

Extraordinary moths and an extraordinary moth researcher: An essay review of G. S. Robinson's *Biology, distribution and diversity of tineid moths**

NIELS P. KRISTENSEN¹ & REINHARD GAEDIKE²

¹ Natural History Museum of Denmark (Zoological Museum), University of Copenhagen, Universitetsparken 15, DK-2100 Copenhagen Ø; NPKristensen@snm.ku.dk

² Florusstraße 5, D-53225 Bonn; tinagma@msn.com

* **Robinson, G. S. 2009. *Biology, distribution and diversity of tineid moths*. – Southdene Sdn Dhd, P.O.Box 10139, 50704 Kuala Lumpur, Malaysia & Natural History Museum, London. – 143 pp., 16 coloured pls. – Price 55 £.**

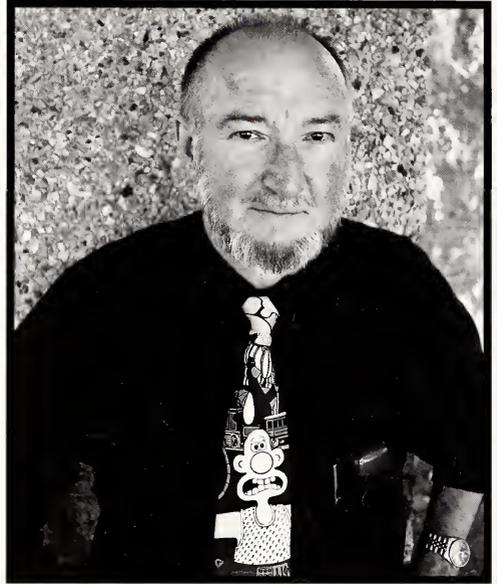
Members of the family Tineidae are extraordinary moths from a number of perspectives, but most of all because of the feeding habits of their larvae. The point is made repeatedly in current writings on insect diversity, that the Lepidoptera (at least the non-micropterigid Lepidoptera, hence >>99% of the extant members of the order) are the most species-rich clade of herbivorous animals – and the family Tineidae is the principal lepidopteran lineage whose members have on a large scale adopted alternative food sources. A few tineid species are probably the only micro-moths known to almost everybody (and have been so for millennia, as testified by references in the myths of the Old Testament), and of course they owe this recognition to the capacity of their larvae to live on substrates as unusual as keratins (fibrous structural proteins), and hence to become troublesome textile destroyers. Ironically, therefore, in several languages the vernacular name for a tineid moth will be the one by which most people will refer to all kinds of smaller moths, which in their biology mostly are so different, and so much more 'typical' members of the order.

Tineids are of outstanding interest for other reasons as well, in as much as they are the most overall generalized ditrysian Lepidoptera, and a knowledge of their structure therefore of crucial significance for any attempts of reconstructing the ancestor which gave rise to the most species-rich lepidopteran lineages in what appears to have been very rapid succession – judging from the difficulties facing current attempts of resolving their interrelationships through analysis of sizable samples of carefully selected genetic markers (Regier et al. 2009). Tineid moths are diverse in morphology and appearance, and their general non-herbivory notwithstanding they are also biologically diverse. Getting a handle on this diversity would, therefore, appear to be an obvious priority in systematic/evolutionary lepidopterology.

In recent decades three milestone publications have appeared which serve exactly this purpose, and the London *Natural History Museum* (previously, and still in the mind of many naturalists, the *British Museum (Natural History)* – BMNH) lepidopterist Gaden S. Robinson was the driving force behind all of them. First, in 1993, came the outstanding book on *Tineid Genera of Australia* coauthored by Robinson and Ebbe S. Nielsen. In 1998 followed Robinson's treatment of the family in the first Lepidoptera

volume of the *Handbook of Zoology*. Finally, in late 2009, the international lepidopterists' community received the book highlighted in the headlines here, only a short time after receiving the news that its author untimely – aged 60 – had succumbed to an untimely but aggressive illness. He lived to see the proofs and had dearly wanted to see the book printed, an event, alas denied him. In fellow-countrymen's obituary writings (e.g., Beccaloni et al. 2009) Robinson was repeatedly referred to as being “clubbable” (a delightful expression that was new to the English vocabulary of both of us), but despite this characteristic, for one reason or another he never joined the *Societas Europaea Lepidopterologica*, and only on very few occasions did he attend a European Congress of Lepidopterology. But since from the onset of his BMNH career he was in charge of a sizable proportion of the micro-moth collections of that matchless institution, he was destined to become a central figure in the minds of European (and indeed extra-European) micro-moth researchers, whose work was often promoted by his insights, and with a number of whom he developed a genuine personal friendship. The appearance of *Biology, distribution and diversity of tineid moths* is, then, an appropriate occasion to reminisce about its author in the SEL Journal.

Gaden Sutherland Robinson had a colourful personality and was a man of many talents. As a lepidopterist he was an apple not fallen far from the tree: his father, Hugh S. Robinson, was a keen amateur Lepidoptera collector and inventor (jointly with his similarly-minded brother Peter) of the renowned ‘Robinson trap’ which was instrumental in revolutionizing moth collecting techniques in the mid 20th century. The paternal impact on the early shaping of Gaden's entomology interest vividly transpires from the brilliant and very ‘Gadenish’ contribution (Robinson 2009a) to the recent *Letters to Linnaeus* volume, and while his later professional commitment and writings were focused on the micro-moth grade, he long retained a broad genuine interest in the British Lepidoptera as a whole and continued light trapping and ‘sugaring’ at/near his Essex homes. Another impact came from Hugh Robinson's later appointment to the colonial civil service in S.E. Asia and eventually Fiji: Gaden's Ph.D. work was an account of the Macrolepidoptera (in a broad sense) of Fiji and Rotuma, and the fauna of S.E. Asia and Australasia remained a theme of focal interest throughout his scientific career. Attractive tenured positions in systematic biology were not yet scarce in the mid-1970s, and aged 25 Gaden found himself employed as a scientific officer (a position combining



Clubbable Gaden Robinson; photograph 2008 by Phil de Vries.

curatorial and researcher duties) in the micro-moth section of the BMNH Entomology Department. The decision that work on ‘lower’ micro-moths with special reference to Tineidae should be a core activity of the new employee was made at managerial level before the successful applicant was hired, and it was prompted partly by the lacunae in expertise among already-present staff members, partly because of the economic importance of tineids (K. Sattler, pers. comm.). The challenge was enthusiastically accepted by Gaden. Over the years he published a series of high-quality taxonomic studies on tineids, with occasional digressions into other lower-grade moth groups (including a book on the hepialids of austral S. America, Nielsen & Robinson 1983). To several tineid workers worldwide Gaden was the ‘court of last resort’ in taxonomic questions; his enormous knowledge was highly valued and his advice will be sorely missed.

Gaden’s extensive empirical work was not restricted to revisionary taxonomy, but ranged from science history/classical collections over lepidopteran host associations to biodiversity assessment issues. Endowed with exceptional verbal skills he enjoyed writing for readerships outside the restricted circle of fellow scientists, and for example his many reviews of entomology books in the *Times Literary Supplement* won wide acclaim. Reference may be made to the above-mentioned Beccaloni et al. (2009) obituary article for more information about his personality and scientific achievements, and a complete list of his scientific publications is accessible (for free to subscribers to *Systematics and Biodiversity*) at www.journals.cup.org/abstract_S1477200009990247. *Biology, distribution and diversity of tineid moths* (Robinson 2009b) was written in Gaden’s last years, when his health state was in rapid decline. It is an impressive, information-packed piece of writing – and moreover it is something as exceptional as a scientific text with distinctive literary qualities! In the first issue of *Antenna* (‘house journal’ of the Royal Entomological Society) the late Miriam Rothschild (1977) addressed the issue of contemporary scientific writing styles and rhetorically asked “Need we be such unmitigated bores?” – As hinted above, Gaden was one of those rare entomology writers who clearly demonstrated that the answer sometimes can be “no”.

The book opens with a succinct ‘Introduction’ chapter with a number of sections, of which ‘Problems and the past’ highlights problems of a general nature, particularly lacking/inadequate illustrations and over-hasty species descriptions with following high synonymy ratios. The section entitled ‘Why Tineidae – why pick on us?’ is entertainingly presented as a conversation between the author and tineid moths, from which the outstanding features of the latter emerge. Here we are told what the emphasis of the book is – and what it is not. The moths “suppose you’re now going to give them [the readers] all that dull spiel about biology, physiology, morphology and classifications and subfamily definitions, repeating yourself yet again from *Tineid Genera of Australia* and *Handbook of Zoology?*”, but the author after stating that “I shall direct the patient reader to Robinson & Nielsen (1993) and Davis & Robinson (1999) for the full Monty...” tersely asserts that the present work “focuses on distribution and biology and if anyone wants any more morphology, or the like, then they can either look it up or sing it themselves. Besides it is bad form to recycle one’s own work too often”. While this last statement may have much to recommend it, and while editors/publishers of the *Monographs on Australian Lepidoptera* and *Handbook of Zoology* will welcome the promotion of the volumes referred to, one may

still ask whether the principle here has been carried to the extreme. We do believe a few pages of annotated morphology illustrations would have been justified and helpful. The need seems particularly obvious for instance in the case of the female genitalia, because neither the *Handbook* nor the Australian volume provide labelled illustrations of certain noteworthy structures referred to in the following text section. Here one otherwise finds a succinct, but informative, account of adult family characteristics, while the immatures are given short shrift: just references to the two above-mentioned treatises. While the next section heading reads “How Tineidae are defined”, one actually here finds no attempt of identifying groundplan autapomorphies of the family, and indeed the author may well have continued to doubt that it has any (this doubt is expressly stated in Robinson & Nielsen 1993: 2), and therefore may well prove eventually to be a non-monophyletic assemblage. It is straightforward to assume, that when the tineids are told that “You do have a fossil record – there are plenty of Tineidae known from the Baltic amber, about 55 mya...” this plenitude also comprises stem-lineage members of other ditrysian families.

We also submit that it would not have been unjustified to ‘recycle’ (and where appropriate, update) at least a number of the *key references* on tineid physiology given in the works already mentioned. Although the subject is clearly outside the scope of the present work, there seems to be a merit in highlighting more strongly that exactly the Lepidoptera-wise very unusual life histories of members of this family render them outstandingly interesting model organisms to biologists outside the systematists/biodiversity researchers’ circles; here they can serve inquiries into mycophagy, coprophagy, keratin digestion, adaptations to extreme dryness – and in particular, into the pathways leading to these physiological capabilities.

The introductory section is closed with an account of the 16 currently recognized tineid subfamilies of which, however, two, viz., the Meessiinae and Myrmecozelinae remain, as it is said, “undoubtedly polyphyletic”. The account is more detailed than that in the *Handbook*, less detailed than that in the Australian volume – and of course it is updated relative to these accounts. The challenging task of unravelling the interrelationships between the subfamilies, and hence in placing the said ecological/physiological specializations in evolutionary context (arguably among the greatest strengths of contributions from ‘the museum approach’ to comparative biology) is left to future workers: subfamily interrelationships were presented as completely unresolved in the previous contributions, and “Little has been added since these publications” (Preface, p. 7). As something new the section enumerates all genera (with global species numbers) assigned to the individual subfamilies. A bonus also not found elsewhere is a list, arranged by zoogeographical regions, of the tineid genera not yet placed in any subfamily; there are no less than 119 (81 monobasic) of these.

The bulk of the book is taken up by the chapter on ‘Distribution, diversity and biology’. It is a genus-for-genus account of known (published and in some cases unpublished, e.g. label information on museum specimens) bionomics of world tineids, organized on a geographical basis, and within geographical units arranged by subfamilies. The first subsection is devoted to “Islands, isolates and invaders” and comprises as many as 40 pages, while 62 are devoted to the predominantly continental faunas, arranged

according to conventional zoogeographical regions. The background for this apparent imbalance is not just that the author always took a special interest in faunas of isolated islands, but also that tineids with their larval dependence on fungal rather than plant material are exceptional colonisers by Lepidoptera standards. Arguably the particularly extensive treatment of the St Helena tineid fauna would have benefited from treatment in a separate full journal article, with only a quite condensed summary in the present book. We make this point not because of the lengthy treatment of the subject, but simply because we found the whole story, including its historical/biographical aspects so fascinating (as well as delightfully presented) that it deserved the wider readership, which could have been attracted if the account had been flagged with a title of its own. Confined to the book it is likely to be found only by micro-moth workers.

The material presented in this central chapter of the book is an impressive compilation of data. Each regional account is opened by a condensed survey of the relevant available literature resources, often accompanied by brief assessments on the quality/usefulness of the works in question – useful ‘consumer’s guidances’, which in some cases come in the form of forthright criticism; the account (p. 80–81) of the Gozmány & Vári book (1973) on Afrotropical tineids is an example. Implicit in this criticism (which we consider well founded) is, then, an emphasis of the need for a new treatment, complying with current ‘best practice’ of the tineid fauna of this region, from which much new material has been procured in recent years. In a general way the treatments of the regional tineid faunas highlight the need for future comprehensive manuals. European workers will feel a particular need for a comprehensive account of the Oriental tineids, like the forthcoming Davis monograph on the Nearctic taxa is indeed „eagerly awaited“ (p. 57), because close links to the Palaearctic fauna are known to exist.

The written account of the global biological diversity of tineid moths is supplemented by a pictorial guide to the diversity in form and colour patterns of the moths. It is presented in 16 plates of colour photographs on which exemplars of a sizable proportion of the world genera (272 out of 341) are depicted in altogether 500 illustrations; the missing ones are consistently ‘rarae aves’ not present (at least as specimens at all suitable for photography) in the NHM collections “or otherwise unavailable for photography in the time-frame available...” (p.8). The pictures are overall good, although the reproduction technique has not enabled them to match the best micro-moth photographs published these years; in several cases they would have benefited from a somewhat higher magnification. The magnification varies considerably between figures which are almost identically sized irrespective of the size of the specimens in question, and while the actual size of the latter can be immediately seen in the captions facing the plates, the variable magnifications do detract from the ease of appreciation of the diversity of the moths depicted. Occasionally the choice of illustrated specimens is debatable, as e.g., fig 278, which illustrates a near-unicolourous dark *Neurothaumasia ankerella*, while the most typical/abundant morph of this taxon has a bold black/white pattern; the congener *N. fasciata* (fig. 279) is similarly variable, but the generic account (p. 74) does not mention this variability.

One of us (NPK) had the opportunity to see a draft of the manuscript and suggested some changes/additions to it. Some of these were followed, others not. As events tur-

ned out, one cannot help being satisfied that the author decided against making any time-consuming additions, such as a compilation of extra references and an extra figure section (and also searching for more photogenic specimens for some plate figures, such as could with certainty have been located in other collections), because every single of them might have compromised the very completion of the book. He was well aware of potential shortcomings but equally of the circumstances under which he was completing the manuscript: “This may well be a valedictory work and if you want it at all, you get it warts and all” was his final statement in the ‘Preface’. His aims and promises, as clearly spelled out in the ‘Introduction’ appear in our judgment to have been overall fulfilled admirably: the book is indeed a comprehensive account of the “biology, distribution and diversity” of the tineid moths of the globe – and as such it will prove an invaluable source of information, and inspiration, to curators, systematists and field biologists (professionals and amateurs alike) for a very long time to come. “*He has left us an extraordinary legacy, for he was an extraordinary man*” was the closing sentence in Gaden Robinson’s (1986) essay about Edward Meyrick’s writings on phylogeny. Very much the same can be said about Gaden himself. *Biology, distribution and diversity of tineid moths* is a fitting copestone to this extraordinary legacy.

Acknowledgements

We are grateful to Drs Malcolm J. Scoble and Klaus Sattler for information and comments.

References

- Beccaloni, G., J. Holloway., I. Kitching, K. Sattler, M. Scoble, K. Tuck & D. Vane-Wright 2009. A tribute to Dr Gaden S. Robinson (1949–2009). – *Systematics and Biodiversity* **7**: 351–355.
- Davis, D. R. & G. S. Robinson 1998. The Tineoidea and Gracillarioidea (Don R. Davis: nontineid families; Gaden S. Robinson: Tineidae). Pp. 91–117. – *In*: N. P. Kristensen, *Lepidoptera, Moths and Butterflies. Volume 1: Evolution, Systematics and Biogeography.* – *Handbuch der Zoologie* **4** (35). – Walter de Gruyter, Berlin. [The correct publication year is not 1999 as printed on the front page, but 1998 as stated in the colophon]
- Gozmány, L. A. & L. Vári 1973. The Tineidae of the Ethiopian region. – *Transvaal Museum Memoir* **18**: i–vi, 1–238, figs 1–570.
- Nielsen, E. S. & G. S. Robinson 1983. Ghost Moths of southern South America (Lepidoptera: Hepialidae). With a summary in Spanish prepared by P. Gentili: “Mariposas Fantasmas del sur de Sudamerica”. – *Entomograph* **4**: 1–192. Scandinavian Science Press, Copenhagen.
- Regier, J. C., A. Zwick, M. P. Cummings, A. Y. Kawahara, S. Cho, S. Weller, A. Roe, J. Baixeras, J. W. Brown, C. Parr, D. R. Davis, M. Epstein, W. Hallwachs, A. Hausmann, D. H. Janzen, I. J. Kitching, M. A. Solis, S. H. Yen, A. L. Bazinet & C. Mitter 2009. Toward reconstructing the evolution of advanced moths and butterflies (Lepidoptera: Ditrysia): an initial molecular study. – *BMC Evolutionary Biology* **9**: 280.
- Robinson, G. S. 1986. Edward Meyrick: an unpublished essay on phylogeny. – *Journal of Natural History* **20**: 359–367.
- Robinson, G. S. 2009a. They call him ‘L.’ It means ‘the’. Pp. 213–222. – *In*: S. Knapp & Q. D. Wheeler, *Letters to Linnaeus.* – Linnean Society, London.
- Robinson, G. S. 2009b. *Biology, distribution and diversity of tineid moths.* – Kuala Lumpur, Malaysia & Natural History Museum, London. 143 pp., 16 coloured pls.
- Robinson, G. S. & E. S. Nielsen 1993. *Tineid Genera of Australia (Lepidoptera).* – *Monographs on Australian Lepidoptera* **2**. CSIRO, Melbourne. xvi + 343 pp.
- Rothschild, M. 1977. Need we be such unmitigated bores? – *Antenna* **1**: 3–5.

ZOBODAT - www.zobodat.at

Zoologisch-Botanische Datenbank/Zoological-Botanical Database

Digitale Literatur/Digital Literature

Zeitschrift/Journal: [Nota lepidopterologica](#)

Jahr/Year: 2010

Band/Volume: [33](#)

Autor(en)/Author(s): Kristensen Nils Peter, Gaedike Reinhard

Artikel/Article: [Extraordinary moths and an extraordinary moth researcher: An essay review of G. S. Robinson's Biology, distribution and diversity of tineid moths 3-8](#)