The social implications of treating floral resources as a common good

I'm not a sociologist. So when a new sociology paper on the topic of competition between managed honey bees and native wild bees was recently published, I wanted to see what I could learn.

As readers of this column have probably been noticing, lately I've been covering several new papers on the topic of competition between managed honey bees and native wild bees. It's a hot-button issue that can elicit an emotional response from many people. But I've also seen that nearly everyone wants to learn more. For the past year, this has been my most-requested talk topic at beekeeping clubs, conservation groups, and land management agencies. I've had four New York State legislators ask me for the current state of science and I'm presently summarizing knowledge on this topic for a major international company that's carefully considering their future involvement with beekeepers due to concerns about environmental sustainability. In other words, the broader public is starting to become aware of this topic, which means the stakes are starting to grow.

What the peer-reviewed literature has to say is becoming clearer due to a couple recent review papers (Mallinger et al. 2017; Iwasaki & Hogendoorn 2022) and several additional studies published in just the last year. Of the 102 peer-reviewed scientific studies that have investigated competition between managed honey bees and native wild pollinators, 69% of studies have found or inferred a negative impact, while 31% of studies have found or inferred no impact. The majority of peer-reviewed literature is comprised of observational studies, especially changes in presence, abundance, and foraging behaviors of wild pollinators in response to varying abundances of honey bees. However, 41 of the 102 studies have been manipulative (e.g., experimentally manipulating apiary presence/absence) and 66% of these studies have found or inferred a negative impact. Notably, only three studies have assessed impacts of managed honey bees on wild pollinator reproduction. Of these, two studies have found that presence of honey bees reduced reproduction in wild mason bees and yellow-faced bees (Hudewenz & Klein 2015; Paini & Roberts 2005), while the other study did not find an impact on reproduction of stingless bees (Roubik 1983).

The paragraph above shows there's still more research needed on this topic, but it also shows that competition between managed honey bees and native wild bees is context-dependent. In other words, we shouldn't be asking, "Does competition occur?" Instead, we should be asking, "When and where does competition occur, and how can we minimize competition in sensitive locations?"

This latter question is inherently social because it's we (i.e., social humans) who are deciding when and where we feel competition should be reduced or avoided. So, what can sociology tell us about competition between managed honey bees and native wild bees? Is it useful to consider floral resources as a common good? What are the main obstacles to collective governance of floral resources that can help reconcile beekeeping with conservation? These are the topics for the sixty-eighth *Notes from the Lab*, where I summarize ***"Competition between wild and honey bees: Floral resources as a common good providing multiple ecosystem services,"*** written by Léo Mouillard-Lample and colleagues and published in the journal ***Ecosystem Services*** **[2023].**

For their study, Mouillard-Lample and colleagues first developed a conceptual model for the human – bee – flower social-ecological system (see Figure 1). Floral resources are the central component of the model and are consumed by either honey bees or wild bees (shown in yellow boxes). The bees provide ecosystem services including hive products, biodiversity, and pollination (shown in blue) which benefits beekeepers, farmers, and wild bee advocates (shown in green at the right side of the model). The people who provide floral resources are foresters, farmers, and landscape managers (shown in green at the left side of the model). And because the people on the left are not the same as the people on the right, there are intermediaries (shown in green at the bottom of the model) who hear from the beneficiaries and providers to influence decision-making regarding floral resource access and management. These are local policymakers, natural area managers, and landowners.

Next, to understand how this model functions from beekeepers' perspec-

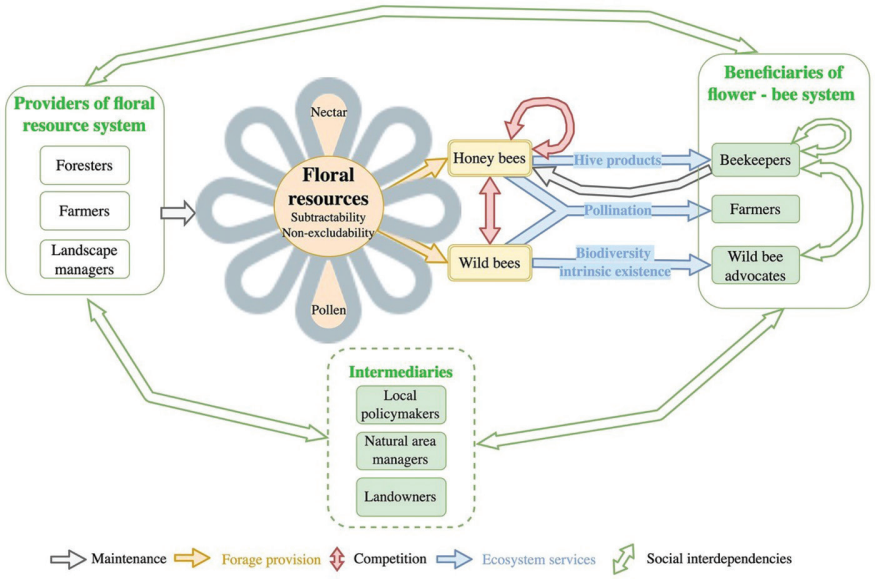

Figure 1. *Conceptual model of the human – bee – flower social-ecological system, drawing on common-pool resource theory and a framework on ecosystem services and social interdependencies.*

tives, the authors interviewed 34 beekeepers who place their hives within the Cévennes National Park of France (see Photo 1). In this region there are approximately 300-320 beekeepers who manage ~26,000 colonies, many of which are moved seasonally from the valley forests or the Mediterranean scrublands (spring) to mountain meadows (late spring), then back to lower elevations for chestnut bloom (mid-summer) and eventual overwintering (see Figure 2). The Cévennes area has a long history of beekeeping that's closely linked to production of the region's sought-after chestnut and heather honey. On the wild bee side of things, there are at least 264 species of wild bees within the National Park. Some species, including some bumble bees, are currently experiencing range contractions and possible population declines.

Gabriel Gonella

Lead author Léo Mouillard-Lample (closest to camera) conducts an interview with a beekeeper in the Cévennes area of southern France.

Beekeeper interviews lasted from 1-4 hours. Each interview started by asking for a description of the interviewee's beekeeping operation and practices, including current and past activities and their migratory circuit. The interviewees were then asked about their perception of floral resources, their use of these resources, the main changes affecting the availability of resources, and the evolution of their beekeeping practices.

So, what did they find? Do beekeepers consider flowers to be a limited resource that can lead to competition? It depends. Many interviewed beekeepers perceived nectar and pollen to be unlimited resources during major blooming periods but limited during periods of low flowers. There was recognition that periods of low flowers could lead to competition between colonies, and there was also recognition that overstocking apiaries could lead to competition between colonies.

That said, there was limited belief that competition between honey bees and wild bees could occur, even during times of low floral resources. Several beekeepers felt that honey bees and wild bees feed on different floral resources, or they challenged the idea that honey bee competition could have an impact on the availability of resources for wild bees, even though they acknowledged it could have an impact on competition between colonies within their own apiaries. Beekeepers often pointed out the problem of resource availability rather than resource distribution — in other words, they felt the problem was more about climate and land-use changes that are decreasing the availability of resources, and less about a potential increasing number of colonies in the region.

How about the interdependency between providers and beneficiaries of floral resources? Do beekeepers recognize this interdependency? Yes and no. On the one hand, floral resources were mostly viewed as natural resources. On the other hand, changes in agricultural practices were perceived as responsible for the lack of resources. This ambiguity regarding how beekeepers perceive providers of floral resources almost certainly hinders communication that could lead to improved floral resources.

Are any policies being implemented to limit competition between bees? Interestingly, yes. Due to numerous conflicts among beekeepers, some beekeeper organizations decided to set up a "good practices" charter. They recommended separating apiaries by a minimum of 300 meters and allowing no more than 70 colonies per apiary.

The professional beekeepers interviewed questioned the relevance of the rules and were frustrated by not being consulted in the development of the charter. The wild bee advocates surveyed also questioned the charter, considering the threshold as insufficient to limit competition between honey bees and wild bees. No farmers were involved in the development of the charter, although it also recommended good practices for farmers (e.g., avoiding the use of pesticides).

Nonetheless, the charter is an interesting attempt to regulate the social interdependencies related to competition for floral resources. This indicates that floral resources are indeed perceived as a common good, and that many beekeepers understand they need to collectively organize to regulate use of this common good.

What are the next steps to more effectively implement policies? Let's take another look at Figure 1. Some beekeepers (i.e., beneficiaries) provided feedback on the charter, but not all beekeepers were engaged and no farmers or wild bee advocates were

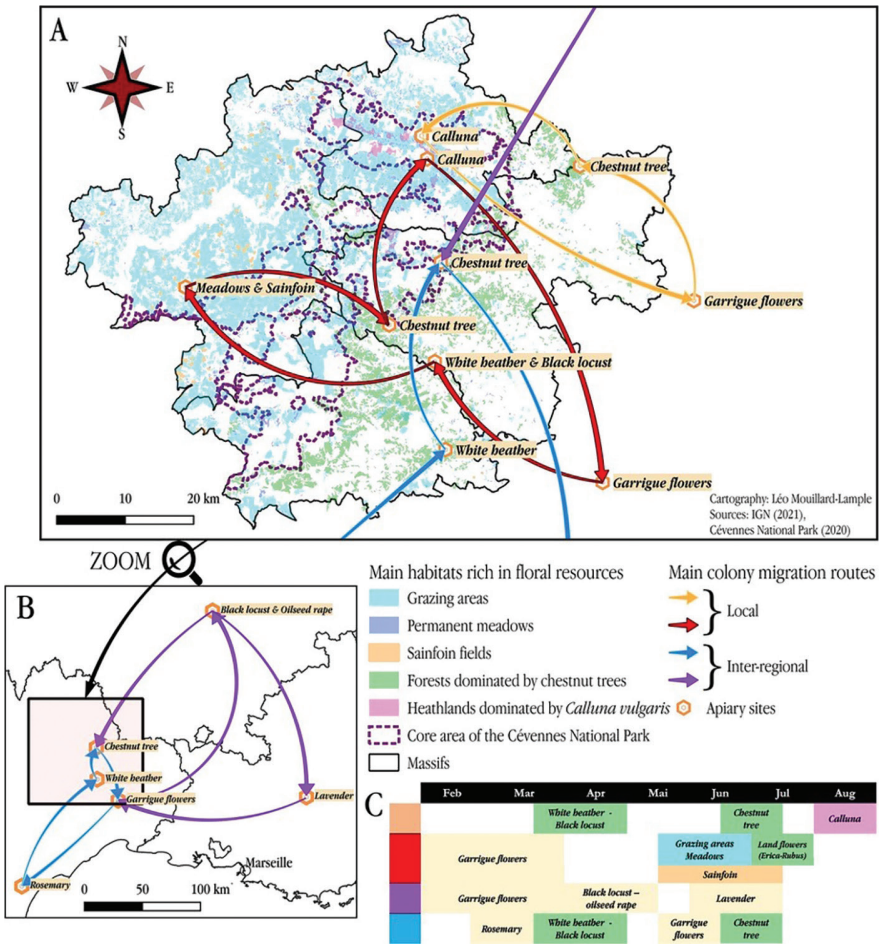

Figure 2. *Migratory beekeeping routes in the Cévennes area. There are two systems of colony migration: (A) a local system whereby colonies are moved locally within the Cévennes area and surrounding garrigue, and (B) an inter-regional system. Colony migration follows the phenology of mass-flowering resources (C). Apiary sites and colony migration routes are schematic examples of typical routes obtained from interviews.*

engaged. No providers were engaged (left side of Figure 1), but most importantly, no intermediaries (policymakers, natural area managers, and landowners) were engaged. I think it's pretty clear that engagement with each of those groups is the next step. The beekeeper-driven charter is the right idea in concept, but it lacked rigor and support because all relevant stakeholders were not involved in its development and implementation.

Getting all relevant stakeholders in one room (or Zoom room, nowadays) certainly isn't easy. But it can be done! If we're going to make tangible real-world progress on the topic of competition between managed honey bees and native wild bees, these meetings need to take place. Conveniently, the invitation list has been provided to us via Figure 1 in the paper by Mouillard-Lample and colleagues.

Until next time, bee well and do good work.

Scott McArt

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Scott McArt, an Assistant Professor of Pollinator Health, helps run the Dyce Lab for Honey Bee Studies at Cornell University in Ithaca, New York. He is particularly interested in scientific research that can inform management decisions by beekeepers, growers and the public.

Email: **shm33@cornell.edu**
Lab website: **blogs.cornell.edu/mcartlab**
Pollinator Network: **cals.cornell.edu/pollinator-network**
Facebook: **facebook.com/dycelab**
Twitter: **@McArtLab**