens which were not shared by the other.

The H antigens of 466–52 were diphasic and phase 1 was agglutinated strongly by sera derived from phase 1 of culture Cal. 1141 (Arizona H 31) and from phase 1 of *Salmonella poona* (z). The latter two phases previously were known to possess strong reciprocal relationships (*Edwards* and *West,* 1950). Reciprocal absorption tests established the identity of phase 1 of Cal. 1141 and phase 1 of 466–52. Therefore, phase 1 of 466–52 is represented by the H symbol 31.

Phase 2 of culture 466–52 was closely related to phase 1 of *Sal-*

TABLE 1
O Antigens of 466–52.

Antigens	Sera			
	Arizona 1,4		466-52	
	Unabsorbed	Absorbed by 466-52	Unabsorbed	Absorbed by Arizona 1.4
Arizona 1,4	2560	160	640	<20
466–52	2560	<20	640	80

monella typhi murium (i). While cross agglutination between these two phases extended to the titers of their respective sera, minimal differences between them were apparent in absorption tests, as shown in Table 3. Since the antigens present in phase 2 of 466–52 hitherto have not been found in the Arizona group, a new symbol (33) was assigned them. Thus culture 466–52 was represented by the antigenic formula 1,4: 31–33.

The O antigens of culture 557–52 were not related to any of those recognized in the *Salmonella* and *Bethesda-Ballerup* groups and possessed only a slight relationship to one of the established *Arizona* O groups. The cross reactions which occurred between 557–52 and the test strain of *Arizona* O group 5 are given in Table 4. The extent of these relationships was not sufficient to justify placing culture 557–52 in O group 5 and therefore it was assigned a new O symbol (29).

As shown in Tables 2 and 3, the H antigens of culture 557–52 were identical with those of culture 466–52 and could be denoted as 31–33. Therefore, the antigenic formula of culture 557–52 was 29: 31–33.

A list of the then known diphasic *Arizona* types was published by *Edwards, Kauffmann,* and *van Oye* (1952). Examination of this list reveals that previously recognized forms, like the cultures described here, frequently possess antigens in common with *Salmonella* types. Also, as in the present cultures, the previously described types possess combinations of antigens usually not found in *Salmonella* types. Often the two phases of diphasic *Arizona* types are related to antigens both of which occur in phase 1 of *Salmonella* cultures.

SUMMARY

Two new diphasic *Arizona* types were described. One (466–52) was isolated from the feces of a healthy duck and possessed the formula 1,4: 31–33. The second (557–52) was isolated from the intestine of a serpent and was represented by the formula 29: 31–33.

TABLE 2

H Antigens of phase 1 of 466–52 and 557–52.

Antigens	Sera															
	S. poona phase 1				Cal. 1141 phase 1				466-52 phase 1				557-52 phase 1			
	Unabsorbed	Absorbed by Cal. 1141 phase 1	Absorbed by 466-52 phase 1	Absorbed by 557-52 phase 1	Unabsorbed	Absorbed by S. poona phase 1	Absorbed by 466-52 phase 1	Absorbed by 557-52 phase 1	Unabsorbed	Absorbed by S. poona phase 1	Absorbed by Cal. 1141 phase 1	Absorbed by 557-52 phase 1	Unabsorbed	Absorbed by S. poona phase 1	Absorbed by Cal. 1141 phase 1	Absorbed by 466-52 phase 1
S. poona, phase 1	12,800	1600	3200	1600	3200	<50	<50	<50	6400	<50	<50	<50	3200	<50	<50	<50
Cal. 1141, phase 1	3200	<50	<50	<50	6400	1600	<50	<50	12,800	1600	<50	<50	6400	800	<50	<50
466–52, phase 1	3200	<50	<50	<50	6400	1600	<50	<50	12,800	3200	<50	<50	12,800	1600	<50	<50
557–52, phase 1	3200	<50	<50	<50	6400	1600	<50	<50	12,800	1600	<50	<50	6400	800	<5C	<50

TABLE 3
H Antigens of phase 2 of 466–52 and 557–52.

Antigens	Sera								
	S. typhi murium phase 1			466-52 phase 1			557-52 phase 1		
	Unabsorbed	Absorbed by 466-52 phase 2	Absorbed by 557-52 phase 2	Unabsorbed	Absorbed by S. typhi murium phase 1	Absorbed by 557-52 phase 2	Unabsorbed	Absorbed by S. typhi murium phase 1	Absorbed by 466-52 phase 2
S. typhi murium phase 1	12,800	200	400	12,800	<50	<50	6400	<50	<50
466–52 phase 2	12,800	<50	<50	12,800	100	<50	6400	100	<50
557–52 phase 2	12,800	<50	<50	12,800	100	<50	6400	100	<50

TABLE 4
O Antigens of 557–52.

Antigens	Sera			
	Arizona 5		557-52	
	Unabsorbed	Absorbed by 557-52	Unabsorbed	Absorbed by Arizona 5
Arizona 5	640	320	320	<20
557–52	80	<20	2560	1280

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