Contents

List of Contributors	i
Preface	x
1 Introduction Hussam Zaher and David J. Gower]
Part I The Squamate and Snake Fossil Record	
2 The Origin and Early Diversification of Squamates Susan E. Evans	7
3 The First 80 Million Years of Snake Evolution: The Mesozoic Fossil Record of and Its Implications for Origin Hypotheses, Biogeography, and Mass Extinction Jason J. Head, Alexandra F. C. Howard, and Johannes Müller	
4 The Diversity and Distribution of Palaeogene Snakes: A Review with Commer Vertebral Sufficiency Krister T. Smith and Georgios L. Georgalis	nts on 55
5 Miocene Snakes of Eurasia: A Review of the Evolution of Snake Communities Martin Ivanov	85
Part II Palaeontology and the Marine-Origin Hypothesis	
6 Sea-Serpentism OLIVIER RIEPPEL	113
7 Reassessing the Morphological Foundations of the Pythonomorph Hypothesis Michael J. Polcyn, Bruno G. Augusta, and Hussam Zaher	i 125
8 A Review of Non-Mosasaurid (Dolichosaur and Aigialosaur) Mosasaurians and Relationships to Snakes Bruno G. Augusta, Hussam Zaher, Michael J. Polcyn, Anthony R. Fiorillo, and Louis L. Jacobs	d Their 157
9 A Review of the Skull Anatomy and Phylogenetic Affinities of Marine Pachyophiid Snakes Hussam Zaher, Bruno G. Augusta, Rivka Rabinovich, Michael J. Polcyn, and Paul Tafforeau	180
Part III Genomic Perspectives	
10 Using Comparative Genomics to Resolve the Origin and Early Evolution of Sna Sara Rhane and Jeegev W. Streeched	akes 209

VIII CONTENTS

11	The Evolution of Squamate Chitinase Genes (CHIAs) Supports an Insectivory–Carnivory Transition during the Early History of Snakes Christopher A. Emerling	235
12	Origin and Early Diversification of the Enigmatic Squamate Venom Cocktail Vivek Suranse, Ashwin Iyer, Timothy N. W. Jackson, and Kartik Sunagar	248
Pa	rt IV Neurobiological Perspectives	
13	Using Adaptive Traits in the Ear to Estimate Ecology of Early Snakes $\operatorname{Hongyu} \operatorname{Yi}$	271
14	A Glimpse into the Evolution of the Ophidian Brain AGUSTÍN SCANFERLA	294
15	Eyes, Vision, and the Origins and Early Evolution of Snakes David J. Gower, Einat Hauzman, Bruno F. Simões, and Ryan K. Schott	316
Pa	rt V Anatomical and Functional Morphological Perspectives	
16	Diversity and Evolution of Squamate Hemipenes: An Overview with Particular Reference to the Origin and Early History of Snakes GIOVANNA G. MONTINGELLI, DAVID J. GOWER, AND HUSSAM ZAHER	35]
17	The Evolution of Sperm-Storage Location in Squamata with Particular Reference to Snakes Henrique B. Braz and Selma M. Almeida-Santos	389
18	An Overview of the Morphology of Oral Glands in Snakes Leonardo de Oliveira and Hussam Zaher	410
19	Macrostomy, Macrophagy, and Snake Phylogeny David Cundall And Frances Irish	437
	Index Systematics Association Special Volumes	455 473

Colour plates can be found between pages 244 and 245.