What's going on with French flora? An approach based on traits related to pollination and floral characteristics

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Résumé

The majority of flowering plant species have a mutualistic interaction with pollinating insects, such that plant and pollinator communities are interdependent. Hence, the current pollinator decline can induce changes in the composition of plant communities, with pollinator-dependent plant species being more affected. Conversely, the depletion of floral resources is involved in the decline of pollinators. This suggested role of pollinators on changes in flora composition is still generally demonstrated only locally and few studies are led on common plants at a large scale. Using 16 years of structured plant monitoring data produced by the citizen science scheme Vigie-flore, coupled with plant trait databases, we aimed to assess whether temporal trends in the abundance of common plant species are related to plant species traits and particularly those related to pollination. Skilled amateur botanists monitored a total of 715 systematically sampled sites across France, which yielded enough data to estimate temporal trends (2009-2022) in abundance for over 500 common plant species. To identify the characteristics of increasing, stable or declining plant species, we selected floral traits related to pollination (*e.g.* corolla colour and shape, nectar quantity) and plant (*e.g.* life form). We identified a pollination syndrome by applying a multivariate analysis of mixed data on trait data, which separated species with brush green flowers and without nectar on one side of axis 1 vs. species with yellow corolla, bilaterally symmetrical, tube-shaped and abundant nectar on the other side. We observed a trend for a negative relationship between the estimated temporal trends in plant abundance and the pollination syndrome, which is in line with previous studies indicating a decline of plants depending on pollinators for their reproduction. However, traits related to pollination only explained a small fraction of the variation in temporal trends in plant abundance. Further analysis will integrate more ecological traits, such as Ellenberg indices, to better elucidate the drivers of current temporal changes within plant communities and evaluate their consequences in terms of resources available for pollinating insects.

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Mots-Clés: Flowering plants, Temporal trends, Floral traits, Pollination, Plant pollinator interactions, Citizen science, France