On the Use of "Wild" and "Feral" for Free-living Honey Bees

by Michael Thiele

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Across regions where honey bees live outside human management, researchers and land stewards face a recurring question of language: whether to call these colonies **wild** or **feral**. Apis Arborea, a nonprofit research and conservation organization dedicated to wild, free-living honey bees, describes self-sustaining, unmanaged honey bee populations as wild. The sections below set out what the term means, why current research favors it and how it is properly distinguished from feral. The framework applies to any free-living population, in any region, that meets the conditions described here.

A free-living honey bee population is properly described as wild when it meets three conditions:

1. **Self-sustaining reproduction.** It persists across years through its own reproduction, independent of swarms from managed hives.
2. **Independence from management.** It lives without treatment, feeding or beekeeping intervention, and reproduces apart from the surrounding managed colonies.
3. **Adaptation through natural selection.** Its traits, including tolerance to *Varroa destructor* and its associated viruses, are shaped by natural selection.

The sections that follow explain each condition and the evidence behind it, and distinguish wild from feral.

What "wild" means

In current usage, "wild" names a mode of living. Kohl and Rutschmann define wild honey bee colonies as ownerless and unmanaged colonies that occupy natural nests at sites they settled themselves.[1] This framework describes a wild cohort as self-sustaining when it persists through its own reproduction across a 10-year period, independent of swarms from managed hives. Kohl and Rutschmann developed this definition, which the 2025 IUCN (International Union for Conservation of Nature and Natural Resources) Red List assessment subsequently adopted.[2] Following Seeley, we add a third element the literature treats as characteristic of wild colonies, which is adaptation shaped by natural selection.[3] A population that meets all three of these conditions, wherever it lives, is properly described as wild.

A term increasingly used in research papers

The choice of "wild" follows a clear direction in contemporary literature. Across recent studies of unmanaged honey bees, "wild" has moved into standard use, with "free-living" alongside it as a careful neutral synonym. Thomas Seeley, the most cited authority on these populations, is the clearest example. He used "feral" in his 2007 Arnot Forest study[4] and adopted "wild" in his titles and abstracts from 2015 onward,[5] including the subtitle of his 2019 book.[3] Rangel and colleagues, who used the older term in earlier work, now describe the Welder Wildlife Refuge population as wild.[6] McCormack and colleagues in Ireland use "wild" freely across their field studies and public science.[7] The forest studies of Rutschmann and Kohl in central Europe report on wild and free-living colonies in the same spirit.[8] This usage recognizes that the honey bee retains an independent, self-directed life in unmanaged settings, the quality the term "wild" is meant to name.

A self-sustaining population

A wild population sustains itself across years through its own reproduction. Kohl and Rutschmann model the

The Galbreath Wildlands Preserve

intrinsic growth of wild honey bee populations from colony survival and swarming rates.[1] Under the swarming rate they adopt, a wild population sustains or expands itself once its annual colony survival exceeds about one-third (this also depends on the reproduction rate and may change for different populations; for example, *scutellata* hybrids may have much higher reproduction rates). Across the seven European countries they studied, the population in southeast England had the highest survival at 37% and was the one projected to grow on its own. Documented survival above this threshold is strong evidence that a population reproduces on its own, apart from any supply of swarms from managed hives.

Long-term studies of free-living populations in North America record survival well above this level. At the Arnot Forest, a research preserve in New York, Seeley found that established wild colonies survive winter at about 84% and live an average of five to six years, while newly founded colonies survive their first winter at about 23%.[9] At the Galbreath Wildlands Preserve in California, Apis Arborea has documented consistently high annual survival among free-living honey bees, drawn from five years of continuous monitoring within an ongoing long-term study.[10]

Independence from managed colonies

A wild population persists independently of the managed colonies around it. Seeley applied this criterion at the Arnot Forest, where a population qualifies as wild when its persistence does not depend on swarms escaping from managed apiaries, and he confirmed that independence through genetic distinctness from nearby managed colonies.[5] Genetic evidence of this kind and sustained monitoring are now a common way to establish independence. At the Galbreath Wildlands Preserve, for instance, mitochondrial analysis found that every sampled wild colony belonged to the M lineage, while managed colonies at the two nearest apiaries belonged to the C lineage that dominates commercial beekeeping, indicating a population reproducing on its own maternal line apart from the surrounding managed stock.[11] A population that lives without chemical treatment, supplemental feeding or beekeeping intervention, and that can be shown to persist on its own, meets this condition.

Shaped by natural selection

Living free of treatment, wild populations develop tolerance to *V. destructor* and its associated viruses through

A wild honey bee swarm

natural selection. This process has been observed across widely separated populations. At the Welder Wildlife Refuge in Texas, wild colonies go untreated against varroa, which has enabled the natural selection of more mite-tolerant bees.[6] At the Arnot Forest, a wild population has persisted with varroa without treatment for decades.[4] In Ireland, free-living colonies persist and reproduce without treatment.[7] Wherever a population carries adaptations of this kind, shaped by selection rather than by management, it satisfies the third condition.

A species living wild

The term also rests on the nature of the animal itself. In "The Lives of Bees," Seeley grounds domestication in human genetic control and shows how limited that control has been over *Apis mellifera*.[3] Artificial selection of honey bees is barely a century old. It has produced no distinct breeds, and its genetic effects dissipate across generations as queens mate freely on the wing with drones from surrounding unmanaged colonies. In the wild, the genetics of honey bees is shaped primarily by natural selection favoring colonies that succeed on their own. The heredity of the species remains governed by natural selection, even where beekeepers manage the colonies' immediate

Monitoring wild honey bees at the Galbreath Wildlands Preserve

Wild bees at the Galbreath Wildlands Preserve

surroundings. A colony living on its own carries forward an ancestral, self-directed way of life, and any population sustaining itself in this way sits at the wild end of the spectrum.

Wildness and origin are separate questions

Because honey bees arrived in the Americas with European colonists, some observers assume the term "feral" must apply. This joins two separate questions. Nativeness concerns where a species originated. The distinction between "wild" and "feral" concerns how a population lives and whether it descends from a domesticated form. "Feral" marks a member of a domesticated species living free of human control. It turns on whether a domestication history exists. Nativeness is a separate matter. Introduced species that were never domesticated are described as wild or naturalized as a matter of course.

The domestication premise is itself the weak link. The heredity of the honey bee has remained under natural selection, the species carries no distinct breeds, and breeding effects dissipate through open mating. A species whose genetics were never brought under sustained human control has no domesticated form to have lapsed from. Even under a strict reading that treats any managed animal living free as feral, feralization is a process with an endpoint. When a population readapts through natural selection, sustains itself demographically and diverges genetically from managed stock, the literature recognizes it as wild.

The North American mustang is a closer example. Descended from domesticated horses that Europeans brought beginning in the 1500s, it adapted to the western range through natural selection over the following centuries, and federal law now recognizes and protects it as a wild free-roaming animal regardless of its nonnative origin.[12] Any honey bee population that meets these same conditions is recognized as wild in the same way.

Set within an ecology of belonging, nativeness resolves into a matter of degree and relationship. Ecologies evolve continuously, with humans among their constituents, and a species present for roughly four centuries has entered the living relationships of the places it now inhabits. A naturalized species lives wild in the same way any free-living animal does.

The term "feral" still has useful work to do. Reserved for recently escaped, swarm-dependent colonies that have not yet shown independent persistence, it gains a precise technical meaning and sharpens the contrast with established wild populations wherever they occur.

References

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