

A Comparison of Russian and Italian Honey Bees

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*American beekeepers have been using Italian honey bees (*Apis mellifera ligustica*) since they were first imported to the New World in 1859. The standard German honey bee (*A. m. mellifera*), which had been in America for more than 200 years, was by that time ill-tempered, disease-ridden, and less suited for honey bee management. Conversely, the Italian bees were and are excellent honey producers, show a gentle temperament that makes them the most popular race of honey bee in North America, have a moderately low tendency to swarm, and have a bright yellow color that makes queens easy to find.*

But Italian honey bees are susceptible to two deadly parasitic mites, the tracheal mite (*Acarapis woodi*) and the varroa mite (*Varroa destructor*), which were introduced into the U.S. in 1984 and 1987, respectively. Colonies contract these mites through equipment sharing and overcrowding, and, once infested, entire colonies can succumb within one or two years. Beekeepers have relied largely on pesticides to control the mites, but many of these

chemicals can contaminate the honey and beeswax in a hive. The mites also are becoming increasingly resistant to the pesticides, making the chemicals less reliable and, eventually, ineffective. The high colony mortality that accompanies these two mites is a serious concern of the bee industry today, and various types of bees are continually being examined with an eye toward finding a hardy, productive stock that can resist them.

Russian Bee Project

Efforts to find a honey bee that is genetically resistant to the varroa and tracheal mites led researchers at the USDA Honey Bee Research Laboratory in Baton Rouge, Louisiana, to Russia. There, on the far eastern side of that vast nation, in the coastal Primorski region around Vladivostok, they found what they sought—a promising strain of *Apis mellifera*. These Russian bees had been exposed to varroa mites for approximately 150 years, much longer than other *Apis mellifera* strains had, and the researchers surmised that the Russian bees could have developed a resistance to the mites. Indeed, subsequent research has shown that these Russian bees are more than twice as resistant to varroa mites than other honey bees. Moreover, they are highly resistant to tracheal mites, the other mortal enemy of bees. Russian bees also tend to produce as much honey as standard bee stocks, if not more.

A number of American queen breeders now produce Russian queens for sale. These breeders are located all across the country, but most are concentrated in the South and in California. Many of the Russian queens on the market are hybrid daughters of a breeder queen openly mated to any drone, which may come from a variety of stocks within two miles of a particular mating yard. The resulting colonies are genetic hybrids. Recent research has suggested the hybrids are only partially resistant to mites, but studies at North Carolina State University show that partial resistance is statistically significant when the hybrids are compared to Italian bees.

Production of pure Russian queens can be guaranteed only by truly isolating the breeding grounds, as has been done at the USDA's bee laboratory on Grand Terre Island, 25 miles off the coast of Louisiana. Here the drone stock is also controlled.

Management of Russian bees

Russian bees are quite different from standard Italian bees in several ways (Table 1):

- Russian bees do not build their colony populations until pollen is available, and they shut down brood rearing when pollen is scarce. This characteristic makes them suitable in areas where the main honey and pollen flows occur later in the year, such as the mountains of North Carolina. By contrast, Italian bees maintain a large brood area and worker population regardless of environmental conditions. This trait can result in more bees than the hive can feed and may lead Italian colonies to early winter starvation. It also explains the Italian bee's tendency to rob other colonies of their honey stores.
- Russian colonies maintain active queen cells throughout the brood-rearing season. In Italian colonies, the presence of queen cells is interpreted by beekeepers as an attempt to swarm (reduce overcrowding by establishing a new colony) or to supersede (kill and replace) the resident queen. This is not the case with Russian colonies, as the workers often destroy the extra queen cells before they fully develop.
- Russian bees can vary in color, but they are generally darker than the Italians.

Requeening Italian hives with Russian queens can be difficult, and many beekeepers lose their newly introduced Russian queens. Russian queens have a different "odor" than Italians, and parent colonies must become acclimated to this odor before they will accept the newcomers. Beekeepers who intend to go from Italian to Russian bees should requeen a colony in the fall by splitting the hive in two with the use of a double screen (see highlighted information). This will permit the odors to mix but, at the same time, prevent the workers from interacting with the new queen. The old Italian queen should be kept in the lower half, and the new Russian queen should be placed in the upper half in a cage. If a separate entrance is provided to the upper half, only young nurse bees will enter the top portion, and the older foraging bees will return to the lower hive.

Table 1. A comparison of various colony characteristics of Italian and Russian honey bees		
Characteristic	Italians	Russians
Varroa mites	More susceptible	More resistant
Tracheal mites	More susceptible	Highly resistant
Brood rearing	Continuous throughout the summer	Usually only during times of pollen availability
Robbing	High	Low
Queen cells	Only during swarming or queen replacement	Present most of the time
Pollination skills	Small difference from Russian bees	Small difference from Italian bees
Temperament	Gentle, less defensive; not likely to sting	Gentle, less defensive; not likely to sting
Color	Light	Dark

The Russian queen should be released from her cage after seven to ten days and permitted to lay eggs for four weeks. During this time, the odor of the Russian queen will co-mingle with that of the Italian colony. If the Russian queen continues to lay eggs and is being tended by the workers, she has been accepted. After this acclimation period, the Italian queen can be removed, and the colony can be reunited. If the workers do not accept the new queen during the four weeks of acclimation, the requeening process has failed, and the workers kill her. But the colony will still have the original Italian queen, and the entire hive will not be lost.

Hybrid bees tend to lose their initial desirable traits over subsequent generations. Because many commercial Russian bees are hybrids, the queen should be marked with paint to distinguish them from succeeding generations. If the colony contains an unmarked queen, she is probably homegrown and a second-generation hybrid and should be replaced with a new marked Russian queen as soon as possible to preserve the hive's resistance to the mites.

When requeening a Russian colony with a Russian queen, it probably will not be necessary to use the extended acclimation period outlined above. Queens usually come in the mail in cages made of wood and wire-mesh. The exit hole is blocked with a hard candy-like substance that the bees must eat through to release the queen. This usually takes several days, after which the queen has acquired the colony "odor" and is readily accepted by the workers. As noted above, requeening an Italian honey bee colony with a Russian queen takes longer because of the Russian queen's very different odor.

Conclusion

Russian honey bees can be a valuable tool in controlling the depredations of varroa and tracheal mites and also in reducing, but not necessarily eliminating, the need for chemical treatments to control these mites. However, the beekeeper must understand how to manage bees of this new stock properly, as they are quite different from the widely used Italian honey bees.

Suggested reading

De Guzman, L. I., T. E. Rinderer, G. T. Delatte, J. A. Stelzer, L. Beaman, and C. Harper. (2001). An evaluation of far-eastern Russian honey bees and other methods for the control of tracheal mites. *American Bee Journal*, 141: 737-741.

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Rinderer, T. E., L. I. de Guzman, and C. Harper. (2004). The effects of co-mingled Russian and Italian honey bee stocks and sunny or shaded apiaries on varroa mite infestation level, worker bee population and honey production. *American Bee Journal*, 144: 481-485.

Requeening Italian colonies with Russian queens

The requeening procedure has frustrated many beekeepers because standard introduction techniques often are not successful when requeening Italian colonies with Russian queens, as the colonies may reject the new queens. Italian bee colonies need more time and separation to become acclimated to Russian queens.

Step 1: Split the colony in half, with the two halves separated by a double screen.

Step 2: Place the old queen in the bottom half and a caged Russian queen in the upper half.

Step 3: Release the Russian queen from her cage after 7 to 10 days.

Step 4: Once the Russian queen has been accepted and has laid eggs for one month, kill the old queen, and reunite the two halves (remove the screens).

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