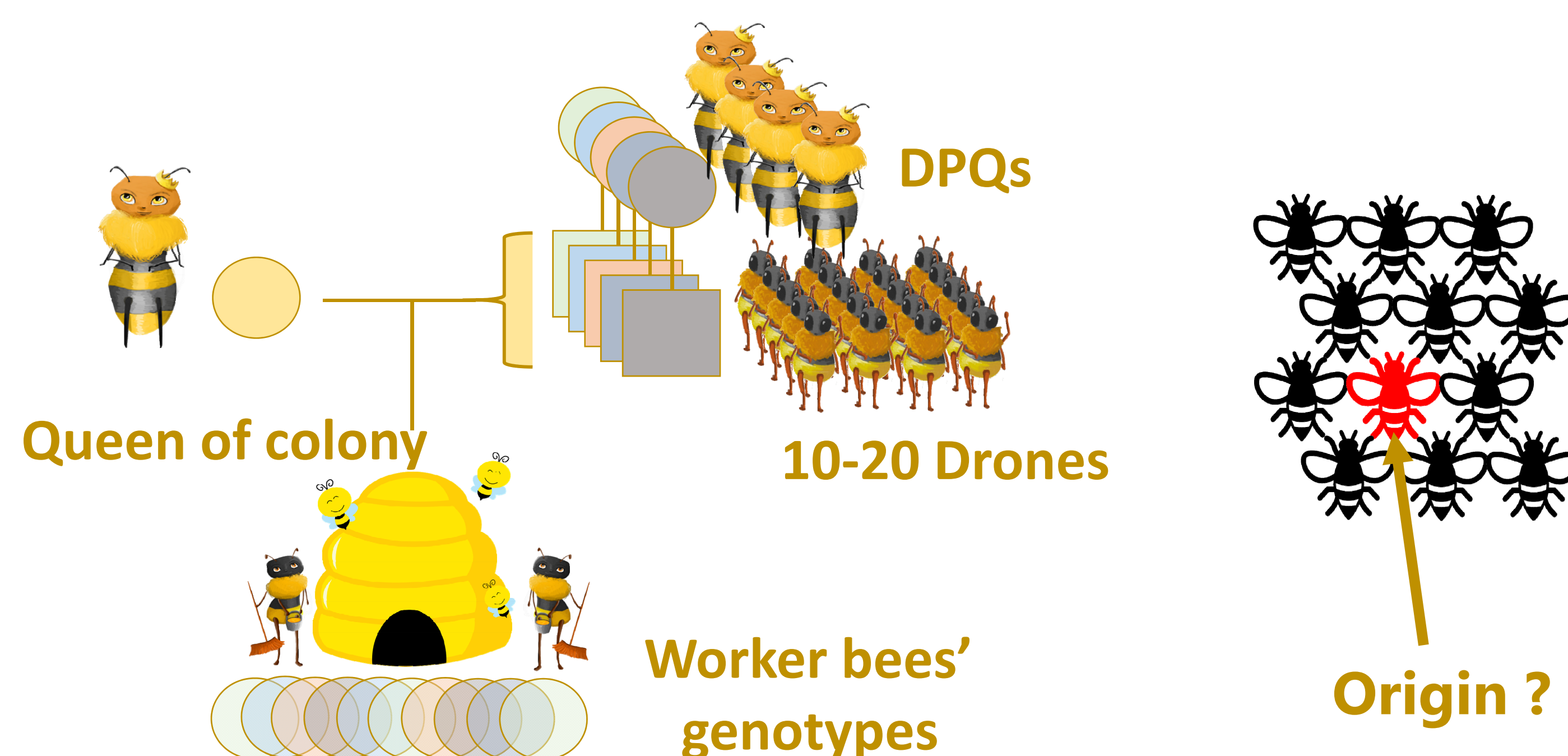
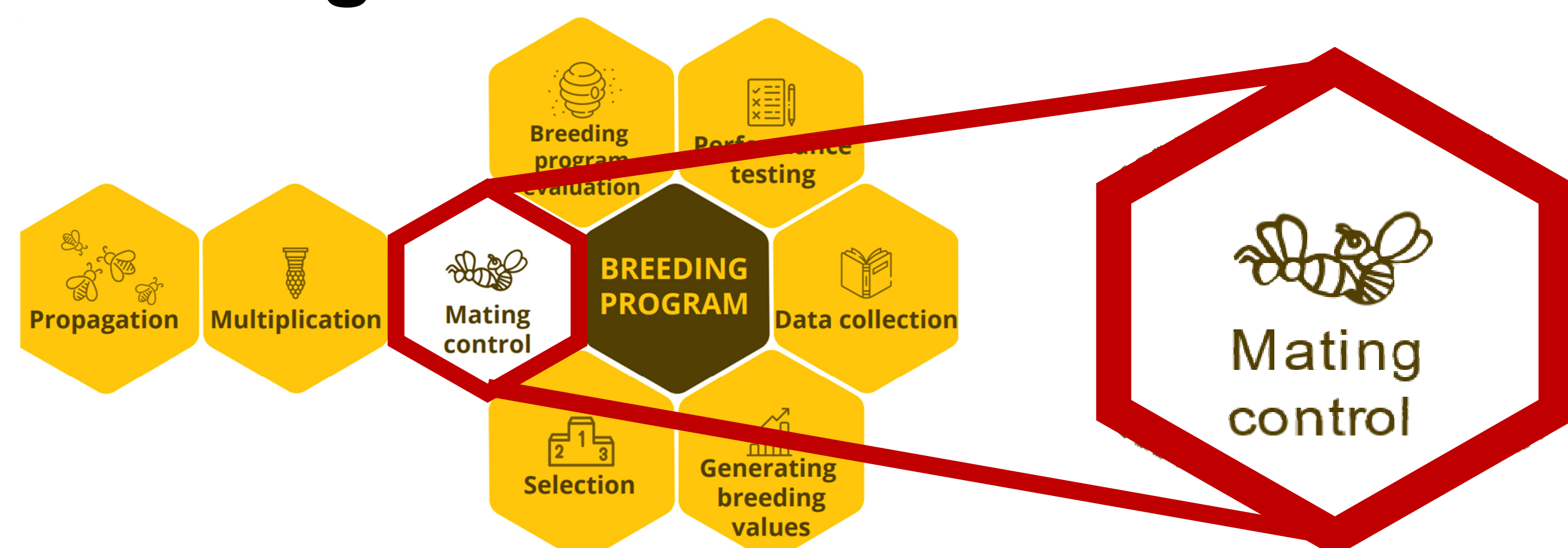


Paternity verification tool in honey bees (*Apis mellifera*)

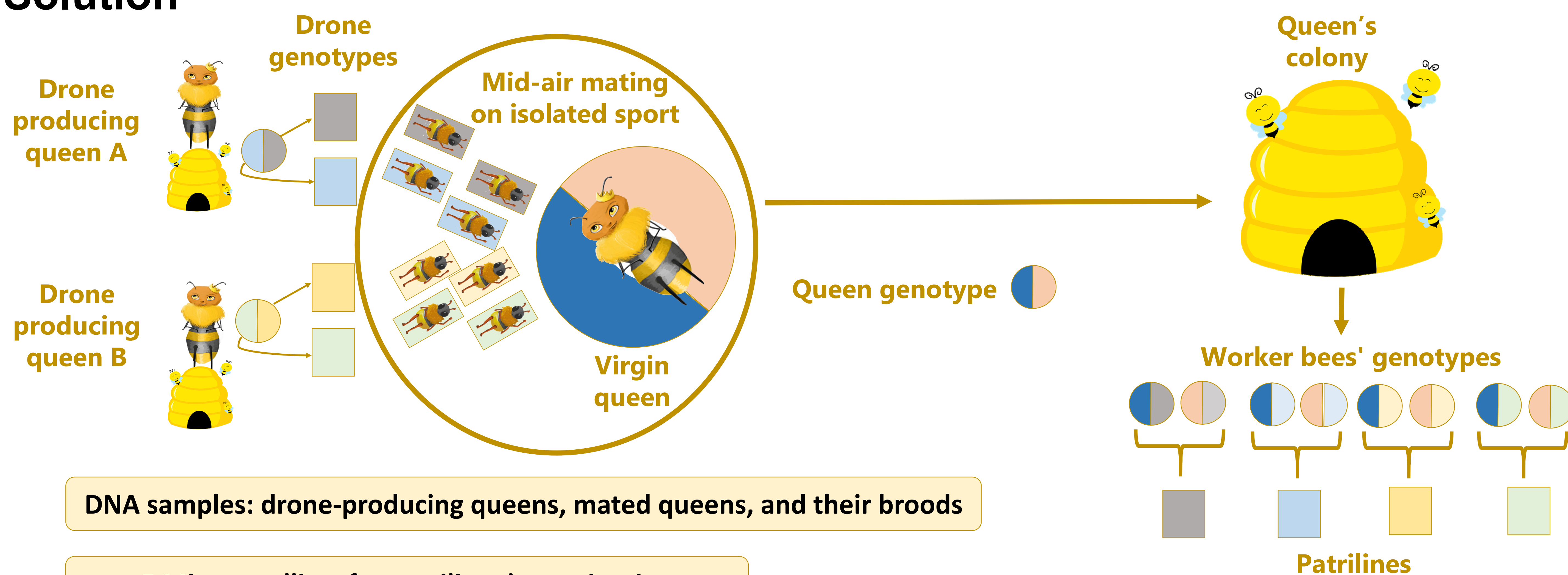
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Challenge



Solution



DNA samples: drone-producing queens, mated queens, and their broods

5 Microsatellites for patriline determination

Linux Script – Bee Reference Genome Paternity

1. Data verification
No colonies
Total No brood samples
Total No brood samples / colony
Total No Drone samples
Verification: all brood samples from queen of the colony

2. Reference genome
Reference Queen's genotypes
Reference Drones' genotypes
Reference colony's genotypes - all possible combinations of queen and drone genotypes

3. Identify paternity percentage
For each brood sample - unique genotype
Verify presence of unique genotype in reference
Summary statistics

The method was tested on *Apis mellifera carnica* and *Apis mellifera macedonica* in mating seasons 2021 and 2022.