

A comparative study of the growth in knowledge of biodiversity, taxonomy and systematics in the order Hymenoptera

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Introduction and Objectives

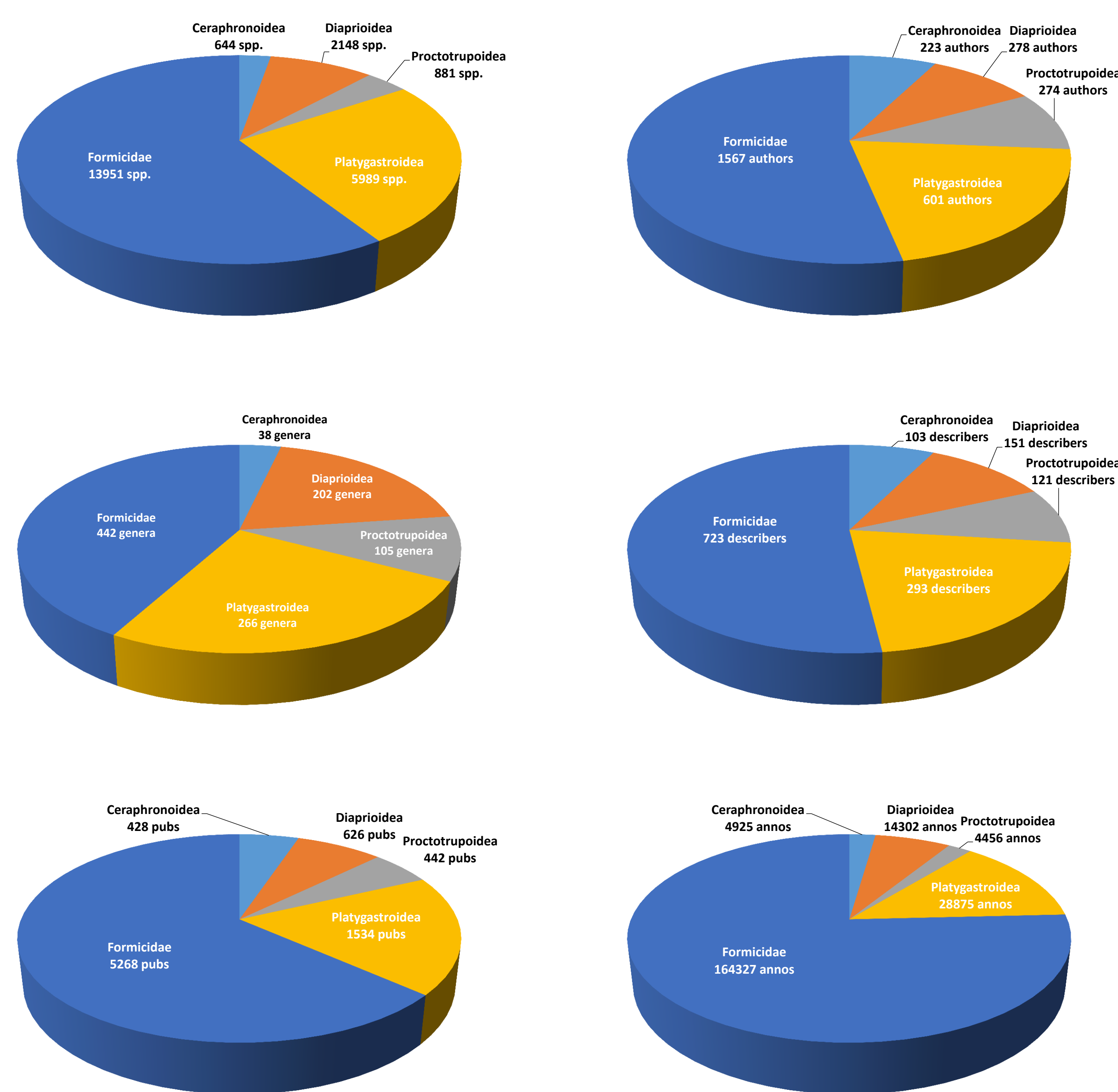
In the 258 years since the publication of *Systema Naturae*, our understanding of the composition and extent of the Earth's biodiversity has grown unevenly. Some groups are relatively advanced and (nearly) complete. Others lag behind, as a result of their rarity, difficulty in study due to their small size, lack of popularity or “charisma,” etc.

The ants (Formicidae) are a universally known, popular, and extensively studied group in the order Hymenoptera. In contrast, parasitoid wasps are considered to be very poorly known. The initial objective was to compare the growth in knowledge of ants with that of parasitoid groups so as to predict how and how quickly we can understand the true extent of parasitoid diversity.

The present work is made possible by data available from a comprehensive review and annotation of the entire corpus of taxonomic or systematic literature of 5 groups within the order Hymenoptera: 1) Formicidae, 2) Ceraphronoidea, 3) Diaprioidea, 4) Proctotrupoidea, and 5) Platygastroidea. These taxa represent three distinct lineages: the Aculeata (ants), the basal Apocrita (ceraphronoids), and three superfamilies within the Proctotrupomorpha. The data are accessible through the **Hymenoptera On-Line** database portal (hol.osu.edu).

Taxon Size and Overall Effort

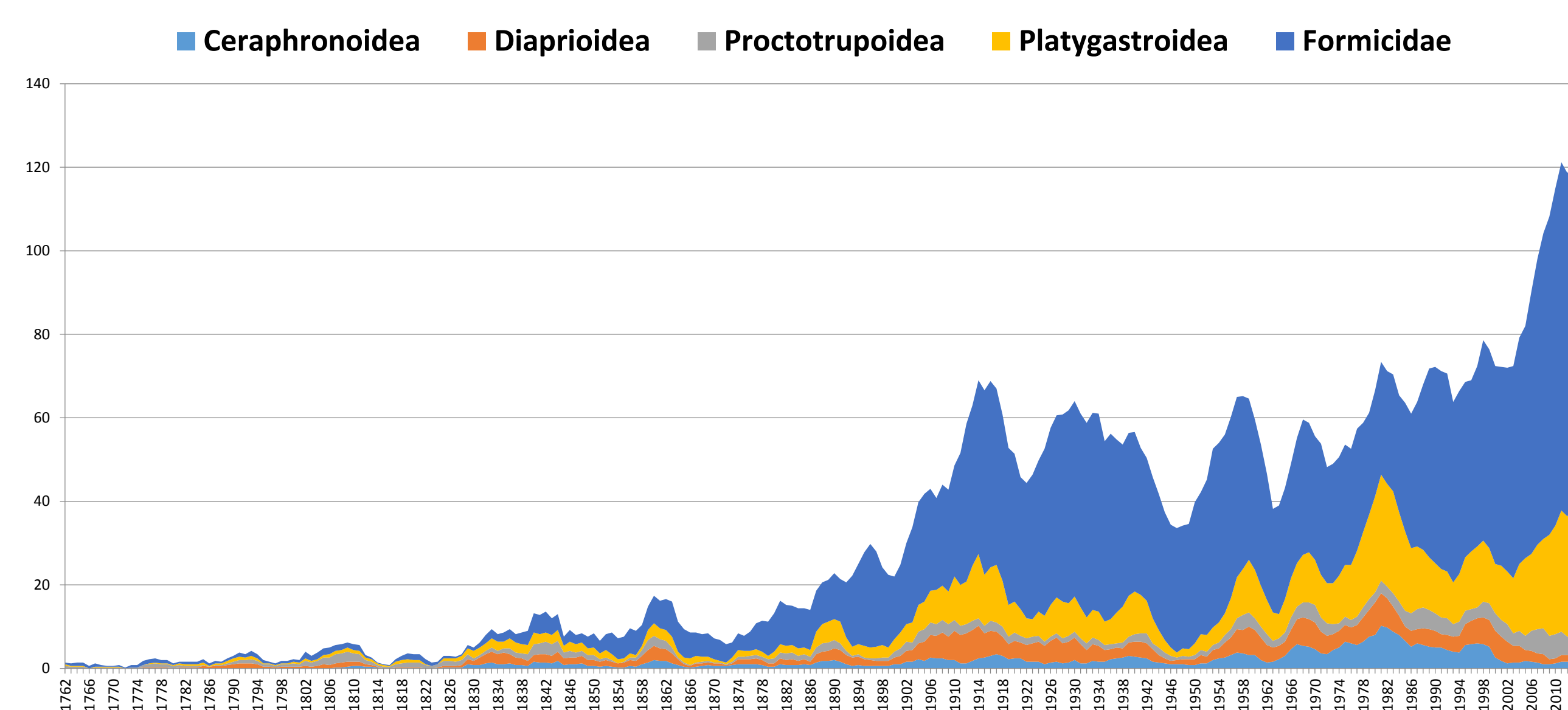
The five focal taxa vary significantly in their overall size, measured as numbers of **species** and **genera** currently considered to be valid; the number of people studying them, measured as number of publication **authors** and **describers** of species; and in the output of the authors, measured as the number of **publications** and the number of **annotations** taxonomic or nomenclatural acts within those publications.



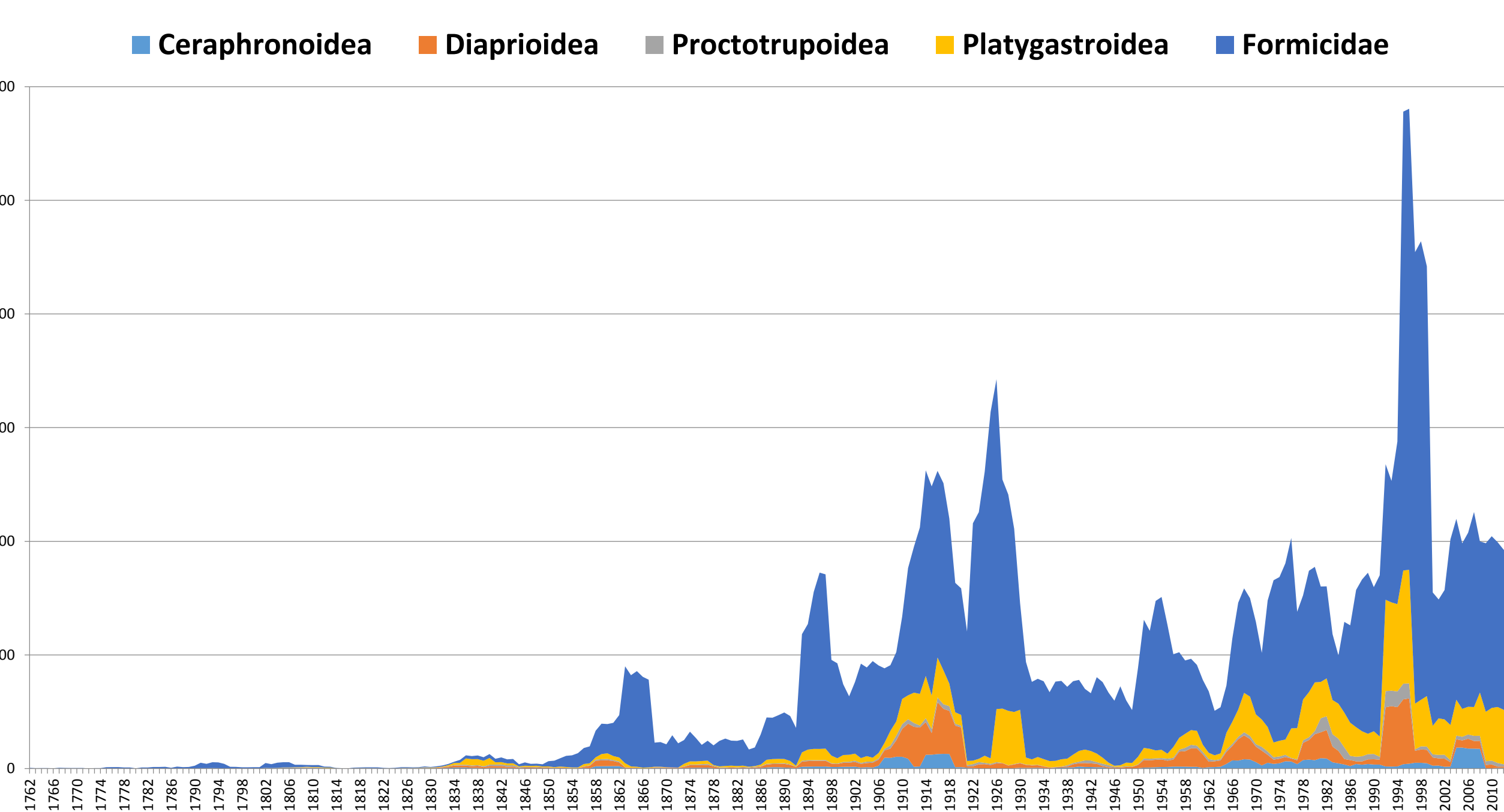
Progress Through Time

The scientific output of researchers on these groups has not grown in a consistent manner over the years. Rather, the number of publications and number of taxonomic/nomenclatural acts has progressed sporadically, neither consistently increasing nor cycling.

Number of publications - 5 year moving average

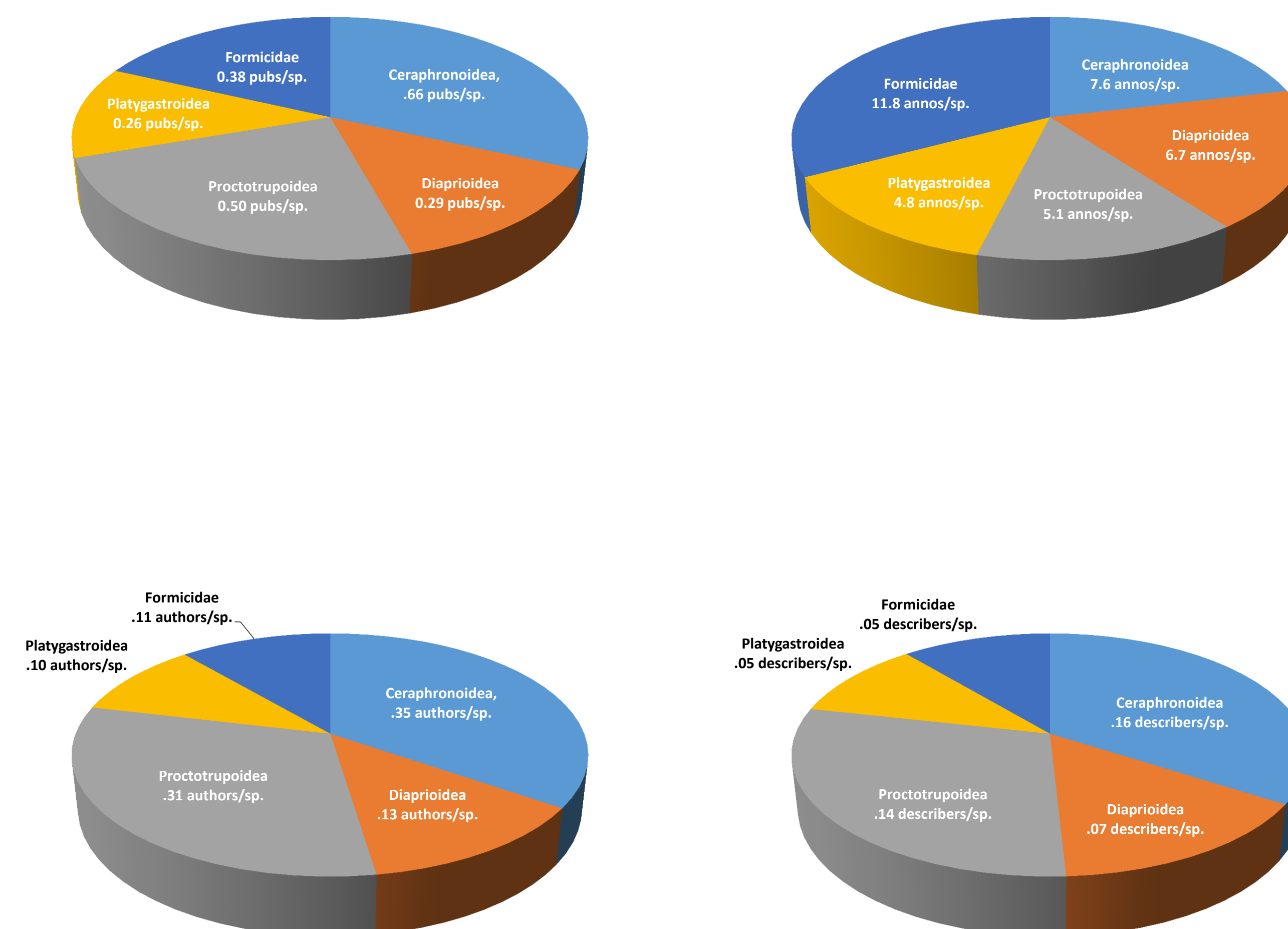


Number of annotations - 5 year moving average



Relative Output and Effort

Despite the significantly greater investments in effort and output in the ants, these measures – expressed on a per species basis – are similar across all groups.

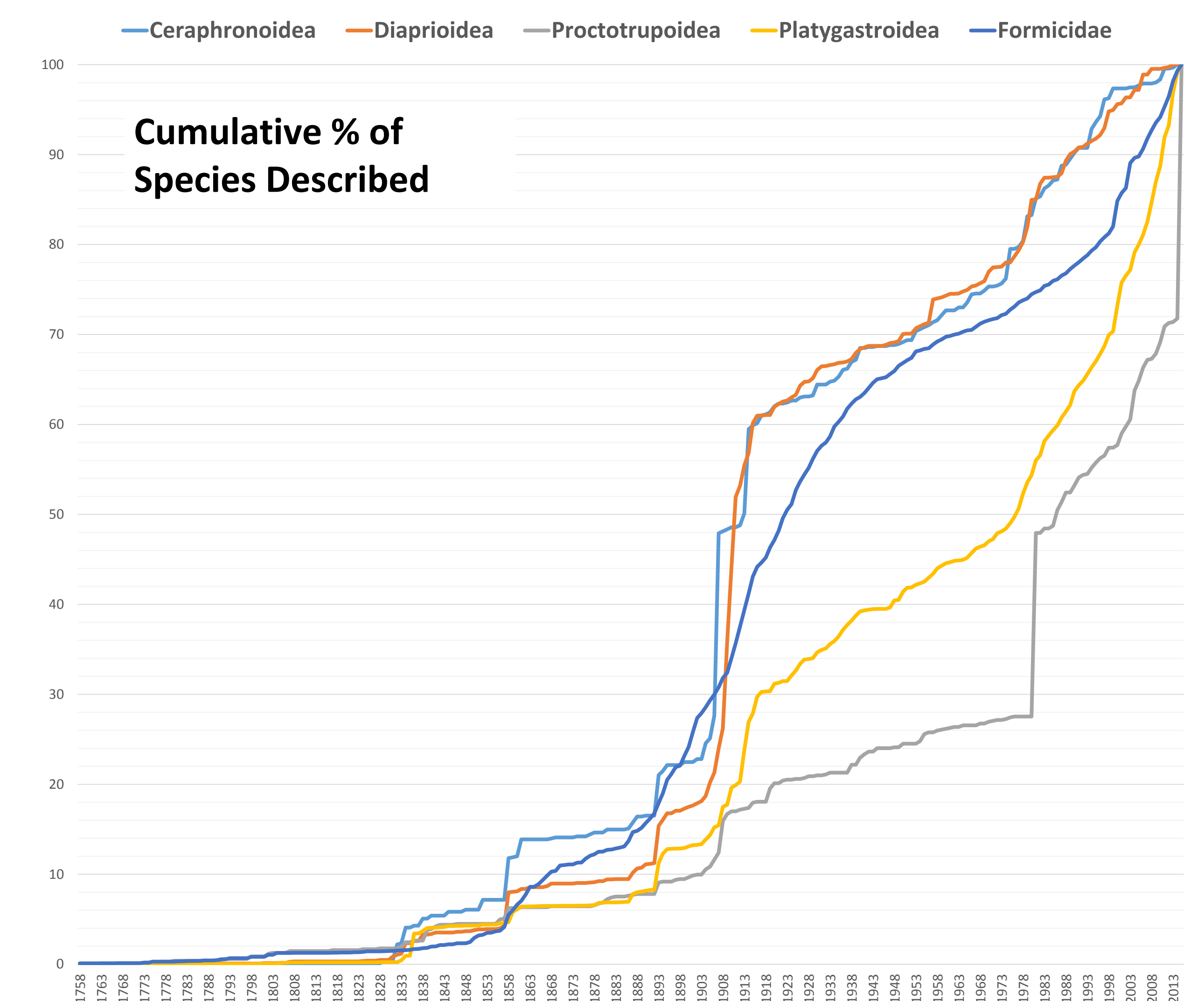


An Aside: Diversity Among Students of Diversity

Following the flurry of interest from Lindon et al. (2015) on the role of women in taxonomic description of land plants, the contributions of men and women were compared. In contrast to land plants, new species description is still an active field in the 5 focal taxa. No more than 7.9% of species were described by women, and the proportion of those species is lower than the representation of women describers. There is one exception, the Platygastroidea, in which 98 more species were described by women than would be expected.

Historical Record of Species Description

The pattern of accumulation of new species over the past 258 years is similar among all taxa compared. None yet show any reduction in the rate of description, in contrast, most seem to be accelerating. No relation is apparent between the size of the group and the rate of species description.



Materials and Methods

All publications on systematics or taxonomy of the five taxa were examined, and the occurrence of taxonomic or nomenclatural acts was documented. Contributions falling into that category include descriptions, diagnoses, identification keys, type information, synonymies, generic transfer, replacement names, and taxonomic catalogs. The gender of every author analyzed was individually determined. All data are stored in the Ohio State implementation of the xBio:D database system and are accessible through the HOL portal (hol.osu.edu). xBio:D is handles data on specimens, characters, literature, distribution, and media. It currently is being used to manage data for 1.5M specimens, 386K taxon names, 18.6K publications, 26.7K people, and 311K annotations. See xbiod.osu.edu/osucWiki/Main_Page for further details.

Reference

Lindon, H.L., L.M. Gardiner, A. Brady & M.S. Vorontsova. 2015. Fewer than three percent of land plant species named by women: author gender over 260 years. *Taxon* 64(1). DOI: 10.12705/642.4.

Acknowledgments

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