

TABLE OF CONTENTS

List of Contributors

Preface

Section 1: The pathogenic clostridia

1 Taxonomic Relationships among the Clostridia 3

John F. Prescott, Janet I. MacInnes, and Anson K. K. Wu

2 General Physiological and Virulence Properties of the Pathogenic Clostridia 7

Julian I. Rood

3 Brief Description of Animal Pathogenic Clostridia 13

John F. Prescott

Section 2: Toxins Produced by the Pathogenic Clostridia

4 Toxins of Histotoxic Clostridia: *Clostridium chauvoei*, *Clostridium septicum*,
Clostridium novyi, and *Clostridium sordellii* 23

Michel R. Popoff

5 Toxins of *Clostridium perfringens* 45

James R. Theoret and Bruce A. McClane

6 Toxins of *Clostridium difficile* 61

J. Glenn Songer, Ashley E. Harmon, and M. Kevin Keel

7 *Clostridium botulinum* and *Clostridium tetani* Neurotoxins 71

Michel R. Popoff

Section 3: Clostridial Infections of the Gastrointestinal System

8 Diseases Produced by *Clostridium perfringens* Type A in Mammalian Species 109

Francisco A. Uzal

9 NetF-Associated Necrotizing Enteritis of Foals and Canine Hemorrhagic
Gastroenteritis 117

Iman Mehdizadeh Gohari, Valeria R. Parreira, and John F. Prescott

10 Necrotic Enteritis of Poultry 123

Kerry K. Cooper and J. Glenn Songer

11 Infections by *Clostridium perfringens* Type B 139

Francisco A. Uzal and J. Glenn Songer

12 Diseases Produced by *Clostridium perfringens* Type C 143

Santiago S. Diab

13 Diseases Produced by *Clostridium perfringens* Type D 157
Francisco A. Uzal, Federico Giannitti, John W. Finnie, and Jorge P. García

14 Infections by *Clostridium perfringens* Type E, 173
J. Glenn Songer

15 Diseases Produced by *Clostridium difficile* 177
Santiago S. Diab, Francisco A. Uzal, and J. Glenn Songer

16 Disease Caused by *Clostridium colinum*: Ulcerative Enteritis of Poultry and Other Avian Species 197
John F. Prescott

17 Clostridial Abomasitis 205
John F. Prescott, Paula I. Menzies, and Russell S. Fraser

18 Diseases Produced by *Clostridium spiroforme* 221
J. Glenn Songer and Francisco A. Uzal

Section 4: Clostridial Histotoxic Infections

19 Blackleg 231
Camila C. Abreu and Francisco A. Uzal

20 Gas Gangrene (Malignant Edema) 243
Rodrigo O. S. Silva, Francisco A. Uzal, Carlos A. Oliveira Jr, and Francisco C. F. Lobato

21 Gangrenous Dermatitis in Poultry 255
H. L. Shivaprasad

22 Bacillary Hemoglobinuria 265
Mauricio Navarro, Fernando Dutra Quintela, and Francisco A. Uzal

23 Infectious Necrotic Hepatitis 275
Mauricio Navarro and Francisco A. Uzal

24 Tyzzer's Disease 281
Karina C. Fresneda and Francisco R. Carvalho Chaigneau

Section 5: Clostridial Neurotoxic Infections

25 Tetanus 295
Michel R. Popoff

26 Botulism 303
Caroline Le Maréchal, Cédric Woudstra, and Patrick Fach

27 Diseases Caused by Other Clostridia Producing Neurotoxins 331
John F. Prescott.