

Color Measurements in Honey

Comparison of:

Lovibond Comparator 2001
Lovibond Honey ColorPad
Hanna Honey Color Analyzer

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Color Measurements in Honey - Objective:

- **independent of individual experience**
- **expanded measurement range**
- **higher repeatability**
- **higher accuracy**
- **more objective**
- **less expensive**

Specifications

	Lovibond Comparator 2001 (incl. Daylight 2000)	Lovibond Honey ColorPod	Hanna Honey Color Analyzer
Price (Euro)	542,00 *	426,00	330,00
Light Source	tungsten	LED	tungsten
Filter		430 and 530 nm	420 and 525 nm
Range	20 – 105 mm Pfund	0 – 150 mm Pfund	
Resolution	5 mm Pfund	1 mm Pfund	
Precision		± 2 mm (80 mm Pfund)	
Method	visual comparison	direct measurement	
Calibration	colored scale wheels	sets zero with glycerol reference	

* add 300 Euro for two scale wheels: 20 to 60 mm, 65 to 105 mm



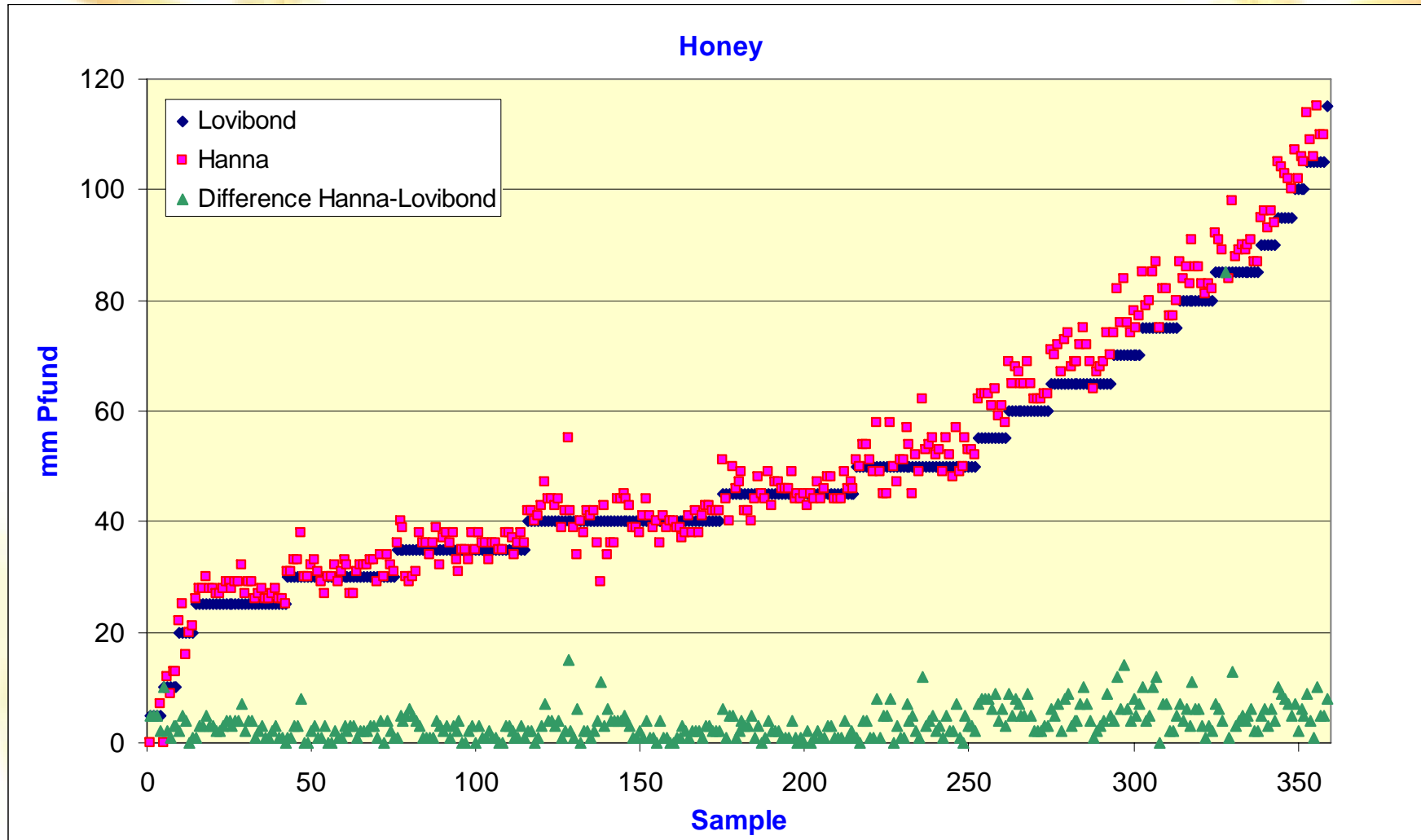
Interlaboratory Ring Trial Test – Honey

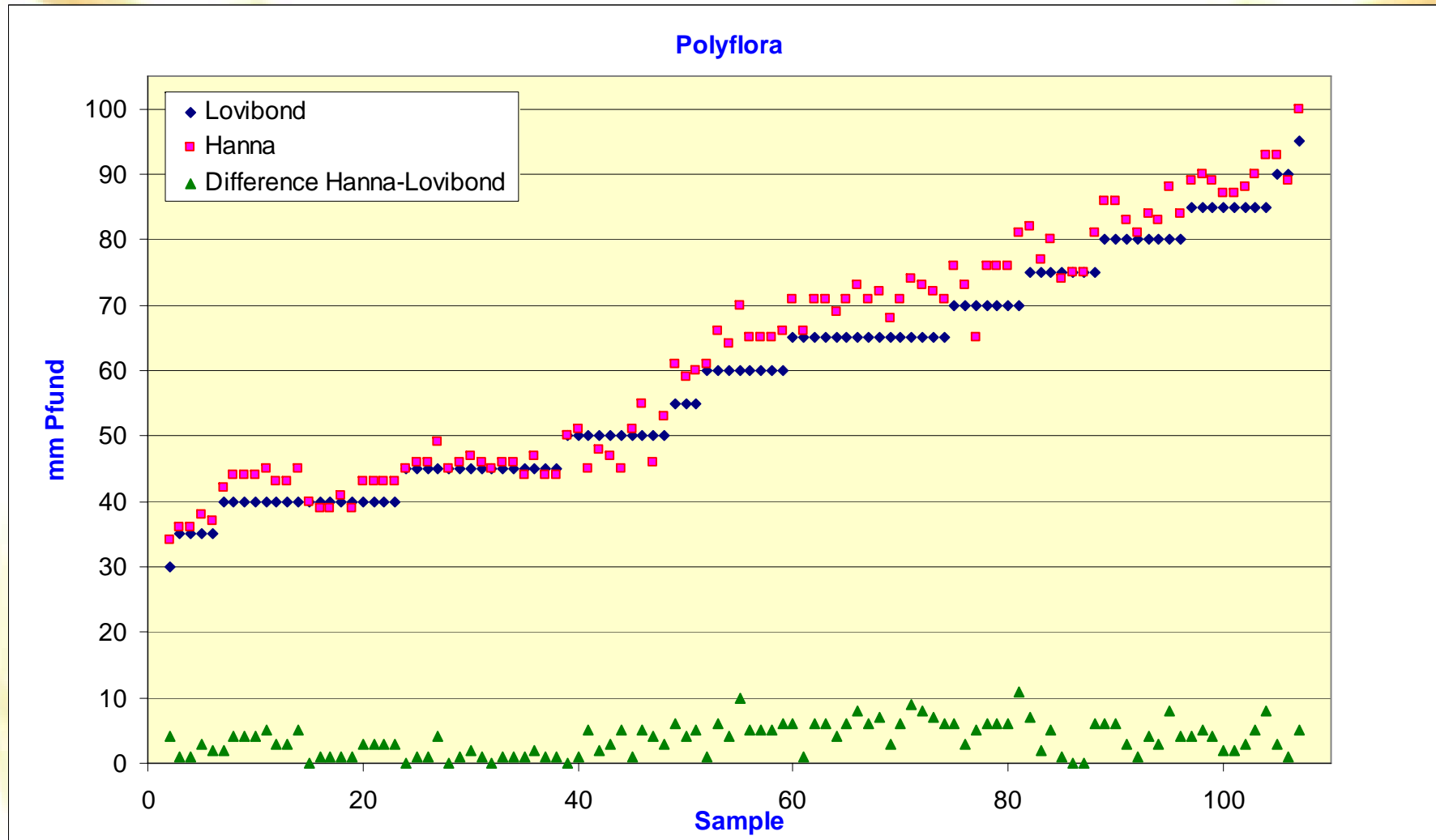
Hanna C221 Honey Color Analyzer - mm Pfund

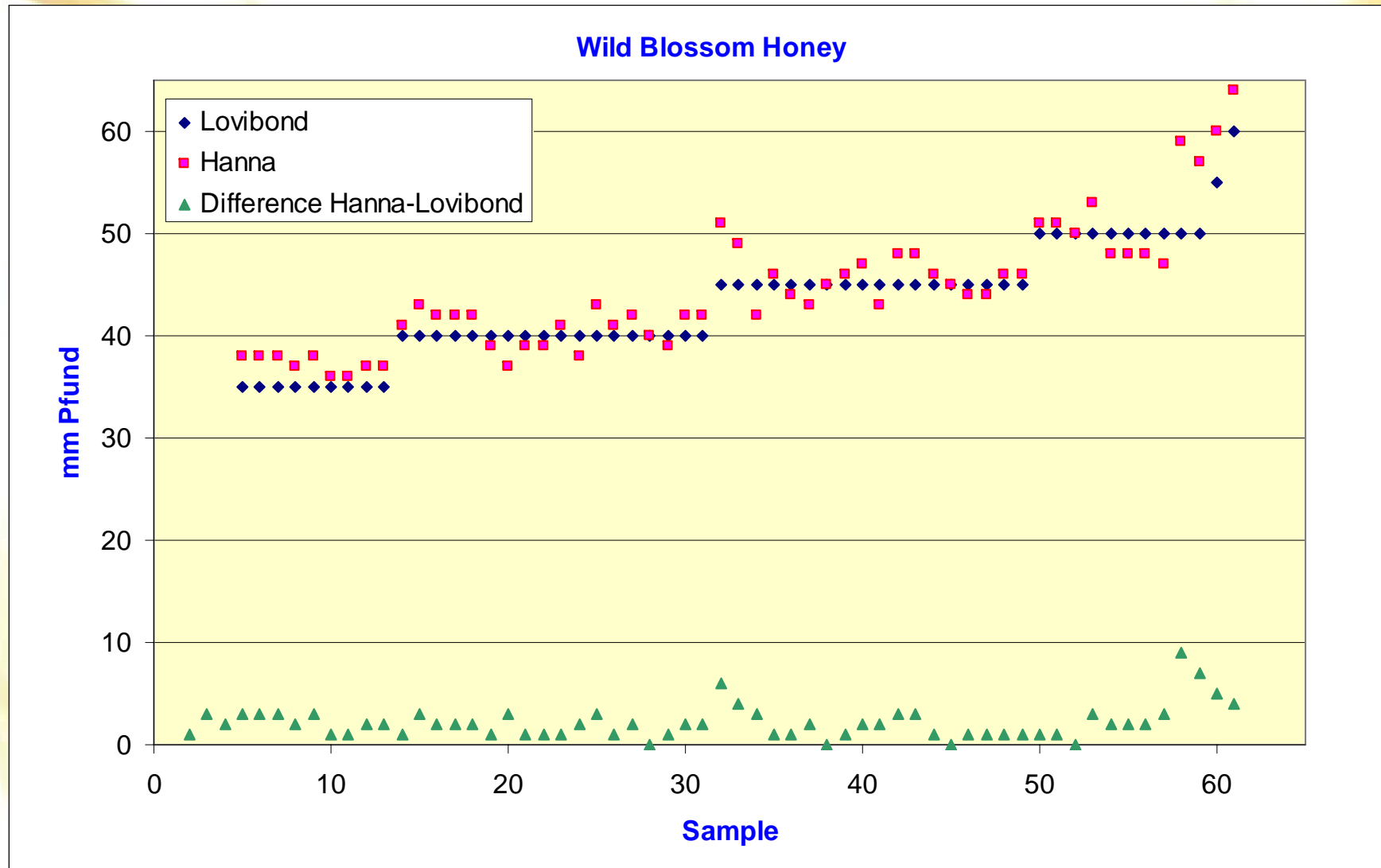
Laboratory	Polyflora	Polyflora	Polyflora	Wild Blossom	Forest
1	49	45 ± 0,0	67 ± 0,0	49 ± 0,8	86 ± 1,0
2	46	45	66	51	85
3	47 ± 0,8	46 ± 0,4	67 ± 0,4	50 ± 0,4	85 ± 0,4
4	59	54 ± 2,0	69 ± 0,8	64 ± 0,6	88 ± 0,8
5	49	44 ± 0,5	68 ± 0,0	50 ± 0,0	86 ± 0,4

Average *	50,0	46,8	67,4	52,8	86,0
std. dev.	5,2	4,1	1,1	6,3	1,2
rel std dev %	10,4	8,7	1,7	11,9	1,4
Median	49	45	67	50	86

* 5 Participants







Reproducibility

Difference between Hanna C221 and Lovibond Comparator > 5 mm

Time of measurement	Sample	Lovibond [mm Pfund]	Hanna [mm Pfund]
27.06.06	1	90	98
29.08.06	2	90	96
	3	90	96
	4	90	96
	5	90	95
	6	90	96
	7	90	95
Mean		90	95,7
Std.dev.		0	0,5
07.09.06	8	90	95
	9	90	95
	10	90	94
	11	90	95
	12	90	95
	13	90	95
Mean		90	94,8
Std.dev.		0	0,4

Difference between Hanna C221 and Lovibond Comparator > 5 mm Comparison with Honey ColorPod

Sample	Lovibond [mm Pfund]	Hanna C221 [mm Pfund]	ColorPod [mm Pfund]
1	50	57	63
2	50	56	64
3	50	56	63
4	50	57	64
5	50	57	63
6	50	57	63
Mean	50	56,7	63,3
Std.dev.	0	0,5	0,5
1	80	85	80
2	80	85	82
3	80	84	81
4	80	84	81
5	80	85	81
6	80	85	81
Mean	80	84,7	81,0
Std.dev.	0	0,5	0,6

**Difference between Hanna C221 and Lovibond Comparator < 5 mm
Comparison with Honey ColorPod**

Sample [Polyflora]	Lovibond [mm Pfund]	Hanna C221 [mm Pfund]	ColorPod [mm Pfund]
1	25	23	23
2	25	24	22
3	25	23	23
4	25	23	23
5	25	22	22
6	25	22	22
Mean	25	22,8	22,5
Std.dev.	0	0,7	0,5
1	50	49	58
2	50	50	58
3	50	51	59
4	50	50	60
5	50	49	58
6	50	49	58
Mean	50	49,7	58,5
Std.dev.	0	0,7	0,8
2	105	106	95
3	105	105	96
4	105	105	95
5	105	107	96
3	105	107	95
4	105	105	94
Mean	105	105,8	95,2
Std.dev.	0	0,9	0,7

Conclusion

- Lovibond Comparator, Lovibond Honey ColorPod and Hanna C221 Honey Color Analyzer are not comparable
- the reproducibility of a single method is high

Proposal

1. presentation of the results to the companies Lovibond and Hanna to ask for a solution of the problem of different filters
2. after their response:
Can we change to photometric color measurement ?
3. Setting up a method with an independent Vis-photometer