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Isolation of *Yersinia enterocolitica* Biotype 4 Serotype O3 from Canine Sources in Italy

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Seventeen strains of *Yersinia enterocolitica* biotype 4 serotype O3 were isolated from 63 apparently healthy puppies. Of these strains, 76.4% showed both multiple resistance to antimicrobial agents and lack of sorbose fermentation.

An outbreak of enteritis involved a few dogs in a breeding kennel in Northern Italy in April 1984. One strain of *Y. enterocolitica* biotype 4 serotype O3 was isolated from the blood-tinged stool of one dog. As a result, apparently healthy dogs in the same kennel were examined for *Yersinia*. At the time of feces collection, there were approximately 200 adult dogs and about 200 puppies of both English setter and Hepagneul Breton breeds in the kennel. Usually puppies live with their mothers for the first 60 days of life; they are then separated from their mothers and kept in groups of 20.

Direct and enrichment culture and identification of *Yersinia* spp. were performed as described in our previous report (4). Serological typing was performed with O antisera prepared at Istituto Superiore di Sanità, Rome, by the method of Wauters et al. (11, 12). Susceptibility to antimicrobial agents was determined by the agar diffusion method (1).

A total of 19 strains of Yersinia spp. (Table 1) were recovered from 19 of 63 dogs examined (30.15%). Of these strains, one was identified as *Y. frederiksenii* NAG (10), one was *Y. intermedia* biotype 4 serotype O8,40 (3), and two were identified as *Y. enterocolitica* biotype 1, of which one was serotype O6,30-31 and the other was serotype O30. Of all isolates, 15 (79.0%) were identified as *Y. enterocolitica* biotype 4 serotype O3; 13 of these did not ferment sorbose at 27°C. Such a characteristic was always associated in our isolates with multiple resistance to antimicrobial agents. Two different patterns of resistance were found: ampicillin, chloramphenicol, cephalothin, streptomycin, sulfathiazole, and tetracycline; and ampicillin, chloramphenicol, cephalothin, streptomycin, and sulfathiazole. The remaining two strains of *Y. enterocolitica* biotype 4 serotype O3 fermented sorbose and showed the usual resistance to ampicillin and cephalothin. All strains of *Y. enterocolitica* biotype 4 serotype O3, regardless of their sorbose reaction, were phage type VIII. Our isolation rate of *Yersinia* spp. is high (30.1%) in comparison with the findings of other authors (7–9). The percentage of *Y. enterocolitica* biotype 4 serotype O3 isolated (23.8%) was greater than that found by Pedersen et al. in Sweden (1.7%; 11). Results obtained by Fukushima et al. (5) are more consistent with ours; in fact, 26.9% of the dogs examined by these authors harbored strains of *Yersinia* spp. Nevertheless, the percentage of strains of *Y. enterocolitica* isolated by us (89.5% versus 27.7%), as well as the percentage of *Y. enterocolitica* biotype 4 serotype O3 (88.2% versus 21.4%), was much higher than that of the Japanese authors.

TABLE 1. Strains of *Yersinia* spp. isolated from dogs

Species	Bioserotype	No. of strains	Sorbose fermentation (no. of isolates)		Antibiotic resistance[a]
			+	−	
Y. enterocolitica	1/O30	1	1		AM CF
	1/O6, 30–31	1	1		AM CF
	4/O3	15	2		AM CF
				8	AM C CF ST TE
				5	AM C CF S ST
Y. frederiksenii	NAG	1	1		AM CF
Y. intermedia	4/O8, 40	1	1		AM

[a] AM, Ampicillin (10 μg); C, chloramphenicol (30 μg); CF, cefalothin (30 μg); S, streptomycin (10 μg); ST, sulfathiazole (1.0 mg); TE, tetracycline.

It would appear that after the enteritis episode the particular bioserotype, pathogenic for humans, remained and involved the dogs being bred. The latter dogs did not have any gastrointestinal symptoms. It is of interest that some strains were unable to ferment sorbose, since sorbose fermentation is one of the biochemical characteristics for distinguishing biotype 1-4 of *Y. enterocolitica* from other *Yersinia* spp. (2). Equally noteworthy was the association of this atypical biochemical reaction with antimicrobial agent resistance; these *Yersinia* spp. are usually susceptible to the drugs named, except for a few strains isolated from patients (6). These findings suggest that these two attributes may have been mediated by plasmid acquisition.

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