Characteristics of the Principle Honey Bee Stocks Found in the U.S.

	Italian honey bee *Apis mellifera ligustica*	**Carniolan honey bee** *Apis mellifera carnica*	**Caucasian honey bee** *Apis mellifera caucasica*	**Buckfast honey bee**	**Russian honey bee**	**African honey bee** *Apis mellifera scutellata*	**German / black honey bee** *Apis mellifera mellifera*
Origin	Italy	Alps of east-central Europe	Caucasus mountains in Eurasia, near the Black Sea	mixed	Primorsky region of eastern Russia, decedent of several subspecies	Central and eastern Africa, to South Africa	Northern regions of central Europe, from UK to Germany
Queen color	golden yellow to leather brown	generally dark with lighter regions in areas	very dark, Tend to be jet black	variable as a hybrid	variable, but generally brown to black	variable	black, with some brownish
Drone color	somewhat variable, but generally yellow to dark brown	dark body, gray and brown, thoracic hairs	black body, black thoracic hairs	variable as a hybrid	variable, but generally brown to black	variable, often brownish abdomen	dark, black to brown
Worker color	golden yellow to brown with yellowish bands on abdomen	gray to almost black, with gray/brown stripes on abdomen, high color variation	black, body with gray bands on abdomen, black thoracic hairs	variable as a hybrid, but often brown with black stripes on abdomen	variable, but generally brown to black	variable	dark, black to brown
Tongue length	short to medium	medium to long	long	average	average	*	short
Defensiveness	average	low	low	low to average	average	very high	average to high

	Italian honey bee *Apis mellifera ligustica*	**Carniolan honey bee** *Apis mellifera carnica*	**Caucasian honey bee** *Apis mellifera caucasica*	**Buckfast honey bee**	**Russian honey bee**	**African honey bee** *Apis mellifera scutellata*	**German / black honey bee** *Apis mellifera mellifera*
Worker behavior on combs	calm	calm	calm	variable, but generally calm	runny	very nervous and flighty, prone to boil out of hive	nervous, flighty
Robbing tendency	high	low	average to high	average	average	average to high	*
Propolis use	average	low	high	low to average	average	high	low
Swarming tendencies	average	high, swarms earlier in season	low, swarms later in season	average	average	very high	average to high
Tendency to abscond	low	low	low	low	low	high	low
Overwintering ability	average, with large clusters	very good, with smaller clusters	low to average, especially in colder climates	average to good	good, with small to average clusters	none (colonies typically do not survive temperate winters)	very good
Honey consumption during winter	high	low	low	low	low	not applicable	average
Spring colony growth	average	rapid	slow	average	average	rapid	slow
Brood production	high	average	average	average to high	average	high	average

	Italian honey bee *Apis mellifera ligustica*	**Carniolan honey bee** *Apis mellifera carnica*	**Caucasian honey bee** *Apis mellifera caucasica*	**Buckfast honey bee**	**Russian honey bee**	**African honey bee** *Apis mellifera scutellata*	**German / black honey bee** *Apis mellifera mellifera*
General disease tolerance	average, somewhat tolerant of AFB and EFB	average to high	average, susceptible to *Nosema*	high, good hygienic behavior, good tolerance to tracheal mites	average to high	average to high	low, especially to EFB and AFB
Tolerance to *Varroa*	average	average	average	average	high	high	variable as reported in the literature
Notes on wax production	quick to produce good quality wax	slow to build comb, but produces nice combs with clean cappings	tends to produce "wet" cappings on combs	*	*	quick to produce combs	average propensity to construct combs, but produces good comb
Honey production	high	high	average	average to high	average	average for colony size	low to average

*Information is not available in the literature related to the given trait.

Sanford, M.T., Bonney, R.E. 2010. Storey's Guide to Keeping Honey Bees. Storey Publishing, North Adams, MA, USA. 246 pp.

Winston, M.L. 1987. The Biology of the Honey Bee. Harvard University Press, Cambridge, MA, USA. 281 pp.

Magnini, R.M. 2014. Identifying characteristics of honey bee races. American Bee Journal, 154(6): 645-648.

Caron, D.M., Connor, L.J. 2013. Honey Bee Biology and Beekeeping. Wicwas Press, LLC. Kalamazoo, MI, USA. 368 pp.

Dietz, A. 1992. Honey bees of the world. In The Hive and the Honey Bee (J. Graham, ed.), Dadant and Sons, Hamilton, IL, USA. 1324 pp.

Shimanuki, H., Flottum, K., Harman, A. (eds.) 2006. The ABC & XYZ of Bee Culture, 41st Edition. The A.I. Root Company, Medina, OH, USA. 911 pp.

Honey Bee Characteristics Defined

Brood production – This relates to a colony's likelihood of producing copious amount of brood during the spring expansion period. "High" indicates that a bee stock produces lots of brood while "low" indicates that the colony produces comparatively little brood.

Colony growth in spring – This refers to how early a colony initiates growth in spring and the rate at which it grows. Slow growing colonies come out of winter with small clusters and are slow to expand. Rapid growth is exhibited in colonies that have nearly explosive growth after winter. These tend to produce more honey during the spring season.

Colony population in summer – This refers to the relative number of adult worker bees in a colony during summer. Some bee stocks produce colonies that have high summer populations while others produce colonies with low populations. This affects a colony's use of resources, vulnerability to pests and pathogens, and use under varying management paradigms.

Defensiveness – All stocks of honey bees exhibit some level of defensiveness, some more so than others. This is rated from low (a colony that is hard to provoke) to very high (a colony that attacks with little provocation). The term "defensiveness" is preferred to "aggression" because the later implies that the bees seek out and preemptively strike potential threats. Honey bees are defensive, not aggressive.

Drone color – The color pattern associated with a typical drone bee of a given stock.

General disease tolerance – The general ability of a given bee stock to tolerate the various bee pests/pathogens that typically affect colonies, *Varroa* excluded. "Low" indicates a stock generally is vulnerable to many pests/pathogens. "High" indicates that the stock is tolerant of many pests/pathogens.

Honey consumption during winter – Some bee stocks go into winter with high adult populations, thus making them very likely to consume large amounts of their honey stores during the winter (high). This can lead to problems, such as starvation, in prolonged winters. Other colonies overwinter with smaller clusters and have a lower tendency to consume honey (low). These bee stocks are more likely to survive winter than are bee stocks that consume a lot of their winter stores.

Honey production – Under average management conditions, this characteristic refers to a colony's typical honey yield. This ranges from "high" (will produce a lot of honey) to "low" (will produce less honey).

Notes on wax production – This characteristic is important to beekeepers who specialize in wax production or wax products. Some bee stocks are quick to build wax in response to nectar flows while others are slower to do this. Some stocks also are known for producing "wet"cappings. This simply means that the cappings constructed over the top of cells of honey contact the honey stored underneath, making them appear "wet." This, typically, is undesirable if the comb is going to be used in comb or cut-comb honey. "Clean" or "dry" cappings do not touch the honey stored within the cell, consequently producing a comb with a more desirable appearance.

Origin – The natural range of the bee stock. A "mixed" origin means that the bee derives from a mixture of one or more stocks.

Overwintering ability – The likelihood that a colony will overwinter successfully. Some colonies do not overwinter well, or even at all, in temperate climates. This ranges from none (colonies from the stock likely will not overwinter in temperate climates) to very good (colonies from the stock possess traits that make them highly likely to overwinter successfully).

Propolis use – The pattern of propolis use among the stocks ranges from low (little propolis used) to high (considerable propolis used).

Queen color – The color pattern associated with a typical queen bee of a given stock.

Robbing tendency – The propensity of a colony to rob other colonies during times of nectar dearth or when the colonies are being inspected by beekeepers. "Low" means colonies are less likely to rob other colonies while "high" means they are highly likely to rob other colonies.

Swarming tendencies – The propensity of colonies of a given stock to swarm. This ranges from a low propensity (the colony does not swarm a lot or takes some time to reach the swarm threshold) to a very high one (the colony swarms multiple times per year or is quick to reach the swarm threshold).

Tendency to abscond – Absconding is a colony behavior whereby all of the bees in the nest, including queens, workers, and drones, leave the nest in response to a colony stress. Some bee stocks rarely abscond (low) while others abscond frequently (high).

Tolerance of American Foulbrood – Some bee stocks are very tolerant of American Foulbrood infections (high) while others are not (low).

Tolerance of European Foulbrood – Some bee stocks are very tolerant of European Foulbrood infections (high) while others are not (low).

Tolerance of tracheal mites – Some bee stocks are very tolerant of tracheal mite infestations (high) while others are not (low).

Tolerance of *Varroa* – Some bee stocks are very tolerant of *Varroa* infestations (high) while others are not (low). Given that *Varroa* are considered the number one threat to honey bees, it benefits beekeepers to use stocks that display some level of tolerance toward *Varroa*.

Tongue length – The relative length of a typical worker's tongue, representative of the stock. This is relative to tongue lengths of workers from other races of *Apis mellifera*. This is important because longer tongued bees access nectaries in deeper corollas. This partly contributed to beekeepers' general migration away from German bees as German bees have short tongues and could not work certain nectar-producing plants well.

Worker behavior on the combs – This is a description of how workers move on the combs when colonies are opened and worked. "Calm" workers go about their jobs while the combs are inspected. "Nervous" workers scurry about the combs rapidly, often migrating to the comb perimeter or vacating the combs altogether. Nervous bees sometimes form masses of bees at the bottom of frames being inspected. This can lead to "flighty" bees which fly from the combs to initiate a defensive response against the beekeeper.

Worker color – The color pattern associated with a typical worker bee of a given stock.