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In honeybees, a virgin queen mates with multiple drones during nuptial flights, storing their sperm in the spermatheca for lifelong use. Controlling this mating process is one of the biggest challenges in honeybee breeding, as it directly influences genetic gain in breeding programs. Mating control success is typically measured by genotyping worker brood to estimate the number and origin of patriline within a colony. However, such evaluation requires waiting for egg-laying and brood development, delaying evaluation by up to three weeks, and demands a large number of samples for accurate colony representation.

The GenoDrone project, a collaboration between research teams from Slovenia and Poland, aims to overcome these limitations by developing a novel methodology for evaluating mating control success in a timely manner. The project explores *csd* allele variation in selected honeybee colonies and investigates whether drone DNA stored in the queen's spermatheca can serve as a direct and timely indicator of mating control efficiency.

The initial step of the project is investigation of the *csd* gene variation within selected honeybee colonies and assessing whether this genetic diversity reliably reflects the colony's patriline composition. Our approach includes instrumental insemination, sampling of the selected colonies, followed by DNA extraction, fragment amplification, *csd* allele genotyping, sequencing, and data curation. To assure the detection of all patrilines, we complemented our analyses with genotyping-by-sequencing (GBS) and compared the outcome. Our results show the power of *csd* gene as a single-marker tool for accurately resolving patriline composition within honeybee colonies.

The GenoDrone project represents a forward-looking initiative with the potential to revolutionize our understanding of honeybee mating biology. It will coordinate an international effort in providing an enhanced practical solution for sustainable and effective honeybee breeding as well as conservation of local honeybee populations.