16th Editorial of the IMS Newsletter

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We are entering – with some delay– the 5th year of the International Mycorrhiza Society (IMS) Newsletter. In this Editorial, I reflect on five-year trends of the Top 10 mycorrhizal research papersprovide updates on new members of our team; and as usual, a summary of the content in the current issue.

A reflection on the Top 10 mycorrhizal papers

According to a questionnaire sent to IMS members, among all sections of the Newsletter, the 'Top 10' mycorrhizal research papers was the most highly ranked by 73% of respondents. The Top 10 is a collective effort which nevertheless is under the subjectivity of the voting panel. Over the past 15 issues of the IMS Newsletter, a panel of between 12–17 scientists from around the world and at different career stages, selected a total of 150 Top 10 papers, from a pool of 2560 papers published between September 2019 and August 2024. To compile such a list, I search terms like "mycorrhiza", "ectomycorrhizal", "arbuscular", and "mycorrhizal" in Google Scholar, ensuring that the selected records include only Web of Science-indexed articles. I also search articles in the published issues of *Mycorrhiza*, *New Phytologist*, *Fungal Ecology*, *Symbiosis*, *Soil Biology and Biochemistry*, *Applied Soil Ecology*, *Plant and Soil*, *Rhizosphere*, *Science* and in *Nature* journals (includes *The ISME Journal*), *PNAS* journals, *Cell* journals (includes *Trends in Plant Science*), *Plant Physiology*, and *G3*. Based on this search, I obtain between 473 and 546 papers per year, albeit surely much more mycorrhizal research is being published worldwide every year. These are very exciting numbers and news for our very niche field!

I evaluated the 150 papers making up the Top 10 lists to explore how these papers were assessed in the wider literature and to identify trends in the types of top-ranked studies. First, it should be noted that many of the Top 10 papers have hundreds of citations. Of the 45 papers ranked in the top three positions across the issues, 19 surpassed 100 citations (at the writing of this Editorial). Articles by Delgado-Baquerizo et al. (2020) in *Nature Ecology & Evolution*; Genre et al. (2020) in *Nature Reviews Microbiology*; Soudzilovskaia et al. (2020) in *New Phytologist*; Miyauchi et al. (2020) in *Nature Communications*; Carmona et al. (2021) in *Nature*; and Jiang et al. (2021) in *New Phytologist*, had greater than 200 Web of Science citations. I checked the Web of Science for the five most cited articles from 2020 to 2024 and compared them to our 45 Top 3 articles and found that only five papers appeared on both lists, indicating that our panel does not necessarily vote for the most cited papers, which tend to be general reviews. Instead, the panel highly ranks original research.

I also split the 150 papers by mycorrhizal type (**Fig. 1**), area of study (**Fig. 2**), and type of study (**Fig. 3**). Regarding mycorrhizal type (**Fig. 1**), most of the Top 10 papers focus on arbuscular mycorrhizal fungi (AMF), although a sizeable proportion of papers —usually ecological ones—- investigate two or more mycorrhizal types simultaneously.

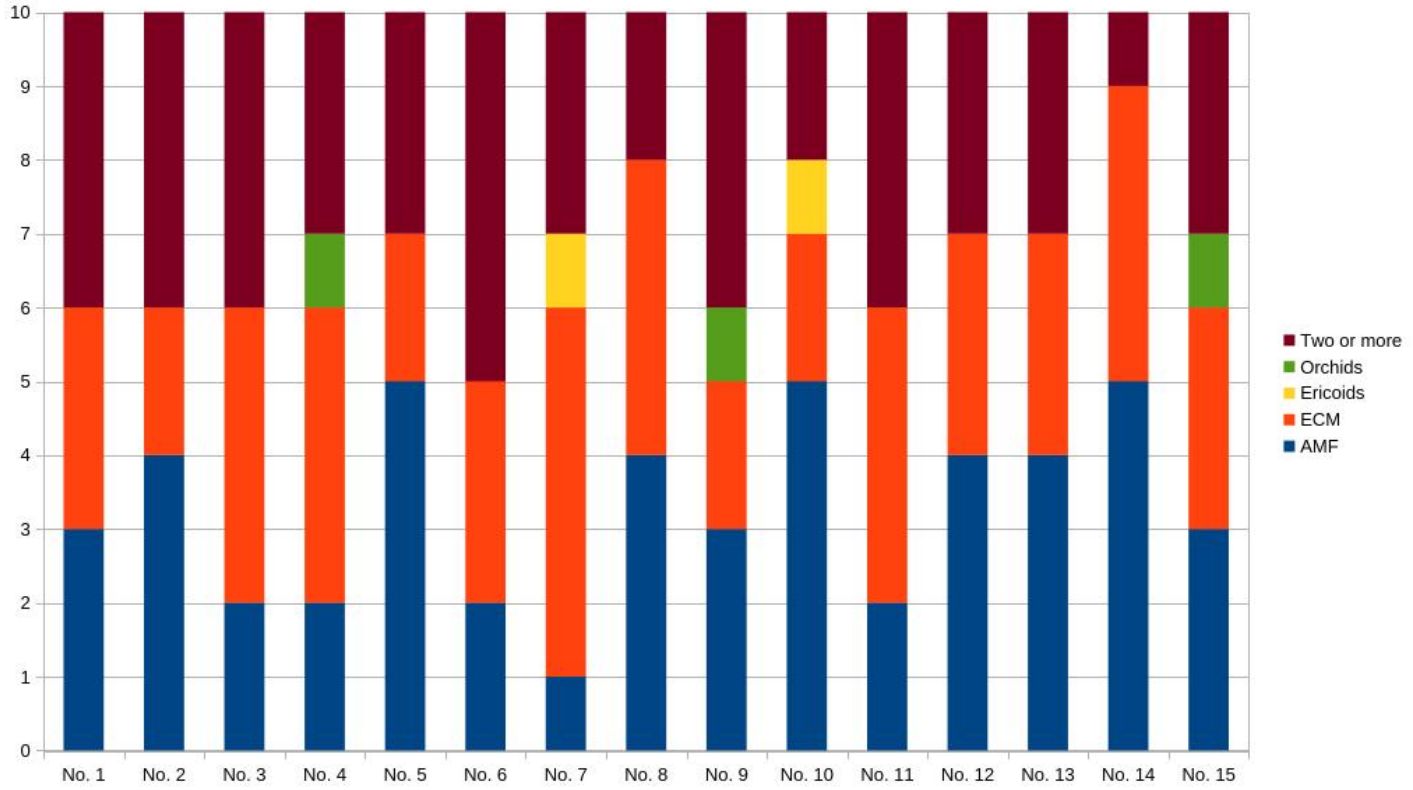

Figure 1. Distribution of mycorrhizal types of the Top 10 mycorrhizal research papers across the IMS Newsletters (No. 1 = March 2020; No. 15 = December 2024). AMF: arbuscular mycorrhizas; ECM: ectomycorrhizas.

Papers with an ecological focus made up the highest proportion of the Top 10 papers, followed by studies in molecular biology (**Fig. 2**). Studies on evolution and applications of mycorrhizal research were scarce in the Top 10. (Fig. 2). I wonder whether this trend reflects a bias in the voting panel, a bias in the field of mycorrhizal research, or both.

Finally, I split the 150 papers by publication type (**Fig. 3**): lab or greenhouse experiment, field studies, review, methods, or meta-analysis/ data mining. In this case, there is no clear dominance of any category, albeit lab/greenhouse experiments and field studies combined make up most of the Top 10 papers.

In this issue

As always, please find on page 9 the Top 10 mycorrhizal research papers of the last four months (papers published between September and December, 2024). The first place article was published by Adrien Anckaert on *Current Biology*, and investigated how *Bacillus velezensis* colonozied the whole mycelial network more efficiently than roots, and how it uses such hyphae for soil invasion and colonize new plants. The second place article was a Tansley review published by Rebecca A. Bunn and co-authors in *New Phytologist*, where they discuss evolutionary (biological market models) and physiological (carbon surplus hypothesis) frameworks, as models that have been used to understand what determines carbon plants to mycorrhizal fungi. Please also find an interview about it, in the YouTube channel of the South American Mycorrhizal Research Network (@whatweareareading6719). An article published in New Phytologist by Tessa Camenzind and co-authors, was ranked third. They discuss how arbuscular mycorrhizal (AM) fungal life-history

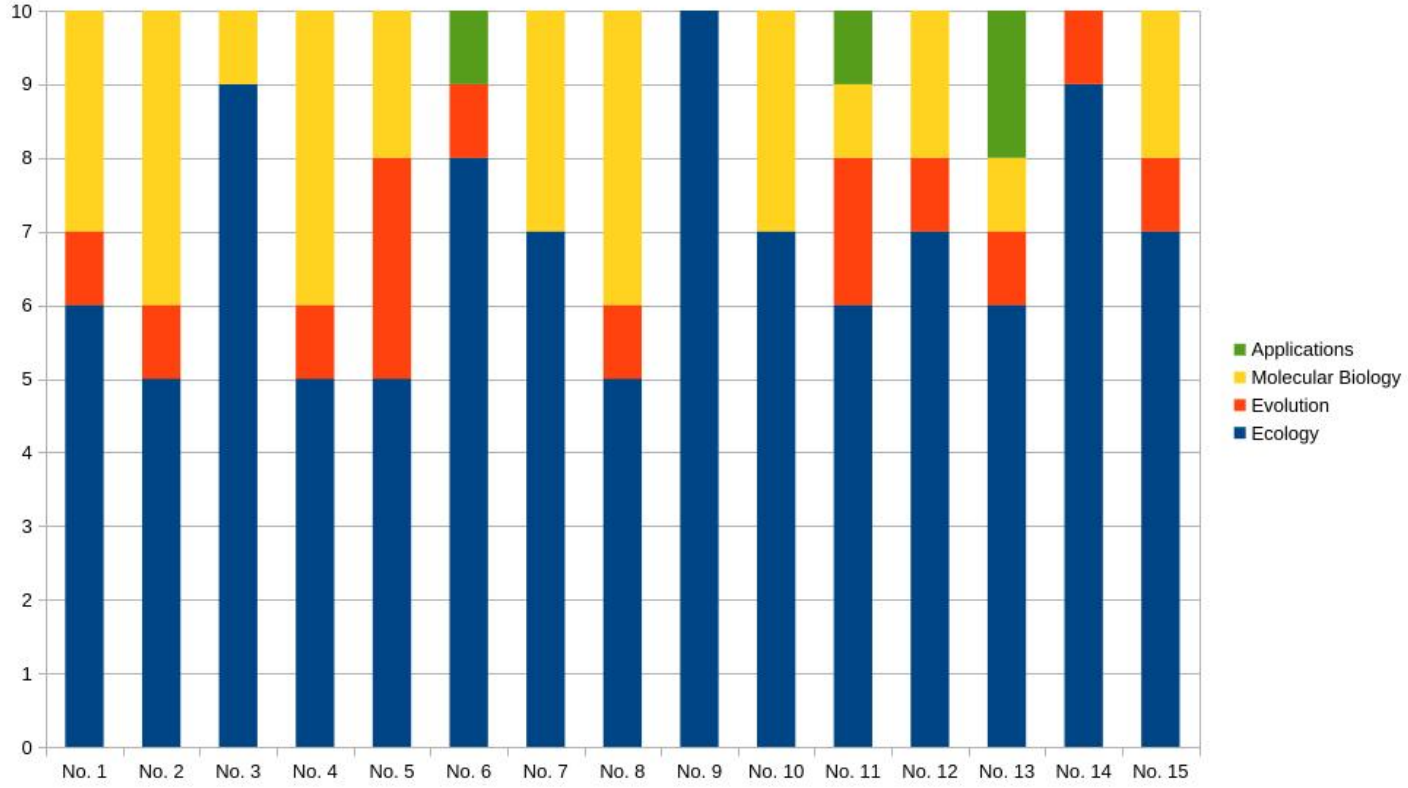

Figure 2. Distribution of study areas of the Top 10 mycorrhizal research papers across the IMS Newsletters (No. 1 = March 2020; No. 15 = December 2024).

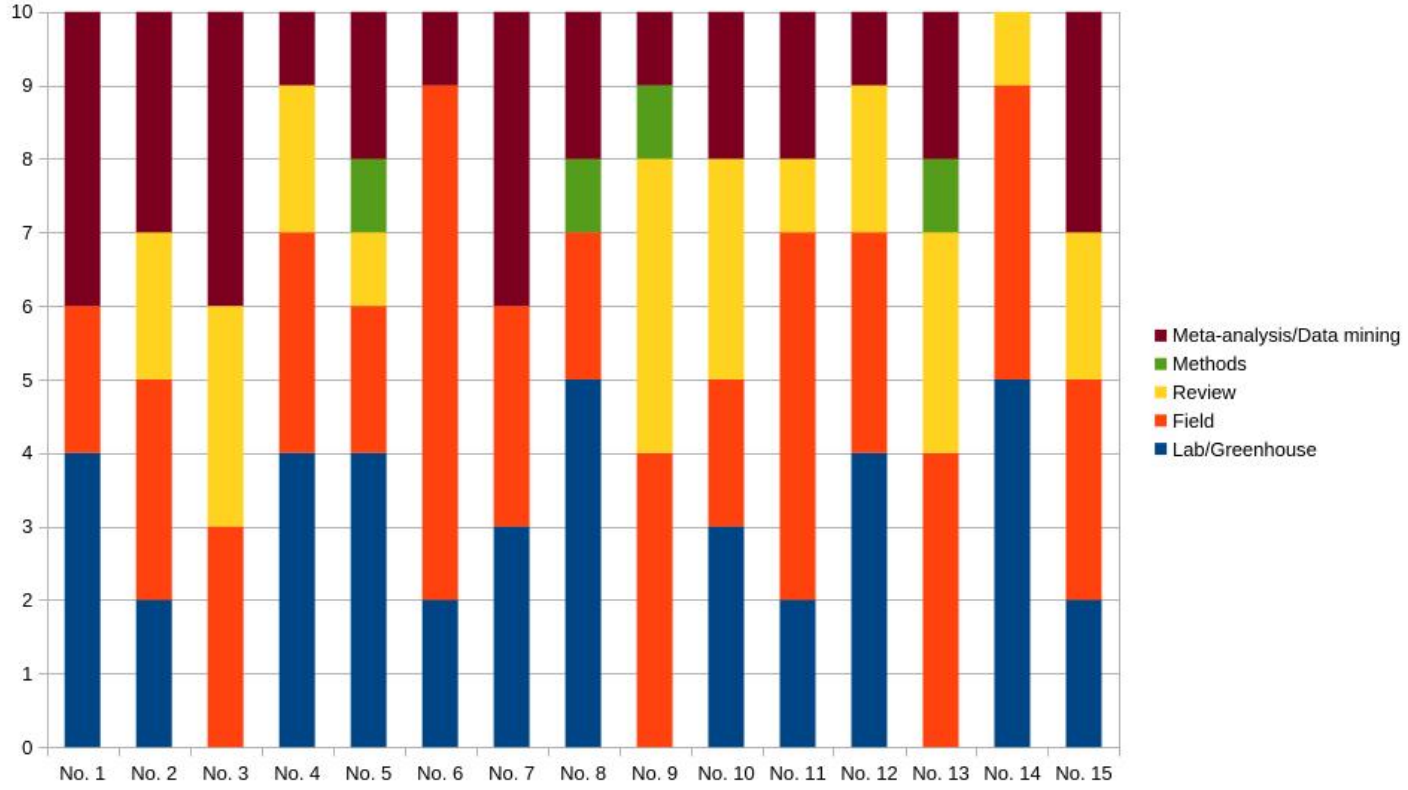

Figure 3. Distribution of publication type of the Top 10 mycorrhizal research papers across the IMS Newsletters (No. 1 = March 2020; No. 15 = December 2024).

theories often focus on differential investment into intraradical vs. extraradical structures among AM fungal taxa, and its implications for plant benefits. They expand such theories by integrating a mycocentric economics- and resource-based life-history framework.

This 16th issue of the IMS Newsletter includes one meeting report, one short article, and one YouTube interviews. The meeting report led by Sarah A. Cuprewich and co-authors details the topics and themes, advances, methods, takeaways, and future research directions discussed during our 12th International Conference on Mycorrhizas (ICOM) held in Manchester, United Kingdom, on 4-9 August 2024. This meeting report reflects equal contributions from a combination of early career and senior researchers whose research crosses a variety of disciplines. Please also find a short article by Nicholas Medina and co-authors on a project on fungal phenology aimed "to know if the timing of fungal reproduction matches the production patterns and species shifts happening underground".
One YouTube interview conducted by César Marín with Prof. Matthias C. Rillig (Freie Universität Berlin), about his recent *New Phytologist* paper entitled "Concurrent common fungal networks formed by different guilds of fungi" (Rillig et al. 2025).

As always, IMS Seminars, Tools, and Events are also highlighted.

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