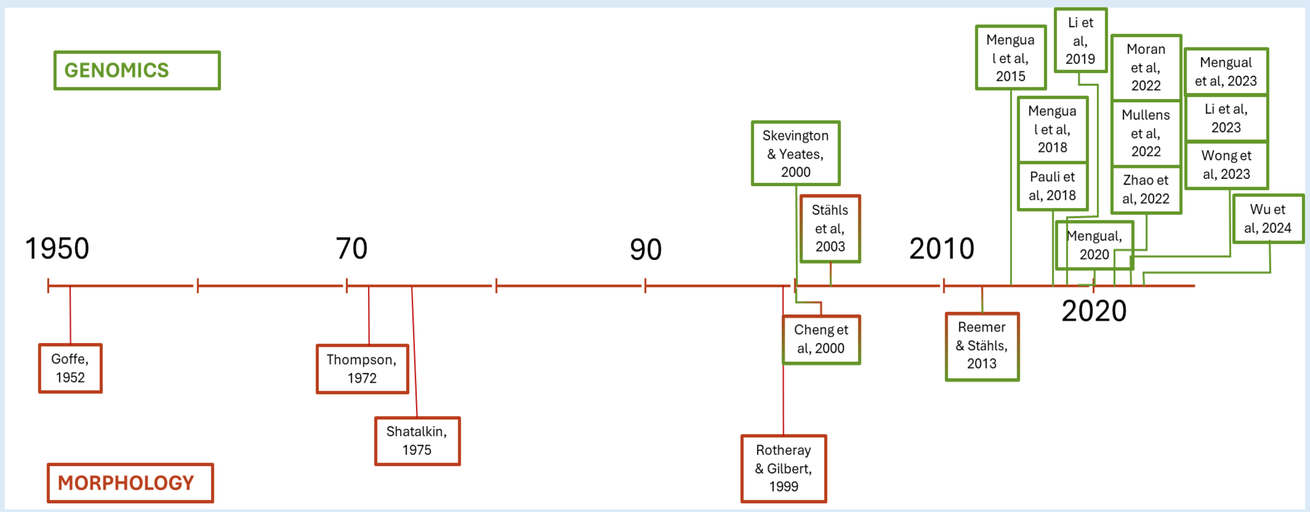
Beyond Genomics: Why Morphology Remains Essential for Syrphid Phylogenetics

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Syrphidae phylogeny: significant progress has been made in clarifying syrphid phylogeny, but some deep relationships remain uncertain.



Timeline of major suprageneric systematic works on Syrphidae since 1950
Color coding highlights whether each study is based on morphology, genomics, or both.

Recent progress
In recent years, substantial effort has been devoted to improving our understanding of syrphid phylogeny.

Genomics dominance
Genomic approaches have become the dominant framework for reconstructing evolutionary relationships

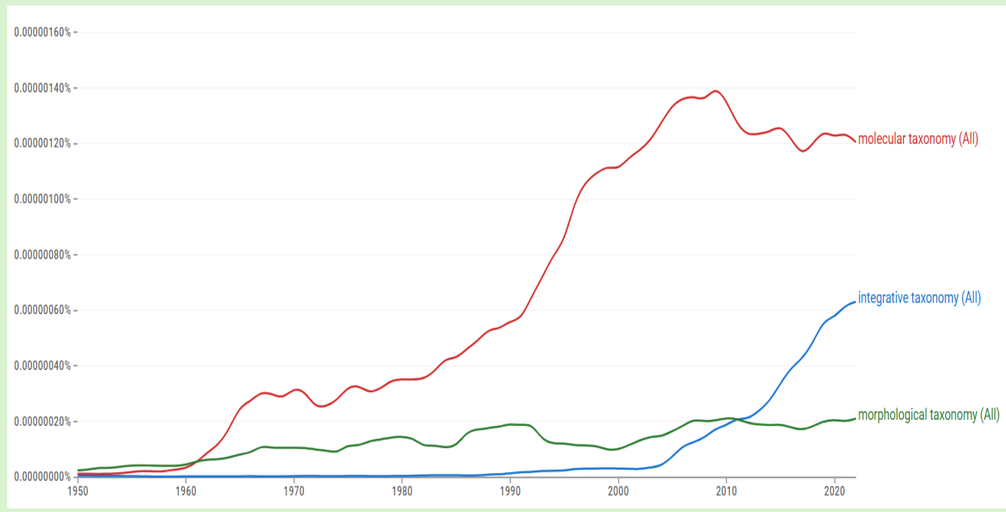
Limits of mixed approaches
Even in studies combining morphology and genomics, morphological datasets often rely on old, pre-existing character codings.

Growing use of Integrative taxonomy
References to integrative taxonomy have increased markedly in recent years, including within Syrphidae (mainly at genus and species levels).

A long-standing concept
The integrative view of characters is not new: Hennig already emphasized that characters reflect the multidimensional "total form" of an organism: " … *the totality of its physiological, morphological, and ethological characters*" (Hennig, 1966)

Unresolved issues
Key challenges remain, including how to reconcile conflicting morphological and genomic signals when they point to different evolutionary scenarios.

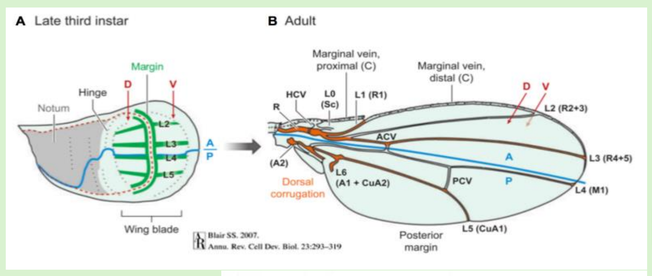
Integrative taxonomy: old concepts, new names.

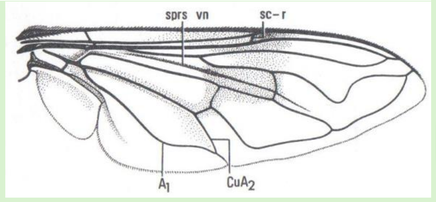


Trends in taxonomic terminology
Relative frequency of the terms "morphological taxonomy", "molecular taxonomy", and "integrative taxonomy" in published literature (Google Ngram Viewer).

Is morphology really a solved chapter in syrphid systematics?

Character development: the developmental basis of many morphological characters is still poorly understood



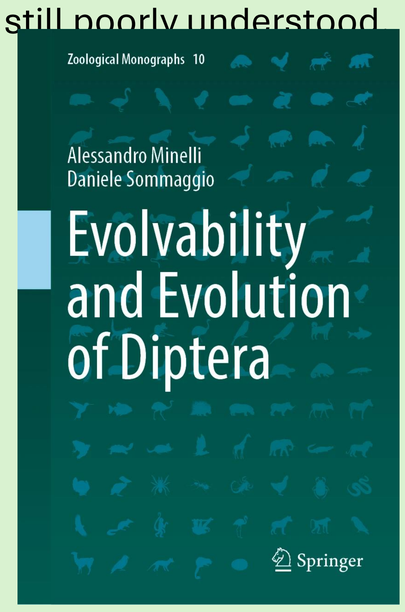


Compartment boundaries in *Drosophila* in the wing disc and adult (after Blair 2007) and the spurious vein in Syrphidae.

The evo-devo approach:
Many discussions focus on character fitness and correlations, but rarely on the developmental mechanisms that generate new traits — the "arrival of the fittest".

A case study: the spurius vein
The spurious vein lies exactly at the boundary between the anterior and posterior compartments in *Drosophila* wing — coincidence or a developmental signal?

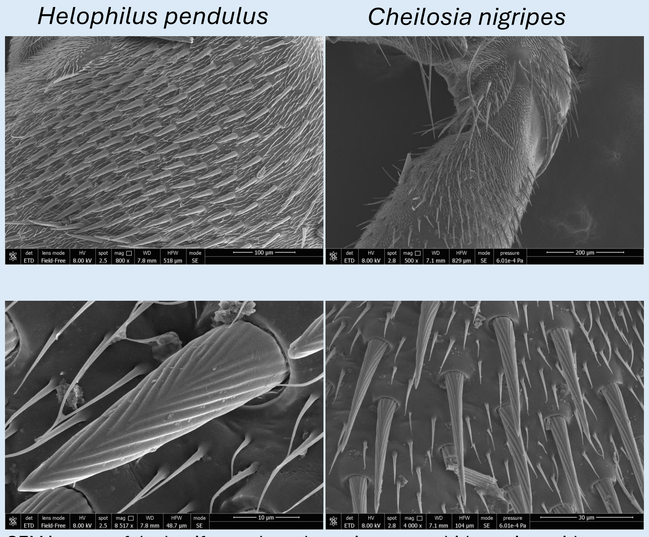
A broader perspective
These developmental and functional aspects of dipteran morphology are explored in depth in a forthcoming book.



Cover of a forthcoming volume on Diptera (August 2026).

Beyond superficial morphology: for many morphological characters, our knowledge remains superficial, limited to external appearance rather than structure, function, or variability.

Helophilus pendulus *Cheilosia nigripes*

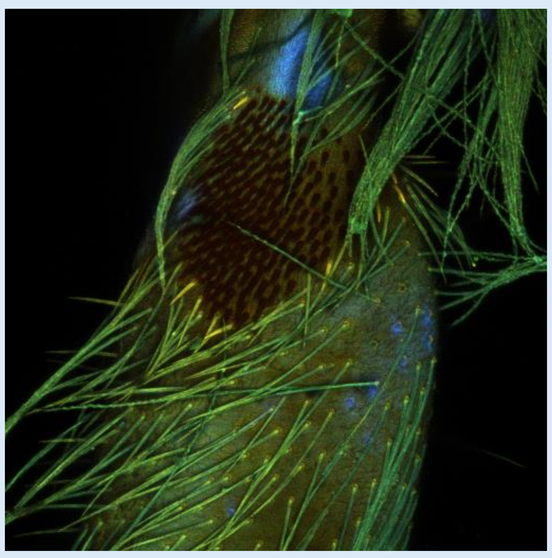


SEM images of the basifemoral setal area in two syrphid species, with close-up views of the setae.

Case study: basifemoral setae
"The basal setal patch on the hind femur will readily distinguish the eristalines from all other syrphid taxa except *Merodon*." Thompson, 1972

Function and homology
Their functional role is unclear, and putative homologues are present in other syrphid lineages (and probably in non-Syrphidae)

Do we really know their structure?
Their autofluorescence under confocal microscopy differs sharply from adjacent hairs, revealing how little we actually know about their internal structure.



Confocal image of the basifemur of *Eristalis tenax*, showing the basifemoral setae and their distinct appearance.

Genomes reconstruct the trees of life; morphology explains them.