In the context of animal-mediated pollination, sharing pollinators between plant species creates a balancing act between two ecological opposites: mutualism and competition. Sharing pollinators can be beneficial because it allows plant species to harness positive feedback loops between populations. It can also be detrimental to co-flowering plants because pollen can be lost to foreign flowers and stigma surface can be occupied by foreign pollen. However, these detrimental effects of sharing pollinators are poorly understood at the community level because, at this scale, many other factors play a role in shaping species interactions. Specifically, here we quantify the potential negative impact that the number of interacting species can play on the pollination service while accounting for the structure of the interactions, the pollen flows that occur within it, and the traits of the species that integrate the community. We found that there is indeed a trade-off between the number of interacting partners and both the quantity and quality of pollination received by different flowering plants. However, the trade-off’s role on pollination service is relatively small when compared to other ecological factors. In particular, competition for pollinators is more strongly shaped by density effects caused by the species abundance and the amount of pollen the plant produces, as well as its functional originality. While sharing pollinators can be detrimental for plant fitness, when scaling up to empirical communities, we show that plants can compensate for these detrimental effects using other ecological mechanisms.