The weakly beta-hemolytic porcine spirochete Brachyspira murdochii is considered a normal intestinal commensal. In the present study, however, a field case of B murdochii–associated catarrhal colitis was identified in a pig, as characterized by extensive spirochetal colonization of the surface epithelium. Experimentally, 8 weaned pigs were challenged with the B murdochii isolate, reproducing catarrhal colitis in 2 animals. By applying fluorescent in situ hybridization using a species-specific oligonucleotide probe targeting 23S rRNA, B murdochii organisms were found in high numbers and were closely associated with the surface epithelium in the pigs with catarrhal colitis. The results indicate that, when present in high numbers, B murdochii is low pathogenic for pigs.