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Sommario/riassunto	This book explores the various functions of butterfly and moth wings. Lepidoptera wings are covered with variously colored scales and exhibit a wide variety of color patterns, with some functioning as significant signals in behavior. They are also the flight organs, as the wings of the other insects are. Although research on Lepidopteran wings has predominantly focused on the color patterns and flight performance, they have many other functions that contribute to their lives. Chapters in this book examine airflow regulation, behavioral signal sending, friction reduction, sensory signal reception, pheromone secretion, antireflection, and high hydrophobicity. Utilizing the perspectives from biology, physics, chemistry, and mathematics, the author explores the functions, structures, construction, and development of these functional wings. Since many of the wing functions are attributed to or assisted by the scale functions, an understanding of the scale functions is necessary to understand the wing functions. The book includes chapters on the marginal scale morphology and function of the small

moth wing, as well as the development of the wing with scales. Programmed cell death, which plays a crucial role in the development of the functional wing, is also described. The extensive descriptions offer new insights into Lepidoptera wings and may inspire ingenious devices from a physics and engineering perspective. In particular, the physiological approach to the wing mechanoreception in this book is the first for butterfly and moth wings to thoroughly investigate their intricate mechanisms. With numerous figures to aid the understanding of readers, the book will appeal to researchers and graduate students interested in entomology, biomimetics and physics.