



Kubernetes-bees



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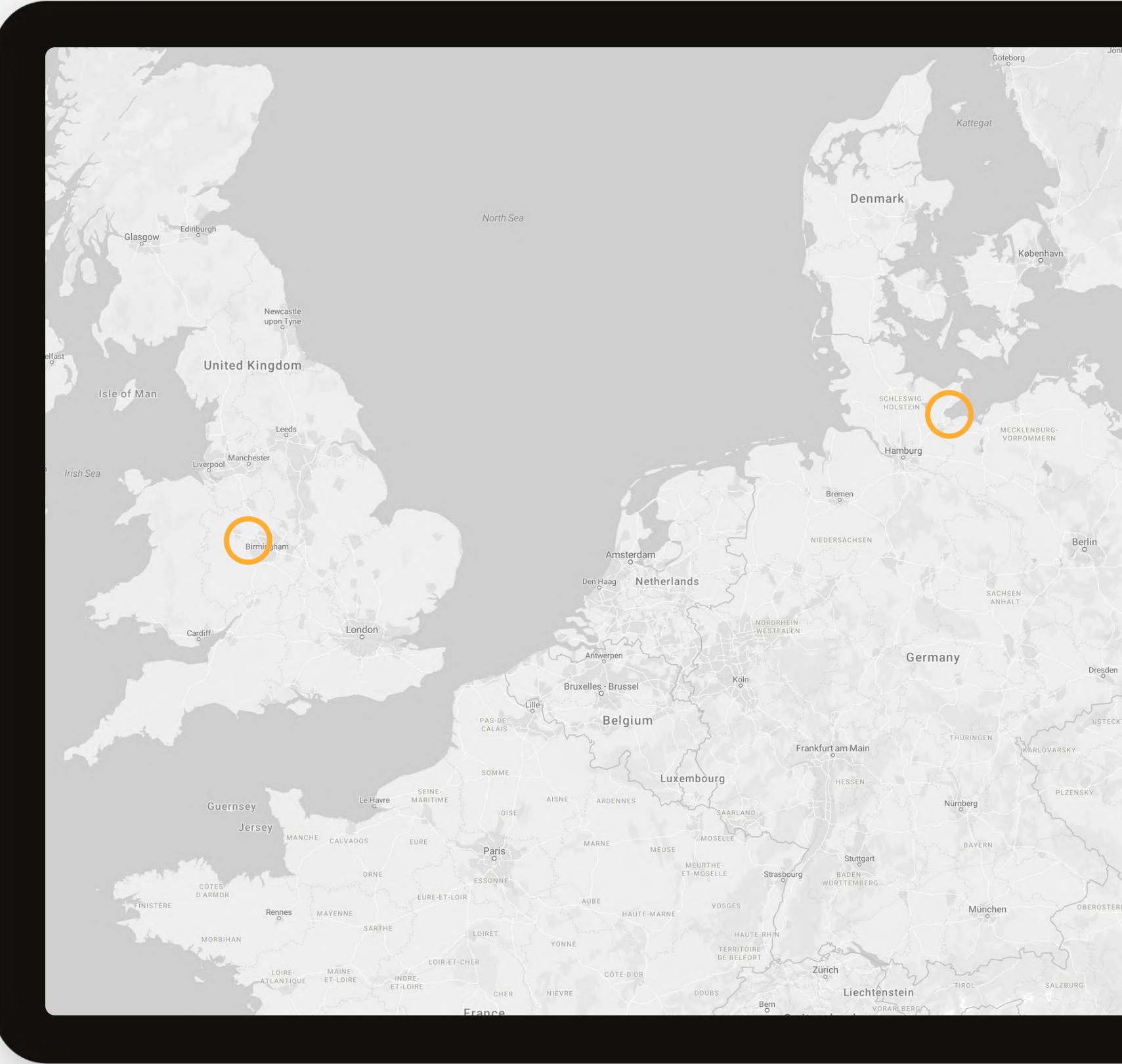
CTO

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More than one way

Much like Kubernetes isn't the only way to build a distributed system, our perspective on beekeeping is far from the only way.



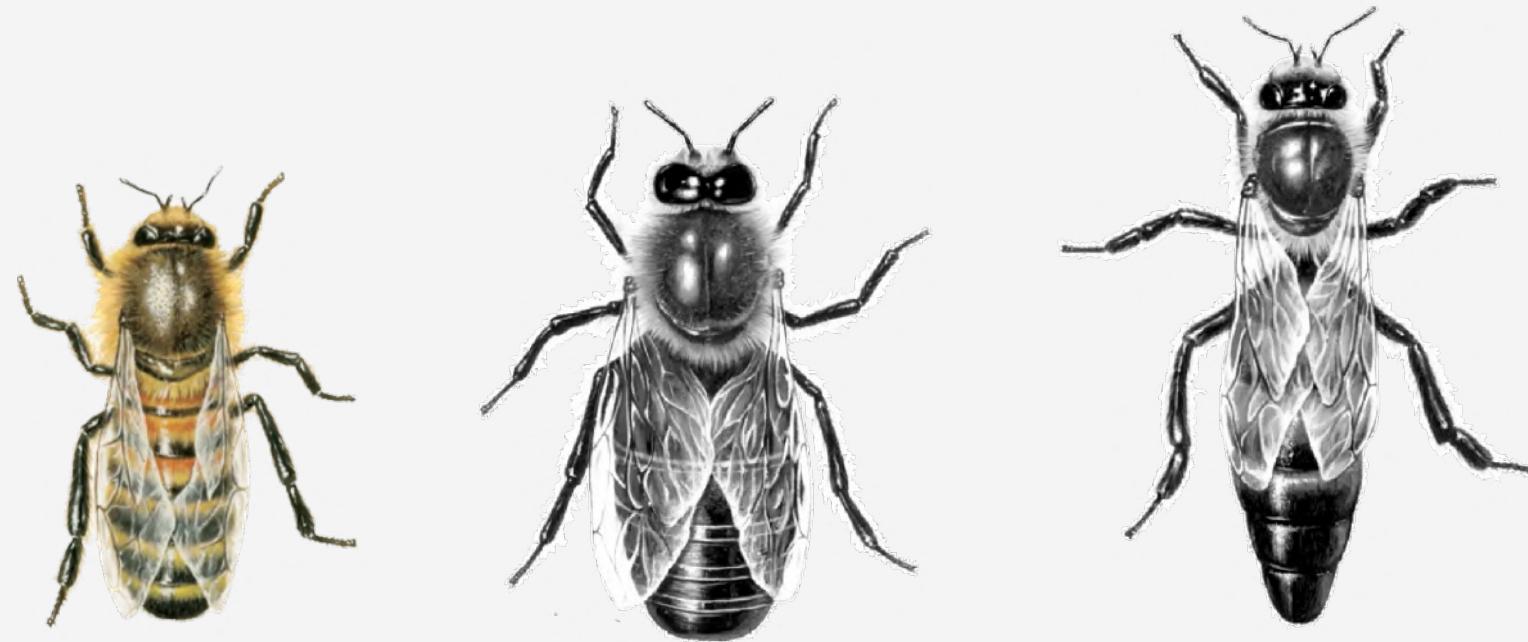
Purpose

Increased appreciation for
bees, their complexity, and
analogy of problems.

Workloads

Bees

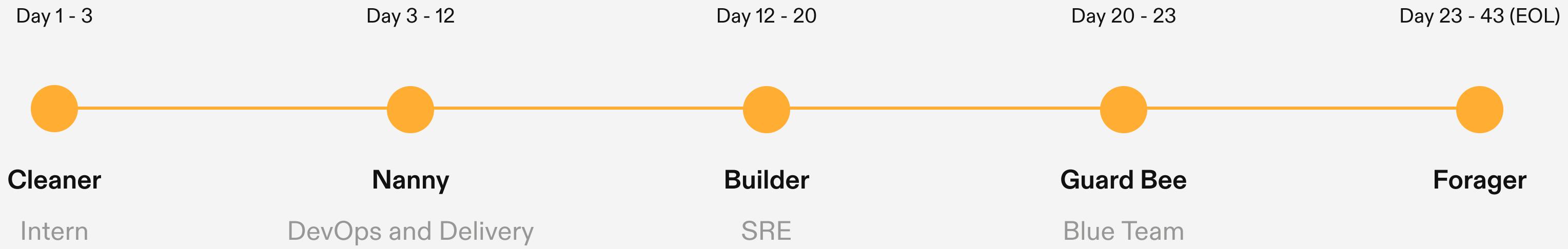
Apis Mellifera



Worker Bee

General Purpose

General Purpose Worker Bees (got a ton of experience)



How much honey does a worker bee produce in its lifetime?

(~20 days as forager)

< 1 g

< 1/28 oz

5 g

1/5 oz

10 g

1/3 oz

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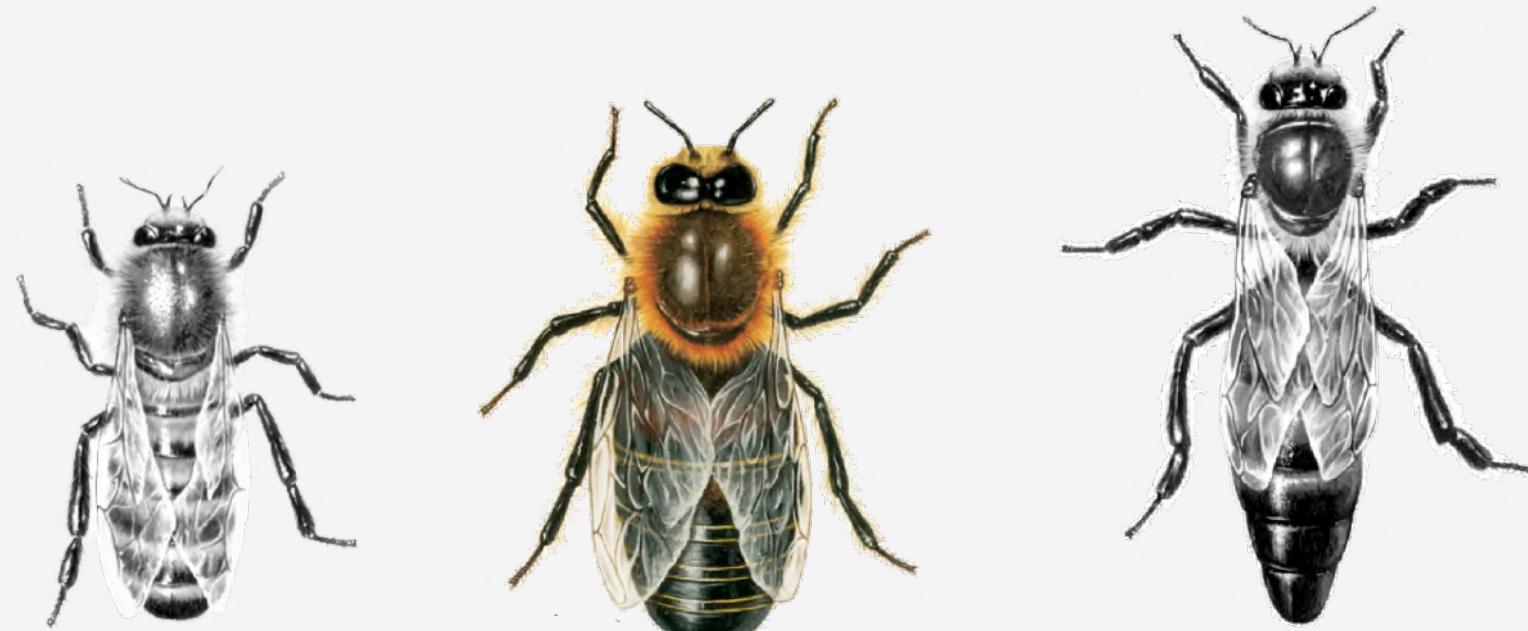
10 g

1/3 oz



**500g of honey
1/2 lbs**

1000 bees



Drone

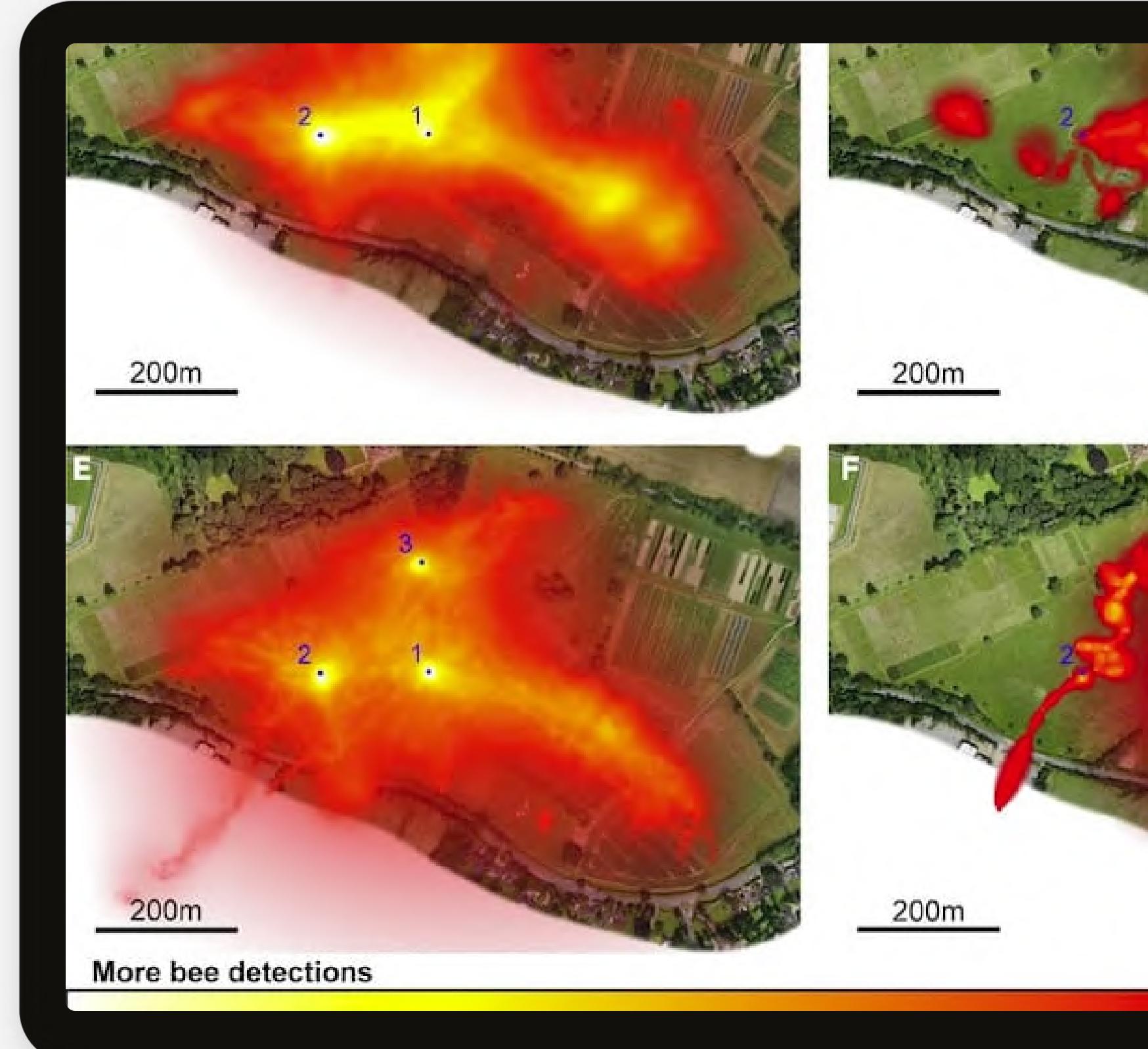
Bootstrap

Service Discovery

Drone Congregation Areas

~ 100m (300ft) diameter

Drones from more than 100 colonies

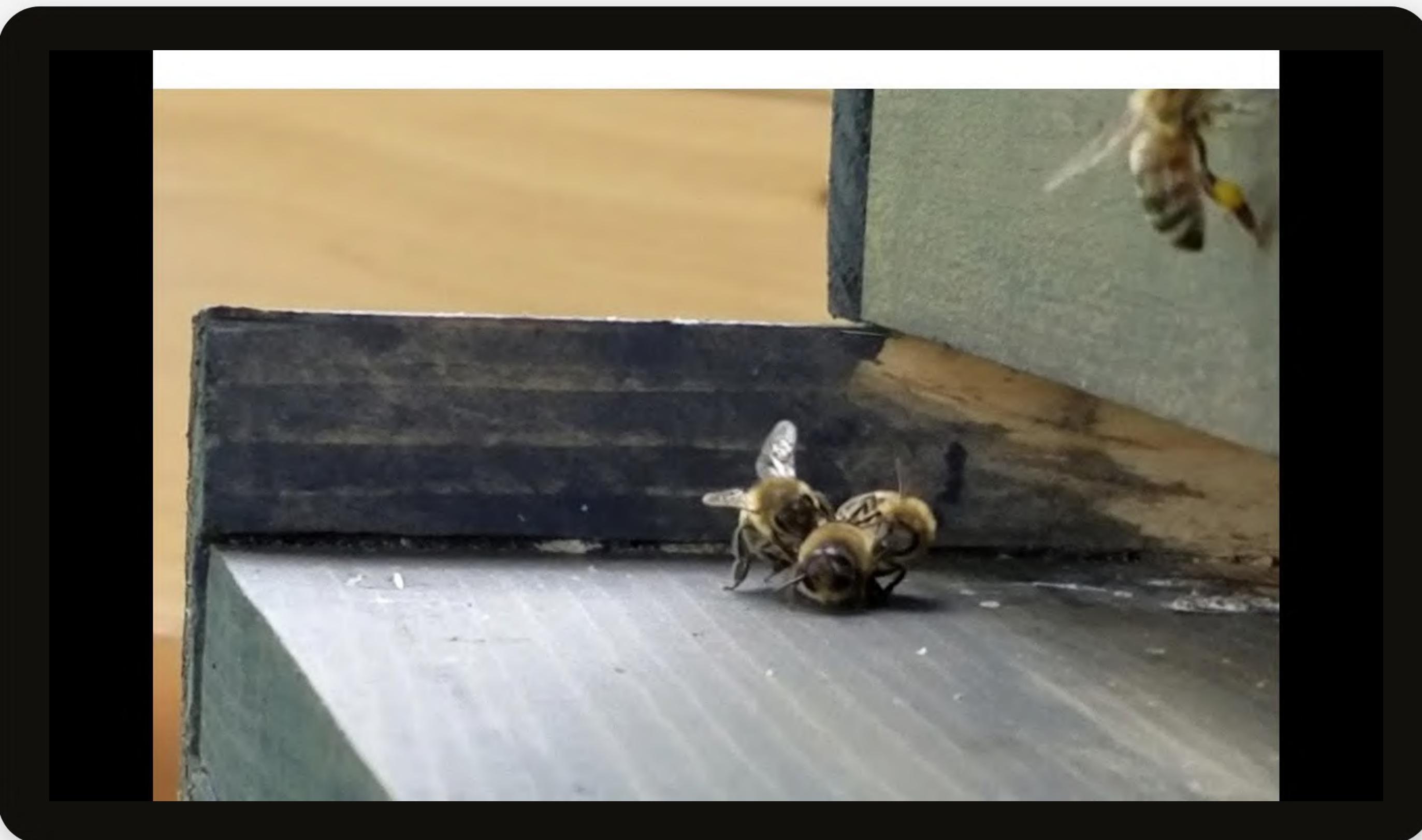


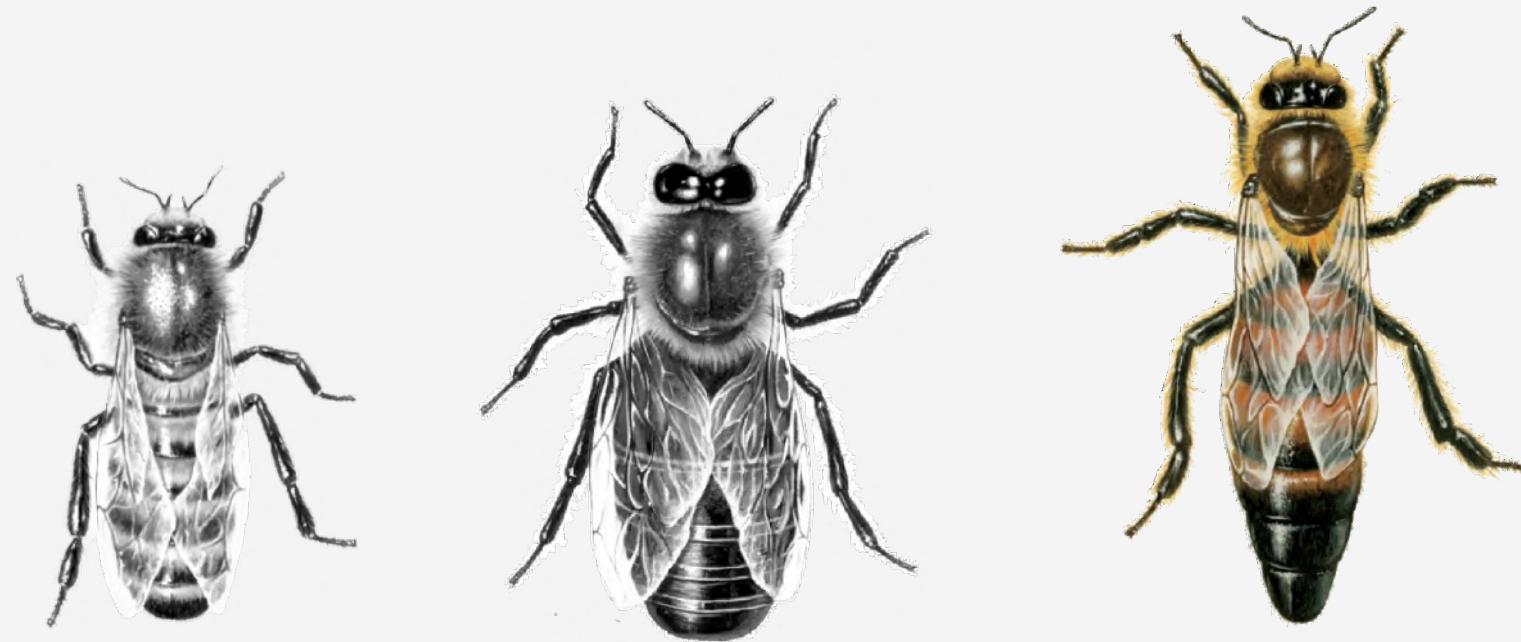
Observability

with harmonic radar



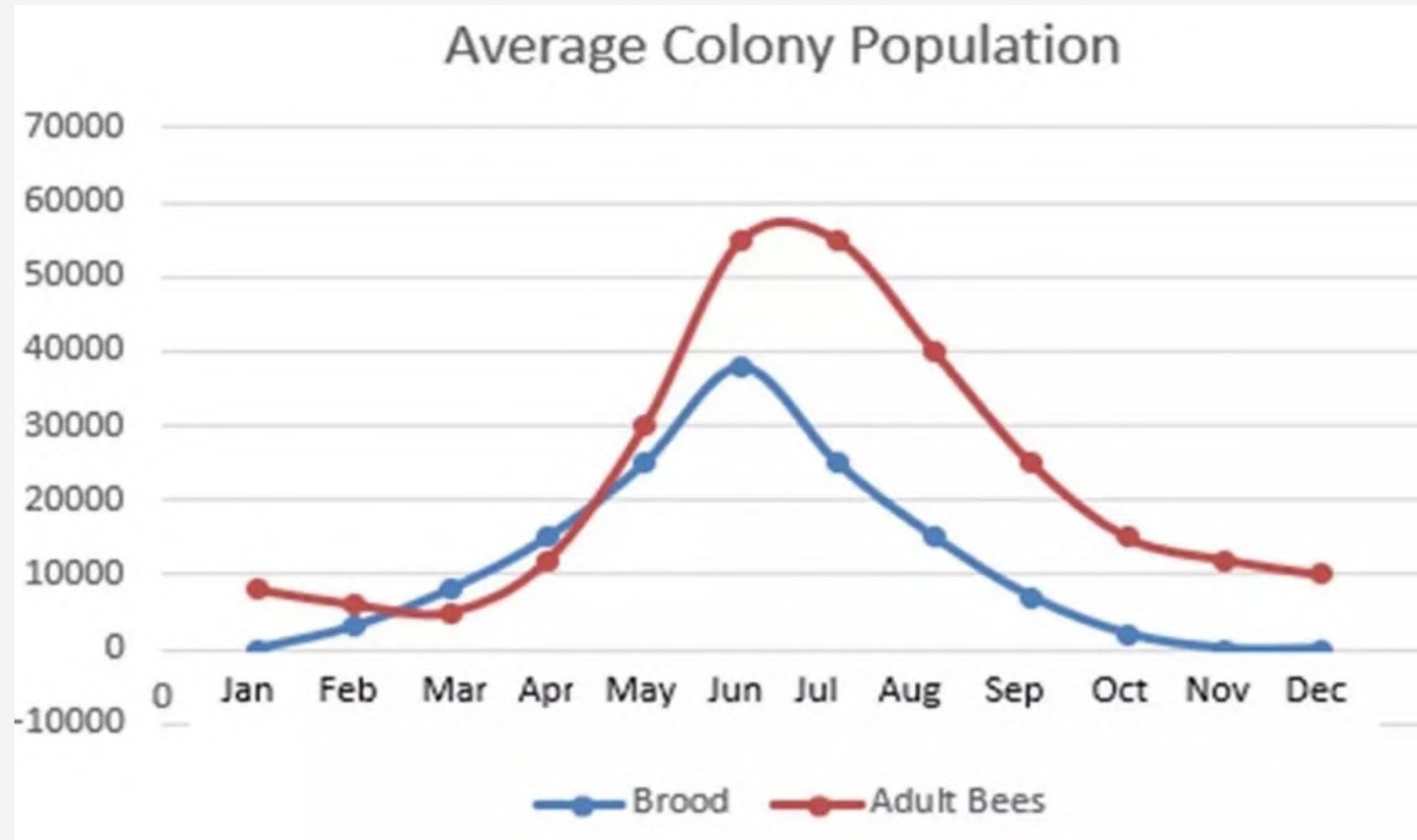
Resource Pressure Eviction





The Queen

HorizontalPodAutoscaler



[Source](#)

At their peak, how many eggs can a queen lay per day?

500

1000

2000

At their peak, how many eggs can a queen lay per day?

500

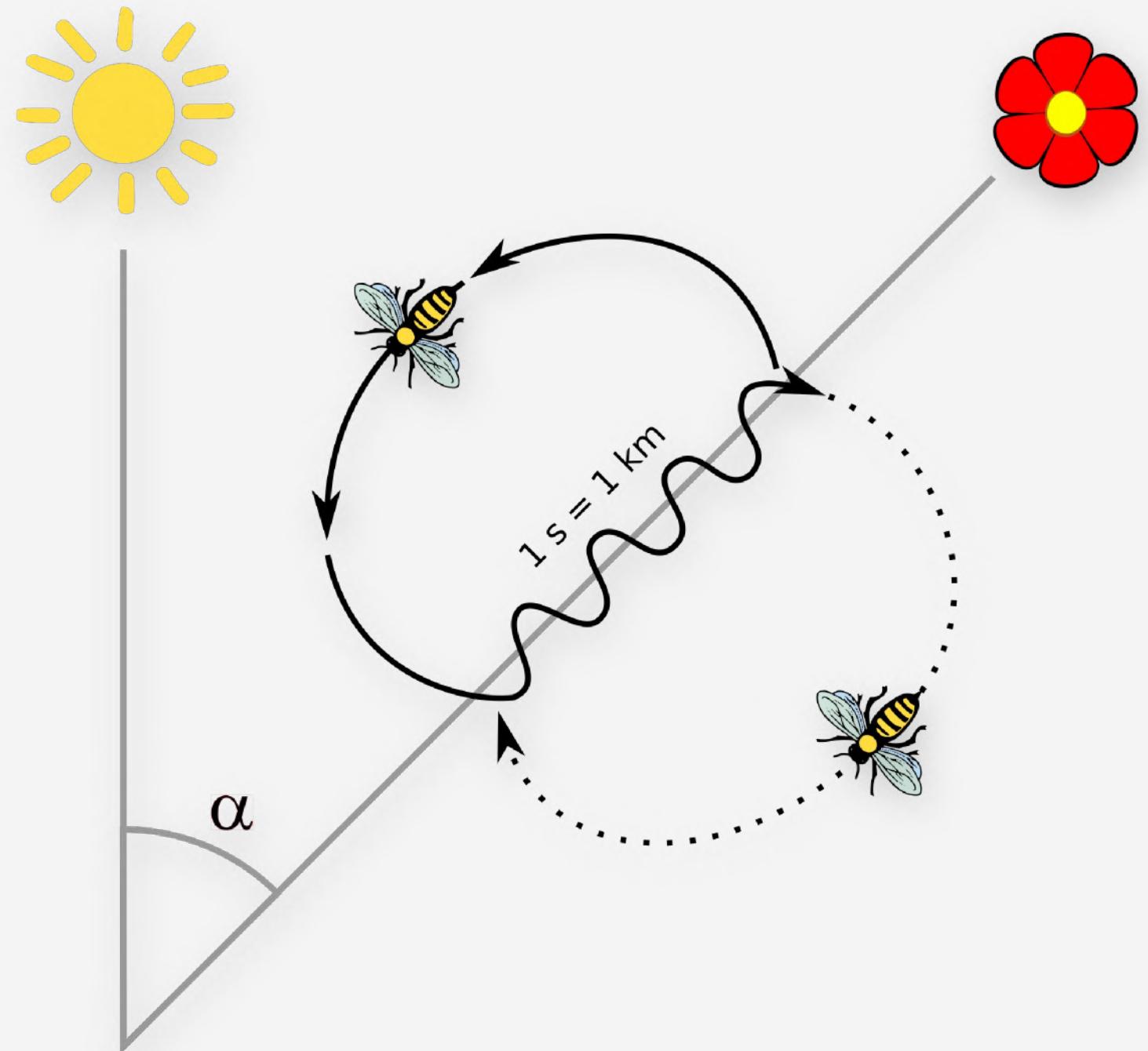
1000

2000



Pub Sub

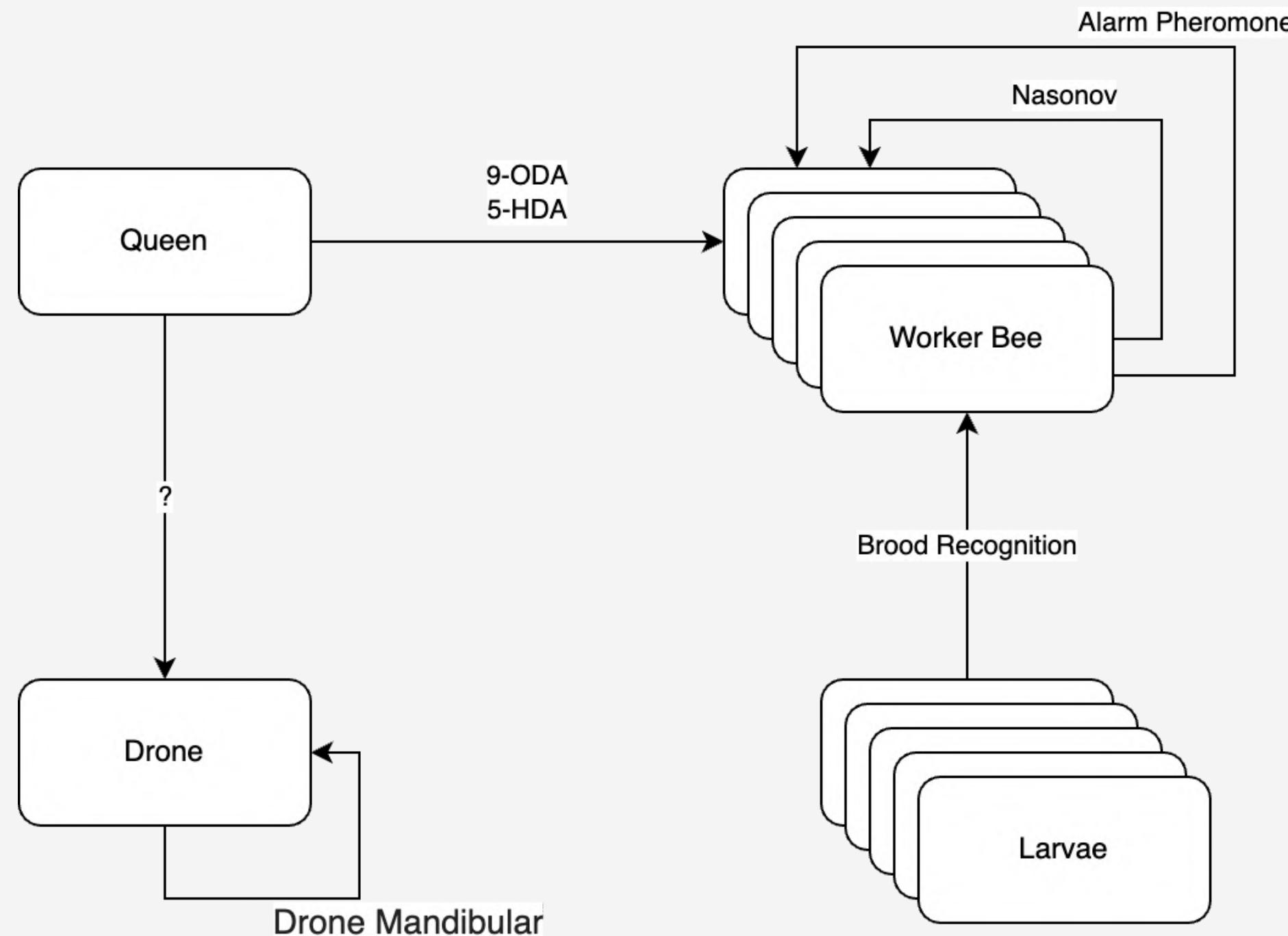
Waggle Dance





Pub Sub

Pheromones





Collision Avoidance

Whoop Whoop Sound

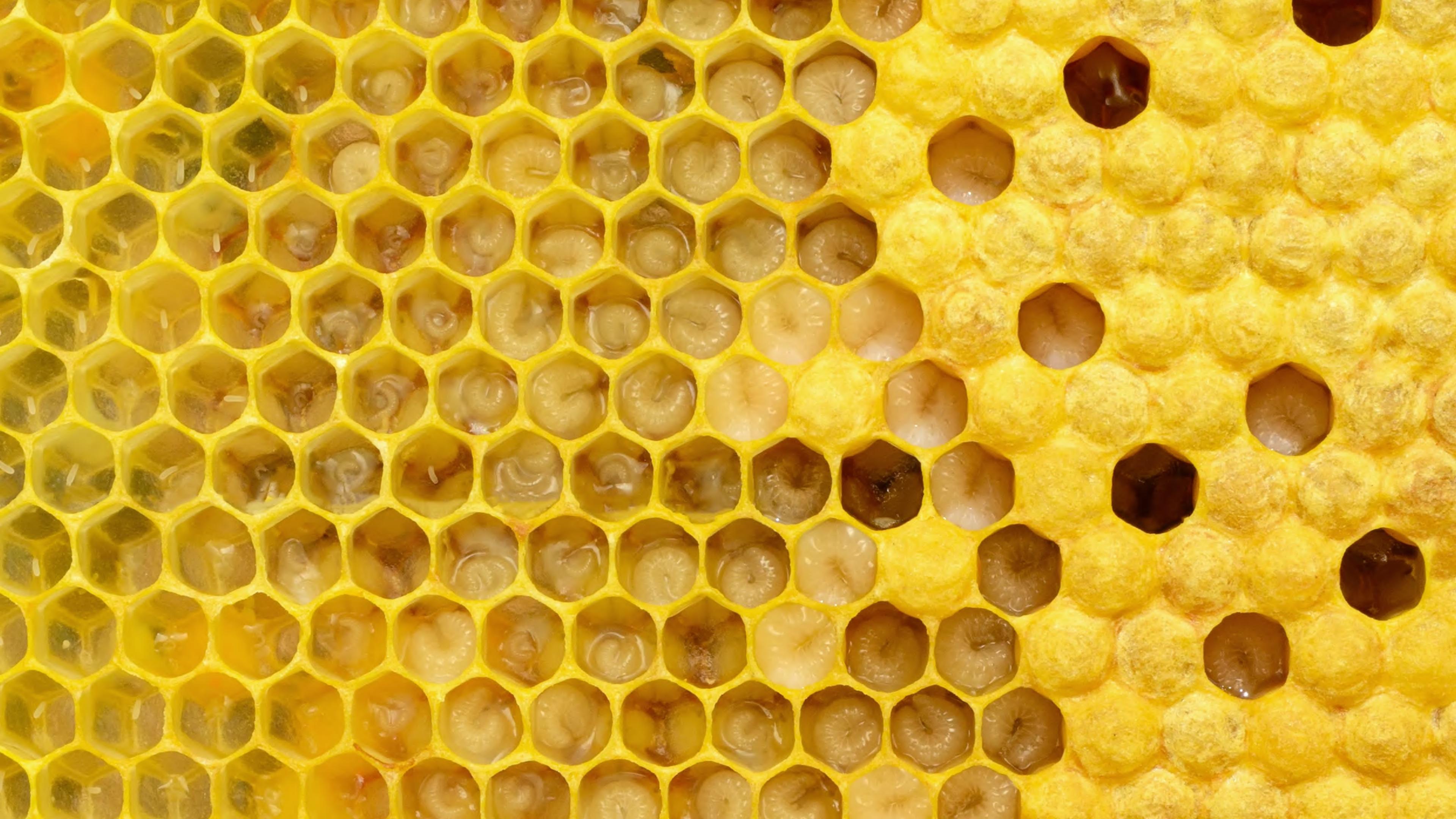
New Scientist Animals



Nodes and Control Plane

Honeycomb





Brood comb cell size

determines brood type

Worker

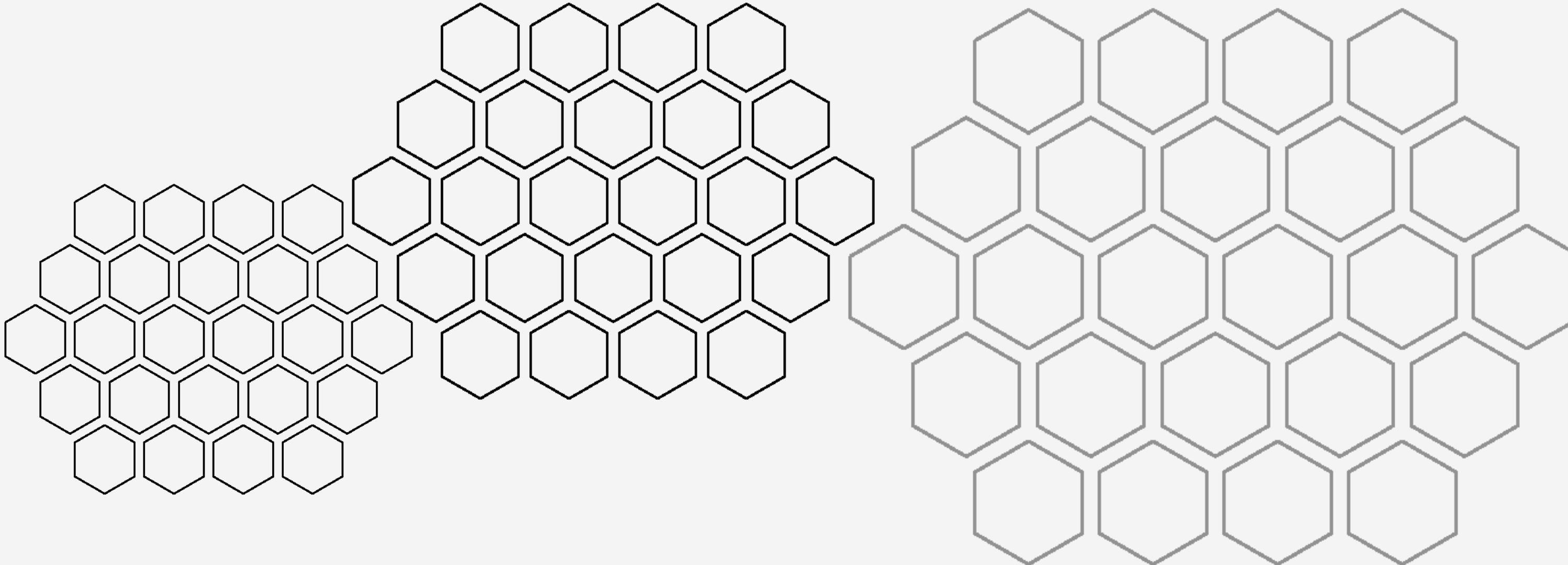
5mm (1/5")

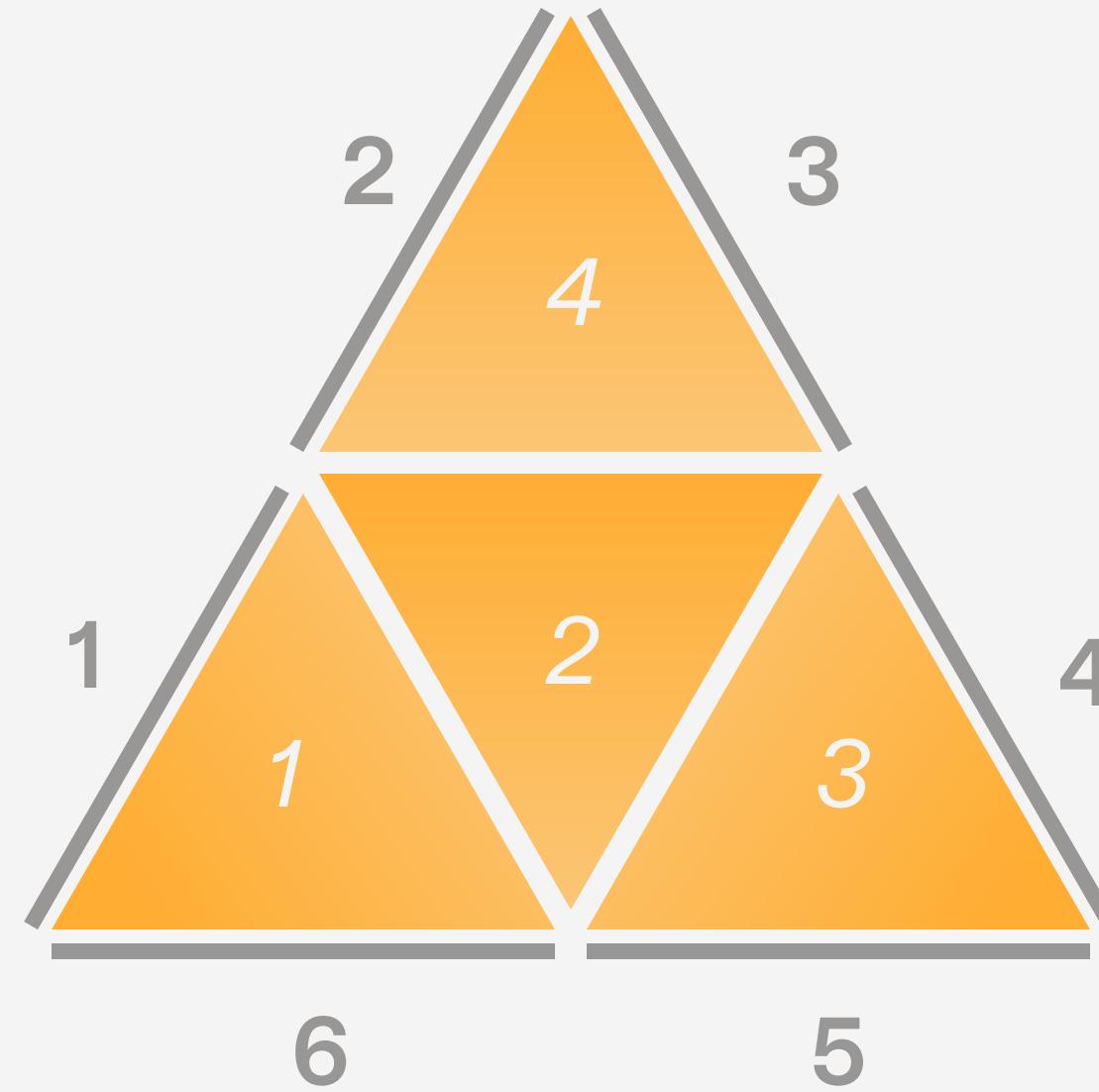
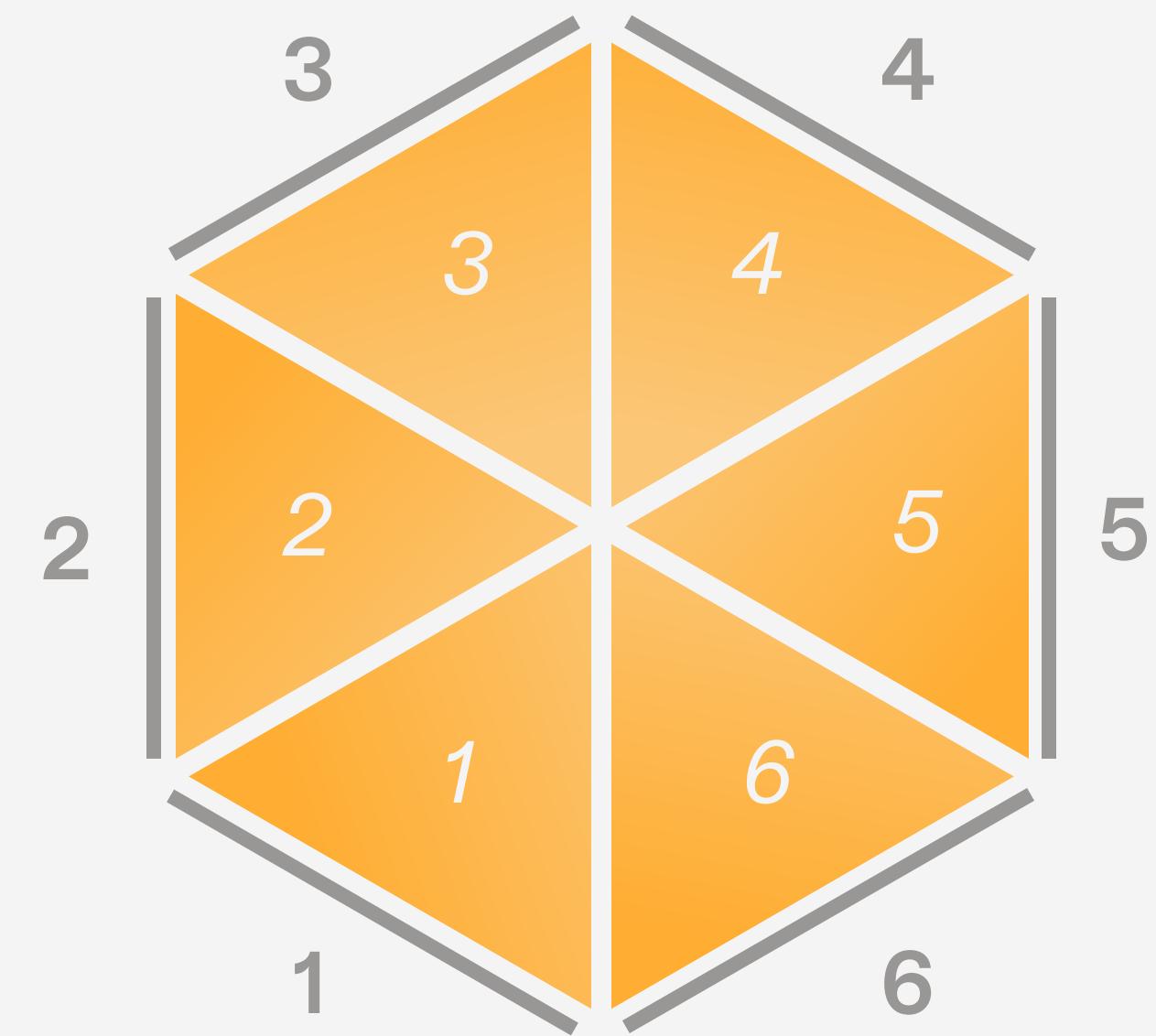
Drone

6.4mm (1/4")

Queen

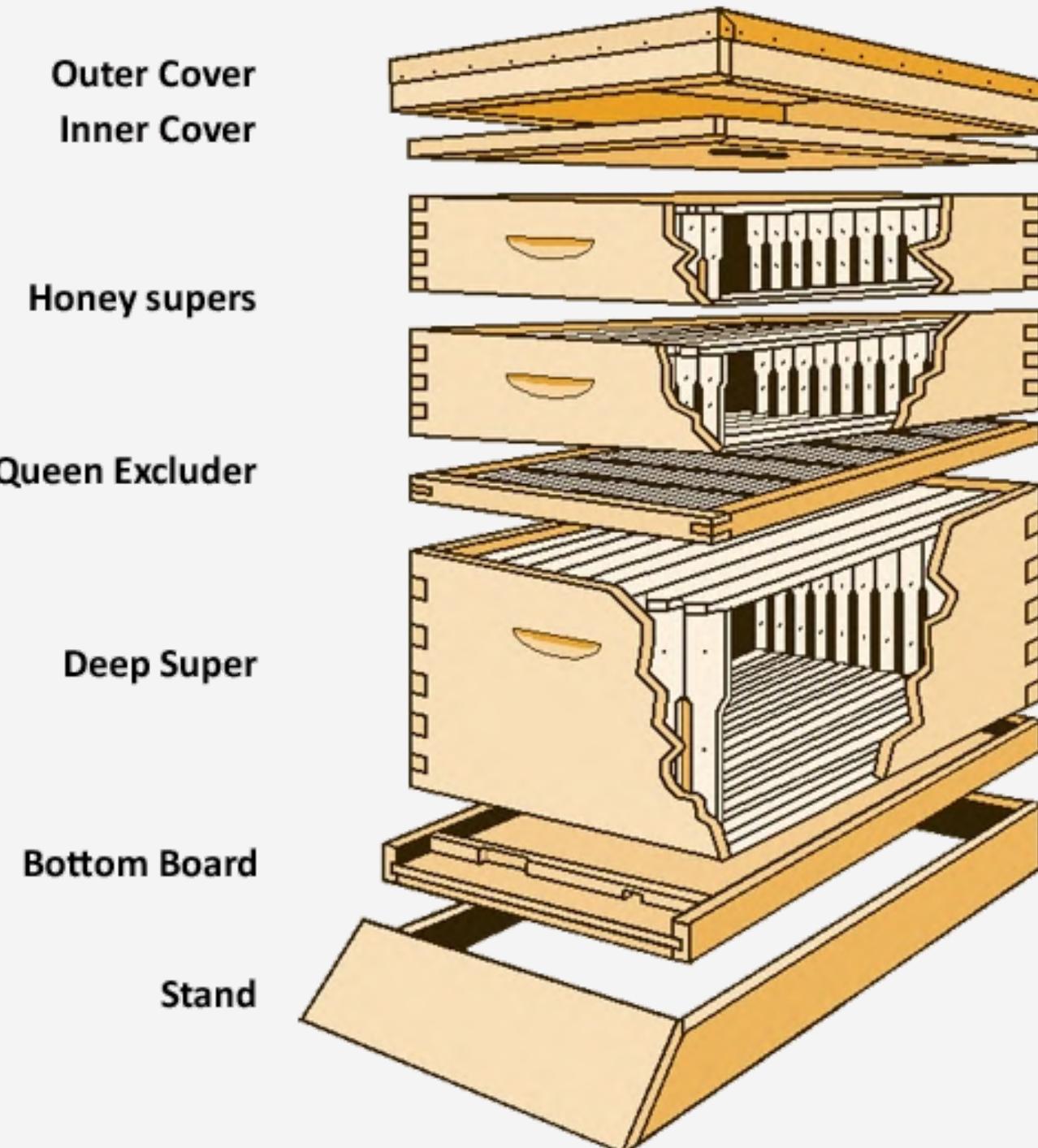
8.5mm (0.337")



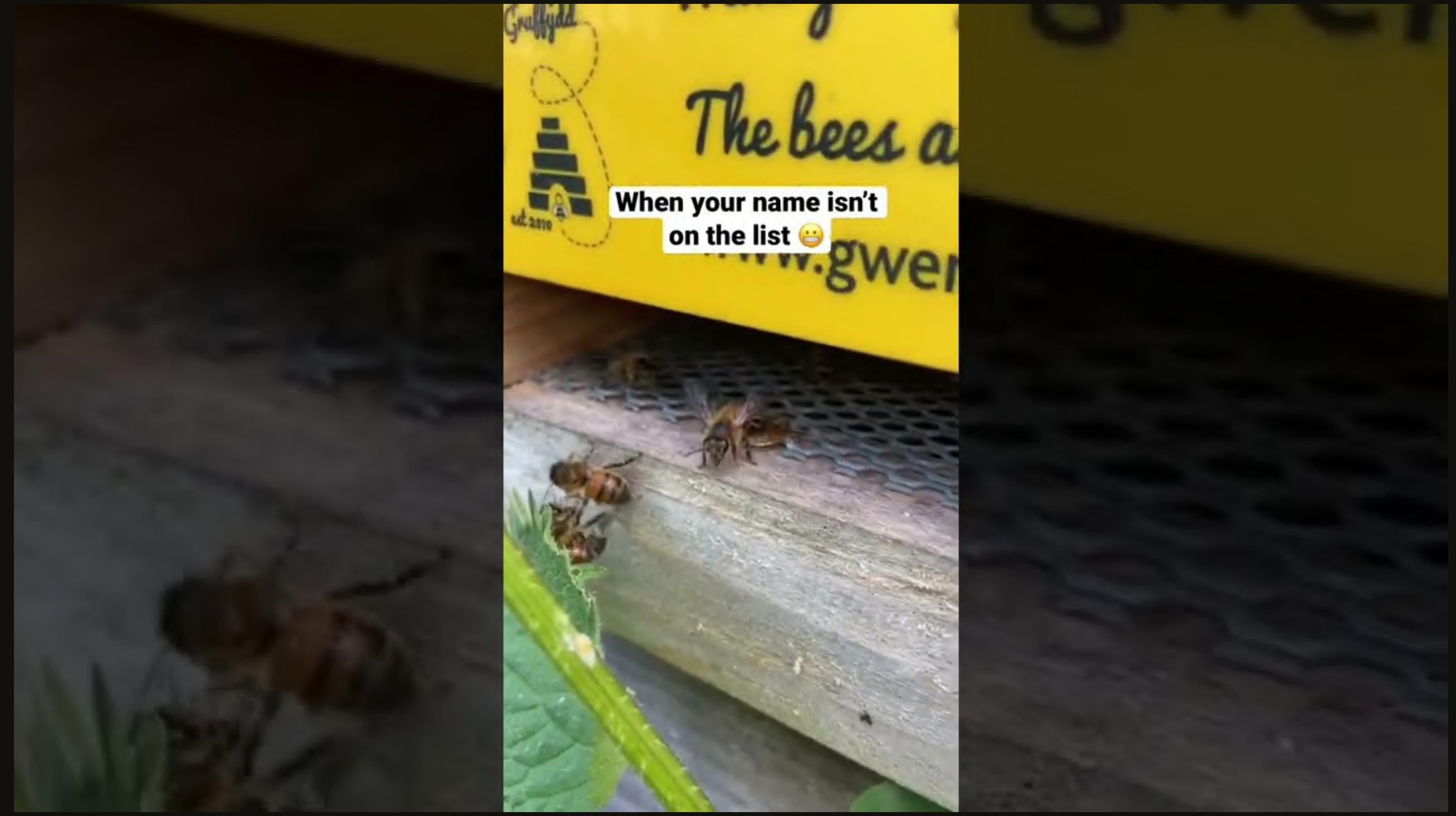


Cluster

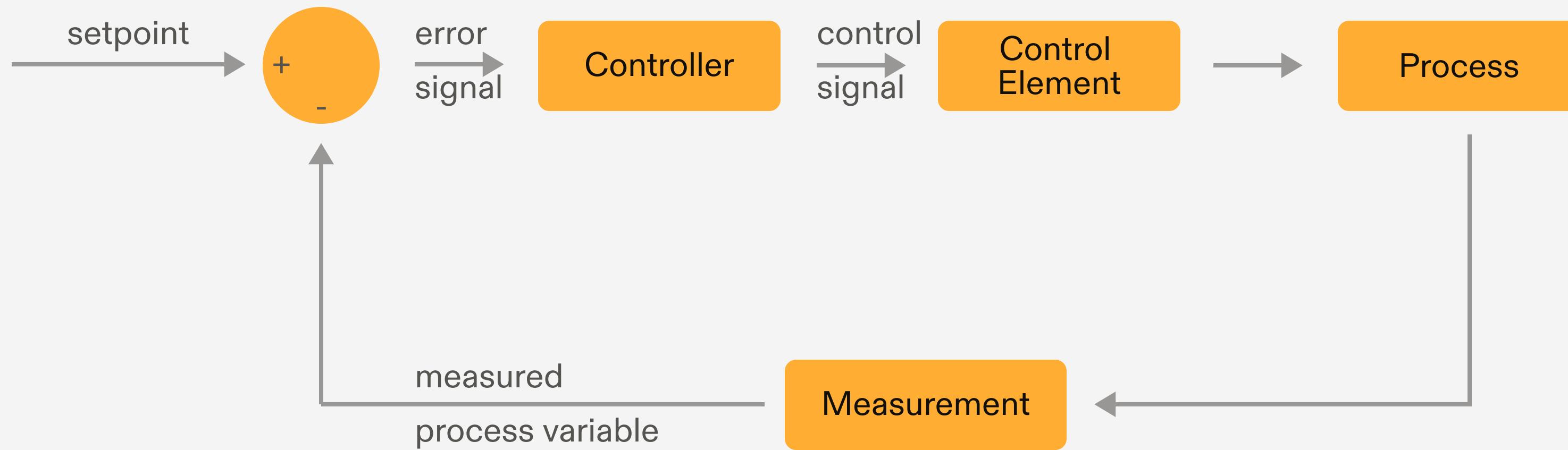
Hives



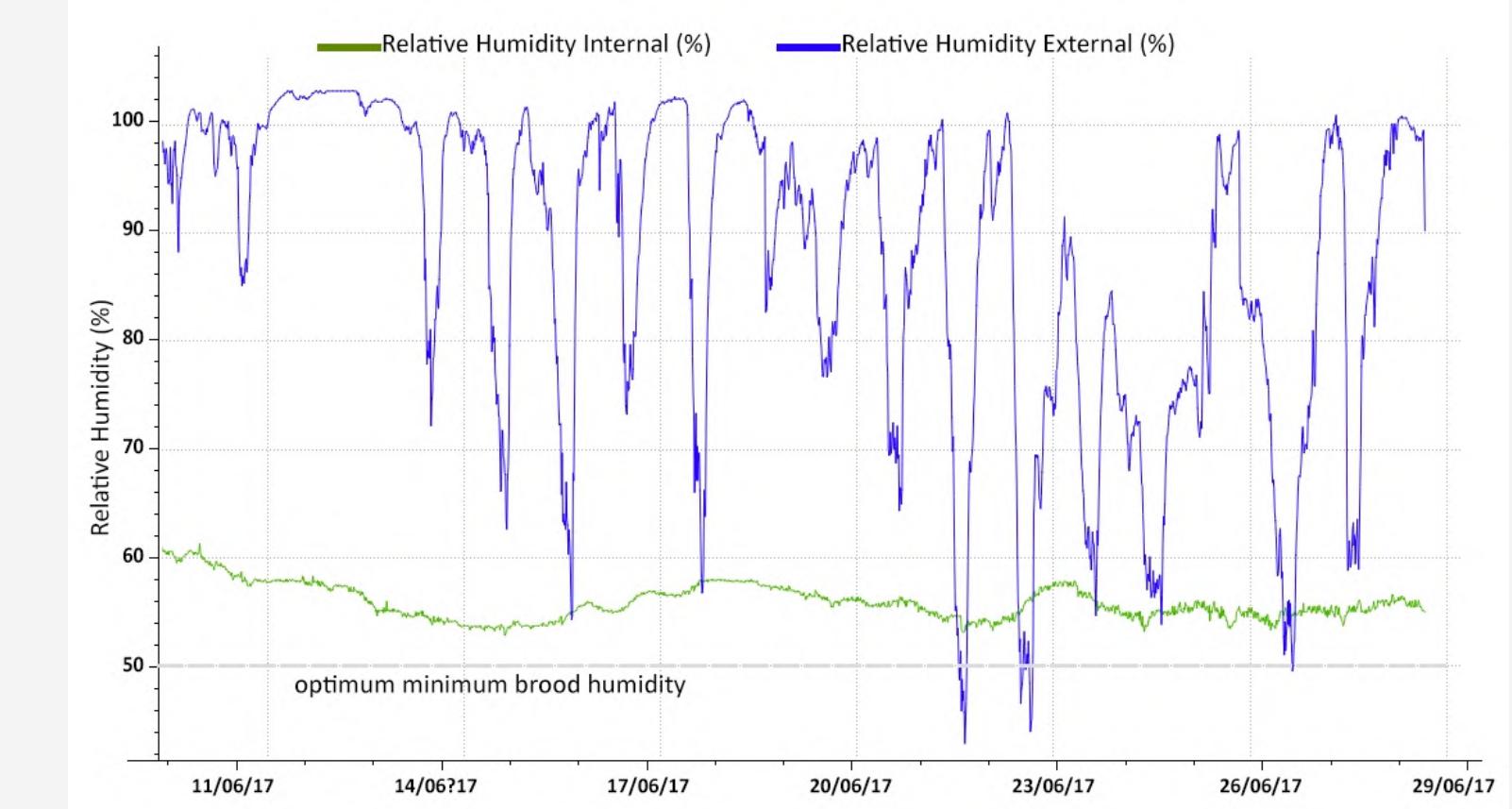
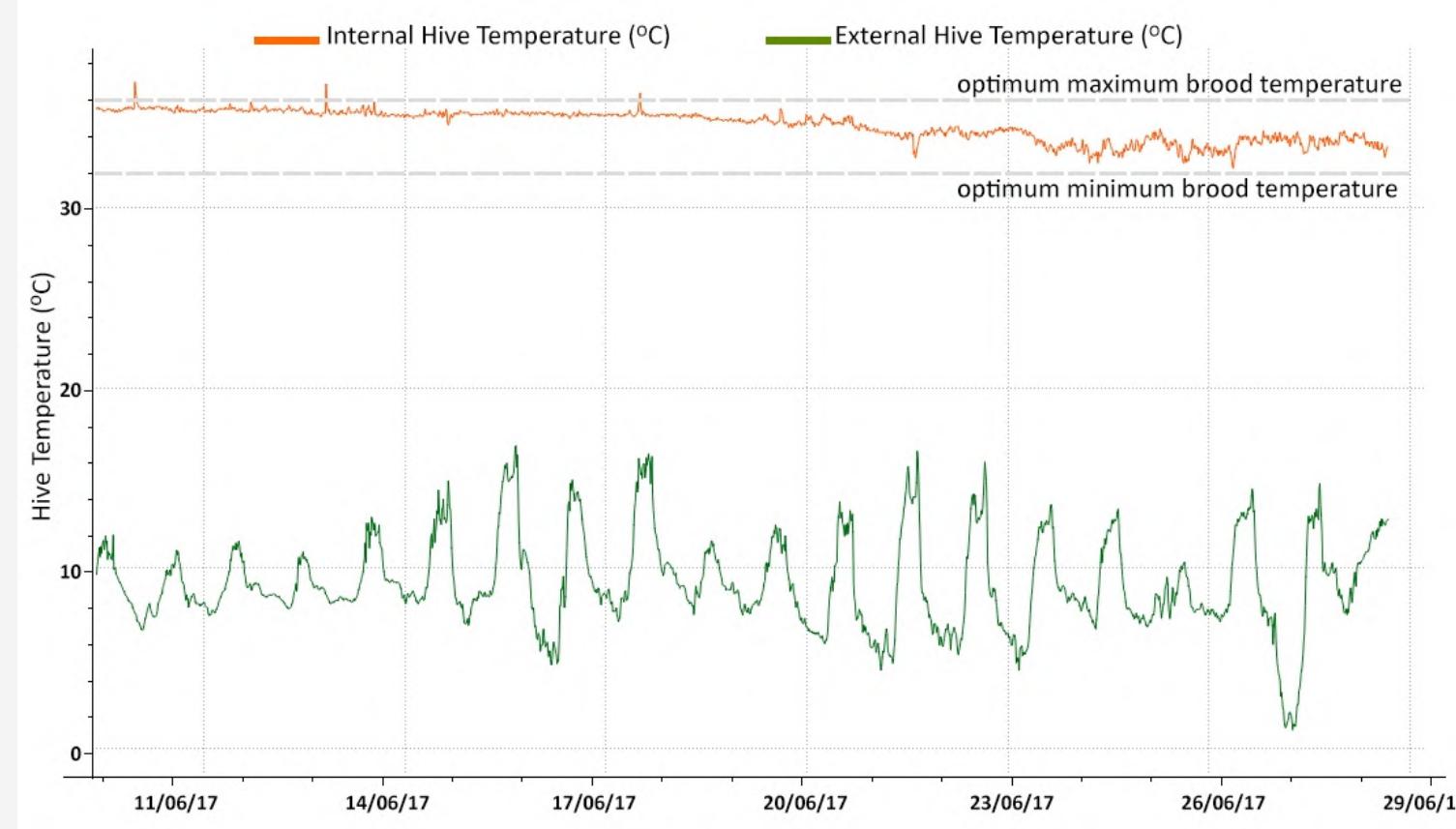




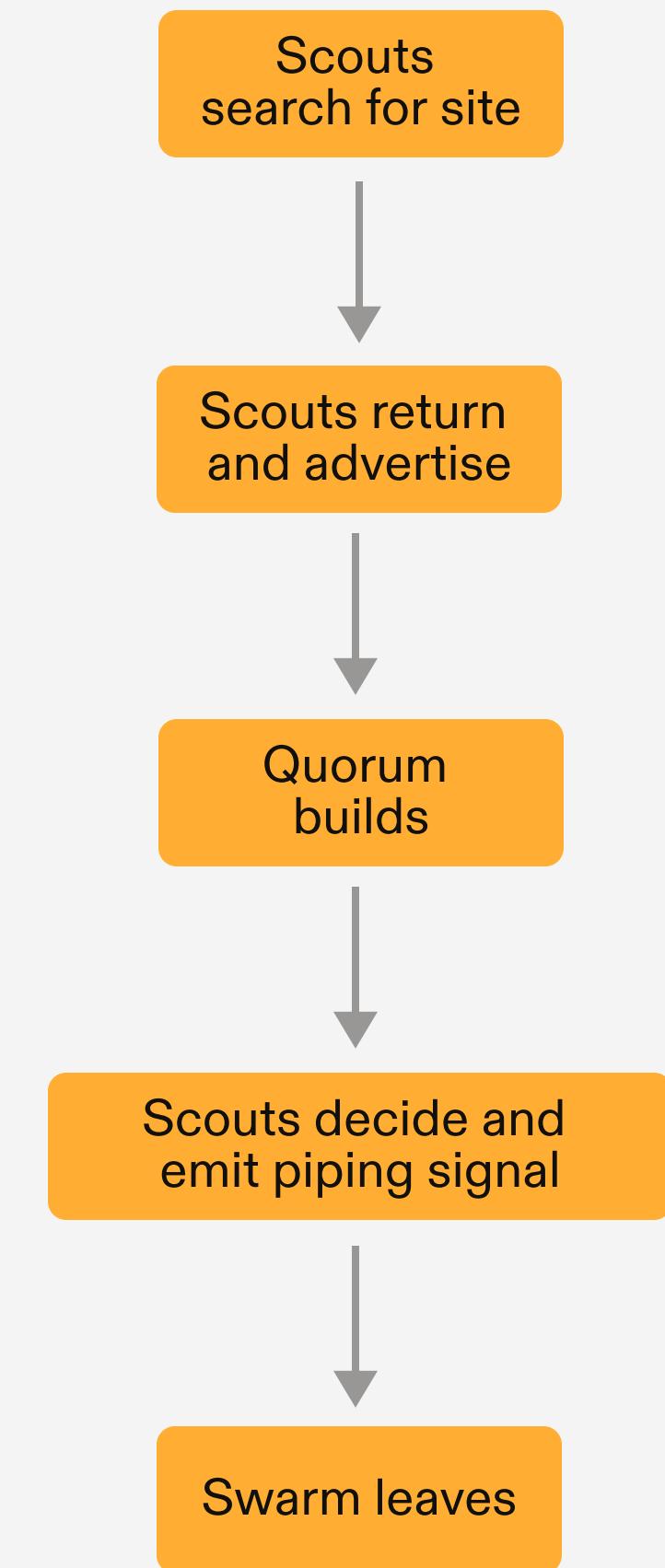
Control Loops



Control Loops







Autoscaling

Failover

Service
Discovery

Storage
Orchestration

Queen Bee
laying eggs

Queen rearing

Drone/Bee
mating

Comb Space
and Size

Control
Loops

Control
Plane

RBAC

Metrics

Environmental
Controls

Honeycomb

Guard Bees

Weight, Sound,
Counts

Message
Passing

(Wall) Time

Quorum

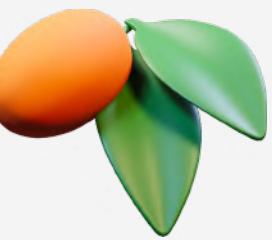
Waggle Dance,
Pheromones,
Sound

Wall Time

Quorum

Conclusion

**Inspiration can come from
anywhere.**



“Bees are awesome.”