

# Combined Biometric Wing Morphometry Report

## *Apis mellifera mellifera* - breeder queen M25

SIA Smilga Spalvina breeding stock for the 2026 season

Sample / breeder queen	Target subspecies	Software used	Wings analyzed
M25	<i>Apis mellifera mellifera</i>	CBeeWing + DeepWings	10 worker forewings

**Overall conclusion:** the same 10 wings are morphometrically consistent with the *Apis mellifera mellifera* / *M-lineage* type. CBeeWing placed all 10 wings within Mellifera limits. DeepWings classified all successful wing images as 100% M-lineage. The DeepWings subspecies-level split between *A.m. mellifera* and *A.m. iberiensis* is best interpreted as within-M-lineage similarity, not as proof of Iberian ancestry.

CBEEWING RESULT	DEEPWINGS LINEAGE	DEEPWINGS BATCH AVERAGE	NON-M SIGNAL
<b>10/10</b> within Mellifera limits	<b>10/10</b> M lineage, 100%	<b>72.7%</b> A.m. mellifera top class	<b>&lt;0.001%</b> no meaningful signal

Two independent wing-morphometry workflows were used on the same sample. **CBeeWing/CooRecorder** applies the traditional Mellifera reference limits using cubital index, discoidal shift angle and Hantel index. **DeepWings** uses automated landmark detection and a classifier. Both analyses support an M-lineage, Mellifera-compatible result. *DeepWings probabilities are classification probabilities, not percentages of genetic blood or ancestry.*

### Summary of results

CBeeWing / CooRecorder			DeepWings	
Trait	Mean	SD	Indicator	Result
Discoidal shift angle (DsA)	-2.7	1.0	Successful images	10/10
Cubital index (Ci)	1.77	0.13	Lineage assignment	M lineage, 100% for every wing
Hantel index (Hi)	0.881	0.032	Batch-average top class	A.m.mellifera (72.7%)
<b>Result: 10 wings, 100% within Mellifera limits in all three CBeeWing diagrams.</b>			Batch-average second class	A.m.iberiensis (27.3%)
			Top-1 wing count	Mellifera 5/10; Iberiensis 5/10
			<b>Result: M-lineage signal only; no meaningful Carnica, Ligustica or Caucasic signal in the reported top-three outputs.</b>	

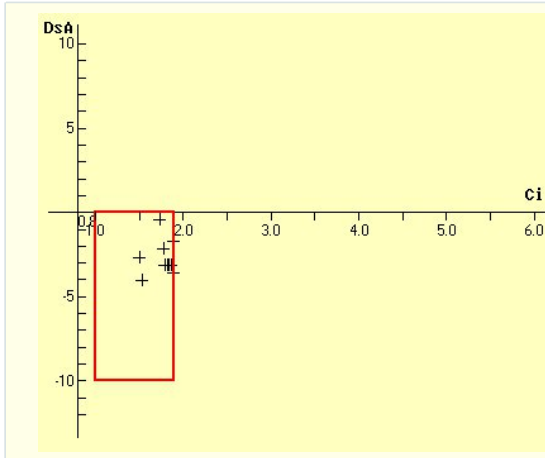
### Individual DeepWings image classifications

Image	Lineage	Top-1 subspecies	Top-1 probability	Top-2 subspecies	Top-2 probability
1.JPG	M (100%)	A.m.mellifera	93.8%	A.m.iberiensis	6.2%
2.JPG	M (100%)	A.m.iberiensis	55.5%	A.m.mellifera	44.5%
3.JPG	M (100%)	A.m.mellifera	92.9%	A.m.iberiensis	7.1%
4.JPG	M (100%)	A.m.iberiensis	75.0%	A.m.mellifera	25.0%
5.JPG	M (100%)	A.m.mellifera	98.6%	A.m.iberiensis	1.4%
6.JPG	M (100%)	A.m.mellifera	73.8%	A.m.iberiensis	26.2%
7.JPG	M (100%)	A.m.iberiensis	84.8%	A.m.mellifera	15.2%
8.JPG	M (100%)	A.m.iberiensis	60.4%	A.m.mellifera	39.6%
9.JPG	M (100%)	A.m.mellifera	100.0%	A.m.iberiensis	0.0%
10.JPG	M (100%)	A.m.iberiensis	85.6%	A.m.mellifera	14.4%

**Technical interpretation:** *A.m. mellifera* and *A.m. iberiensis* are both M-lineage honey bees. Therefore, a Mellifera/Iberiensis split at the DeepWings subspecies layer can occur when wing shapes are close to the boundary between these related M-lineage reference groups. The practical signal here is that the sample is consistently M-lineage, with no meaningful non-M-lineage signal.

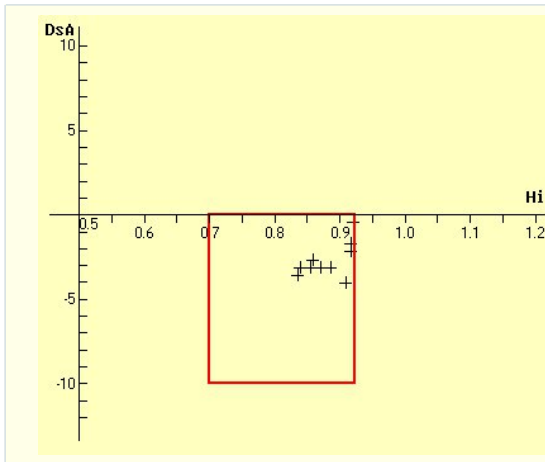
**Report limitation:** This is a morphometric wing-character report. It supports identification of the measured worker sample as fitting Mellifera/M-lineage wing morphology, but it does not replace DNA-based ancestry testing, closed-mating records, pedigree records or field-performance evaluation when making formal genetic-purity claims.

## CBeeWing diagrams



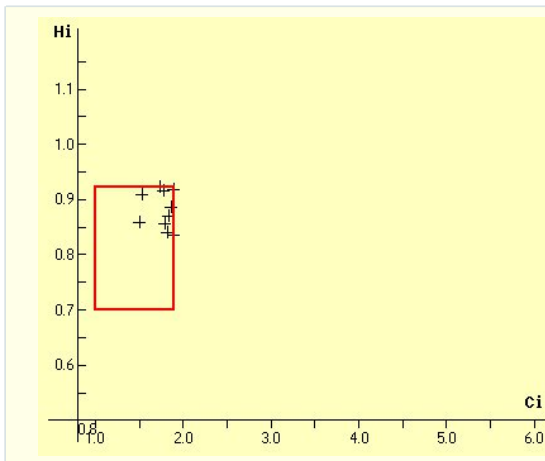
### Discoidal shift angle / Cubital index

10 wings; 100% within limits for Mellifera; mean Dsa -2.7, mean Ci 1.77.  
Reference area is shown by the rectangle; measured wings are plotted as crosses.



### Discoidal shift angle / Hantel index

10 wings; 100% within limits for Mellifera; mean Dsa -2.7, mean Hi 0.881.  
Reference area is shown by the rectangle; measured wings are plotted as crosses.



### Hantel index / Cubital index

10 wings; 100% within limits for Mellifera; mean Hi 0.881, mean Ci 1.77.  
Reference area is shown by the rectangle; measured wings are plotted as crosses.

## CBeeWing individual wing values

Wing no.	Cubital index (Ci)	Discoidal shift angle (Dsa)	Hantel index (Hi)
1	1.7	-0.5	0.92
2	1.9	-1.7	0.92
3	1.8	-3.2	0.84
4	1.9	-3.1	0.87
5	1.8	-2.2	0.92
6	1.9	-3.6	0.84
7	1.8	-3.1	0.87
8	1.5	-2.7	0.86
9	1.5	-4.0	0.91
10	1.8	-3.1	0.86