

# *Differences vs. similarities:*

## Monty Wood's approach to tachinid classification (Diptera: Tachinidae)

by James E. O'Hara

*Canadian National Collection of Insects, Agriculture and Agri-Food Canada, 960 Carling Avenue, Ottawa, Ontario, K1A 0C6, Canada. E-mail: james.ohara@canada.ca*

**When I was growing up** in a small town outside Ottawa in the 1950s and 60s, my view of the world was largely based on what I learned in school, what I saw on two channels of a black and black television set, and what I read in books. We did not have the means to travel much but we had relatives in Montreal and when the world fair opened in that city during the Centennial year of 1967, we visited them and spent a day at Expo 67. For me at the impressionable age of 14, seeing the world on display like that was quite a revelation.

I had no idea at the time that the dipterists at the Canadian National Collection of Insects (CNC) in Ottawa were similarly broadening their horizons in 1967. Their grand plan to coordinate a replacement to Curran's (1934) *Families and Genera of North American Diptera* had been approved the year before and they were hosting German phylogeneticist and dipterist Willi Hennig for three months to discuss phylogenetic principles and dipteran phylogeny. Those early discussions laid the philosophical foundation for the *Manual of Nearctic Diptera* (MND) that developed into three volumes published sequentially in 1981, 1987 and 1989. Monty Wood (1989: v) noted in the Preface to the final volume: "This third volume ... explains the rationale underlying the classification that was adopted in Volumes 1 and 2, using the methodology of phylogenetic systematics developed by Hennig".



**Figure 1.** The *Manual of Nearctic Diptera* coordinators with German dipterist Willi Hennig during his visit to the Diptera Unit in the fall of 1967. Back, left to right: Frank McAlpine, Herb Teskey, and Guy Shewell; front, left to right: Monty Wood, Dick Vockeroth, Bobbie Peterson, and Willi Hennig. (Picture and caption from Cumming et al. 2011: 548.)

Monty had only been on staff in the Diptera Unit of the CNC for a short time, since 1964, when the MND was approved and Hennigian phylogenetics was adopted as a guiding principle. Monty would go on to coordinate the third volume with Frank McAlpine (McAlpine & Wood 1989) and coauthor the chapter on *Phylogeny and Classification of the Nematocera* with Art Borkent (Wood & Borkent 1989) but here I want to focus on Monty's tachinid research leading up to his Blondeliini revision (Wood 1985) and chapter in MND (Wood 1987).

Monty had worked on black flies for his Ph.D. and had used phylogenetic methods during that study. He was also already familiar with tachinids when he was hired by Agriculture Canada to work at the CNC. If he had not known it already, he soon realized as his knowledge of tachinids grew that the most significant work ever written on the Tachinidae and their relatives, the 12-volumes of C.H.T. Townsend's *Manual of Myiology* (1934–1942), was founded on untenable views of tachinid phylogeny. This would not have been so bad if genera were of moderate size and reasonably monophyletic but Townsend restricted most genera to single species and personally described about 1500 genera (Arnaud 1958, Evenhuis *et al.* 2015). The bulk of the new names were given to New World flies and especially Neotropical ones. Townsend's keys to genera are difficult to use and the net effect was summed up in the introduction to Monty's *Taxonomic Conspectus of the Blondeliini of North and Central America and the West Indies*:

“Townsend's generic concepts seldom admitted more than a single species per genus. As more and more species were discovered, he erected new genera for nearly all of them, sometimes relying solely on published descriptions of others. This approach culminated in a vast array of monotypic genera ..., separated on the most insignificant differences, and on occasion, the 2 sexes of the same species separated in different genera. Such excessive splitting at the generic level contrasted with large, undefined, and usually polyphyletic tribes. Subsequent authors, finding it difficult or impossible to assign their new species to Townsend's genera, proposed still more of their own (e.g. Thompson 1968). The result has been the creation of hundreds of what I believe to be unnecessary taxa.” (Wood 1985: 4.)

Monty's solution was to visit museums in the New World and Europe to examine types and rebuild a classification for them, using Hennigian methodology and searching for shared derived character states (synapomorphies). How was this accomplished in an age before computers, spreadsheets and digital cameras? Partly by taking notes but more importantly by committing to memory the features of type specimens:

“It seems to be a matter of training the brain, and my brain has been trained to spot useful details on a tachinid body, and to recognize thousands of profiles and bristle arrangements” (*in litt.* to PHA, 9 February 2000)” (quoted here from Adler & Currie 2021: 8).

The idea of rebuilding tachinid classification from the ground up based on a memory of thousands of described species may sound fanciful; i.e., simply impossible given the diversity of the Tachinidae. Monty was not a boastful man and I never heard him claim to have a phenomenal memory, yet I witnessed it in action time and again. For example, he could often identify a specimen I showed him from his memory of a type he had examined in a collection decades before. Similarly, it was rare to show him a problematic specimen in the CNC that he could not recall having looked at before and wondered about.

At the same time that Monty was visiting collections and memorizing types, he was looking for underlying features that could group them together according to synapomorphies, or at least according to similar characters that might

have a phylogenetic basis upon further study. This seems to have been at the center of Monty's interest in tachinids and he left behind brief notes on the possible synonymy of hundreds of generic names. He was less interested in describing new species—even though he had discovered many—than in placing the old. In his *Blondeliini conspectus* (Wood 1985), for example, he proposed 177 generic-level synonyms, 67 species-level synonyms, and 321 new combinations for species; he described no new genera and only three new species. Similarly, his tachinid key in MND “covertly” proposed almost 200 additional generic-level synonyms for genera mostly from north of Mexico (Wood 1987, reviewed in O’Hara & Wood 1998).

Monty’s philosophy was one of searching for derived similarities, not just differences. I will use his own words to illustrate this:

“By an unfortunate accident of fate, early specialists in the Tachinidae, from Robineau-Desvoidy (1863) to Townsend (1934-1942), have been more concerned with differences than with similarities. This perspective has resulted in finer and finer splitting at the generic level. Proliferation of genera by these authors became an end in itself, at the expense of a deeper understanding of higher levels of classification. Because of the superficial heterogeneity in appearance of many adult tachinids, few stable taxonomic characters have been found that may be depended upon to indicate relationships. Instead, Townsend used various permutations and combinations of the presence or absence of bristles but made little use of their relative size or arrangement. Unfortunately, there are only a limited number of possible combinations of presence or absence relative to the many thousands of extant species and most of them do not seem to serve as a basis for understanding relationships or building a stable classification. Descriptions of new taxa, even today, sometimes neglect to mention unique features, but instead, present further combinations or recombinations of the same limited suites of characters. Furthermore, these character suites are usually not correlated with internal structure, life cycle, larval characters, or other character states; instead, they appear, presumably by convergence or parallel development, in various genera that seem unrelated on other characters of terminalia or developmental stages. Such convergence, multiplied many times over because of the vast number of superficially similar species, has resulted in a long history of incorrect identifications and misunderstandings of relationships, a trend that still continues. A classification based on shared derived character states is badly needed but will be difficult to develop and may be long in coming. This need is now being met by research into internal structures, terminalia, larvae, and life cycles. However, much remains to be discovered, and even the most recent classifications still rely mainly on arrangements of bristles and probably contain few monophyletic taxa.” (Wood 1987: 1200.)

The greatest legacy of Monty Wood in the published world of tachinidology, from my perspective, has been his contributions toward consolidating New World genera into more recognizable entities. By so doing, he made possible the keys to genera of America north of Mexico in MND (Wood 1987) and Central America (Wood & Zumbado 2010), and gave those of us following after him a more solid footing from which to conduct our studies.

As we forge ahead with the Tachinidae we would do well to keep in mind this passage Monty quoted from Hennig in the Preface to the third volume of MND:

“... there is no simple and absolutely dependable criterion for deciding whether corresponding characters in different species are based in synapomorphy. Rather it is a very complex process of conclusions by which, in each individual case, ‘synapomorphy’ is shown to be the most probable assumption. [Hennig 1966: 128].” Wood (1989: v.)

## Acknowledgements

I thank Art Borkent (Salmon Arm, B.C.) and Jeff Cumming (CNC, Ottawa) for their helpful comments on this article.

## References

- Adler, P.H. & Currie, D.C. (2021) [Obituaries.] Tribute to a naturalist and systematist nonpareil: Donald Montgomery “Monty” Wood (1933–2020). *The Simuliid Bulletin*, 55, 2–11.
- Arnaud, P.H., Jr. (1958) The entomological publications of Charles Henry Tyler Townsend [1863–1944]; with lists of his new generic and specific names. *Microentomology*, 23, 1–63.
- Cumming, J.M., Sinclair, B.J., Brooks, S.E., O’Hara, J.E. & Skevington, J.H. (2011) The history of dipterology at the Canadian National Collection of Insects, with special reference to the *Manual of Nearctic Diptera*. *Canadian Entomologist*, 143, 539–577.
- Curran, C.H. (1934) *The families and genera of North American Diptera*. Ballou Press, New York. 512 pp. + 2 pls.
- Evenhuis, N.L., Pont, A.C. & Whitmore, D. (2015) Nomenclatural studies toward a world list of Diptera genus-group names. Part IV: Charles Henry Tyler Townsend. *Zootaxa*, 3978, 1–362.
- Hennig, W. (1966) *Phylogenetic systematics*. Translated by Davis, D.D. & R. Zangerl, R. University of Illinois Press, Urbana. 263 pp.
- McAlpine, J.F. & Wood, D.M. (coords.) (1989) Manual of Nearctic Diptera. Volume 3. *Agriculture Canada Monograph*, 32, vi + 1333–1581.
- O’Hara, J.E. & Wood, D.M. (1998) Tachinidae (Diptera): nomenclatural review and changes, primarily for America north of Mexico. *Canadian Entomologist*, 130, 751–774.
- Robineau-Desvoidy, J.-B. (1863) *Histoire naturelle des diptères des environs de Paris. Oeuvre posthume du Dr Robineau-Desvoidy publiée par les soins de sa famille, sous la direction de M. H. Monceaux*. V Masson et fils, Paris; F Wagner, Leipzig; and Williams & Norgate, London. Tome premier, xvi + 1143 pp. Tome second, 920 pp.
- Thompson, W.R. (1968) The tachinids of Trinidad. VIII. Phorocerines. *Memoirs of the Entomological Society of Canada*, 56, 1–207.
- Townsend, C.H.T. (1934–1942) *Manual of myiology in twelve parts*. Privately published by Charles Townsend & Filhos, Itaquaquecetuba, São Paulo.
- Wood, D.M. (1985) A taxonomic conspectus of the Blondeliini of North and Central America and the West Indies (Diptera: Tachinidae). *Memoirs of the Entomological Society of Canada*, 132, 1–130.
- Wood, D.M. (1987) Tachinidae. Pp. 1193–1269. In: McAlpine, J.F., Peterson, B.V., Shewell, G.E., Teskey, H.J., Vockeroth, J.R. & Wood, D.M. (coords.), Manual of Nearctic Diptera. Volume 2. *Agriculture Canada Monograph*, 28, vi + 675–1332.
- Wood, D.M. (1989) Preface. Pp. v–vi. In: McAlpine, J.F. & Wood, D.M. (coords.), Manual of Nearctic Diptera. Volume 3. *Agriculture Canada Monograph*, 32, vi + 1333–1581.
- Wood, D.M. & Borkent, A. (1989) Phylogeny and classification of the Nematocera. Pp. 1333–1370. In: McAlpine, J.F. & Wood, D.M. (coords.), Manual of Nearctic Diptera. Volume 3. *Agriculture Canada Monograph*, 32, vi + 1333–1581.
- Wood, D.M. & Zumbado, M.A. (2010) Tachinidae (tachinid flies, parasitic flies). Pp. 1343–1417. In: Brown, B.V., Borkent, A., Cumming, J.M., Wood, D.M., Woodley, N.E. & Zumbado, M.A. (eds.), *Manual of Central American Diptera*. Volume 2. NRC Research Press, Ottawa. xvi + 715–1442.