



International Seed Testing Association

# ISTA Proficiency Tests on GMO Testing

ISTA GMO TF  
Bettina Kahlert



# Outline

## PT06

Design,

Qualitative, sub-sampling and quantitative results

Rating of laboratories

Summary and conclusion

## PT01 to PT06

Design, results and conclusion



# Design of the 6<sup>th</sup> Proficiency Test

- crop: *Brassica napus* L.
- # of samples per lab: 10
- # of negative samples: 3
- # of positive samples: 7
  - 0.3%: 2
  - 0.6%: 3
  - 1.2%: 2
- event: GT73
- sample size: 3300 seeds
- Qualitative and Quantitative tests
- the laboratory chooses the method

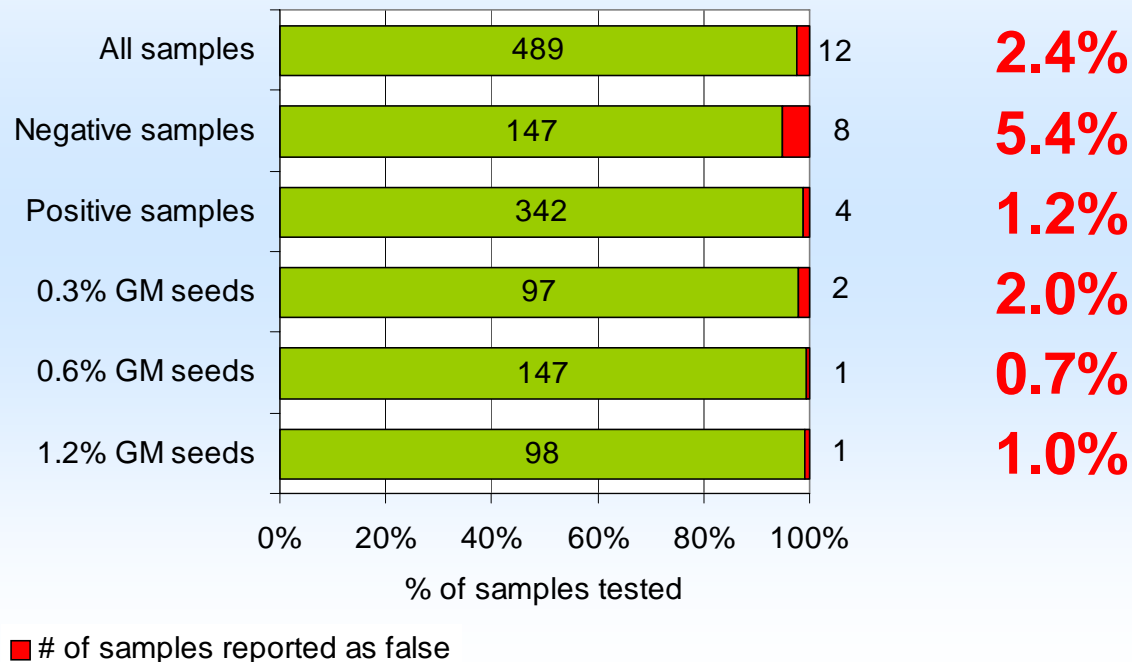


# Qualitative Test: The detection of GM seeds in samples

49 labs classified each of the 10 samples as either positive or negative.

4 laboratories reported false results. These are 8% of the laboratories.

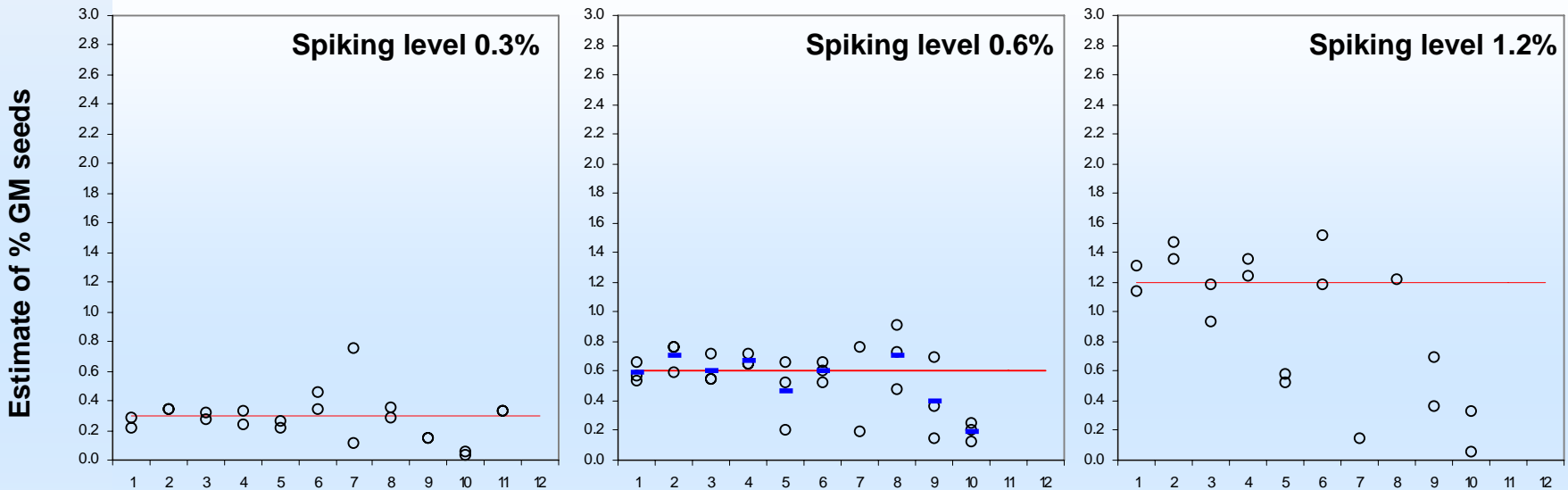
Sample classified as false...





# Sub-sampling Quantification

## Laboratory's estimated results and its mean



12 laboratories reported the test plan...

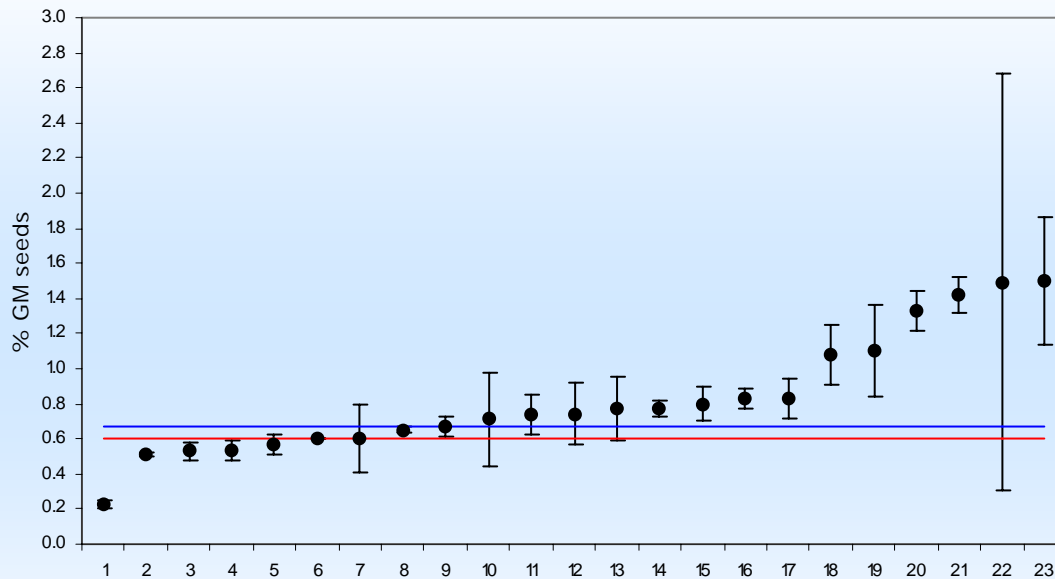
- the size of sub-samples (in number of seeds)
  - the number of sub-samples tested
  - the number of positive sub-samples
- ⇒ used to compute the result

Labs	# of sub-samples	size of sub-sample
1	~300	10
2	~90	30
3, 4	~30	~110
5, 6	20-25	~150
7, 8	15	210-220
9, 10, 11	5-10	330-550
12	2-3	



# Quantitative Test

23 laboratories reported the GM content of the positive test samples in % of GM seed by number or by mass or in % DNA copies



Spiking level (%)	Mean (%)	Standard deviation	Variation coeff.
0.3/0.33	0.38	0.22	59%
0.6/0.67	0.80	0.40	50%
1.2/1.35	1.57	0.90	58%



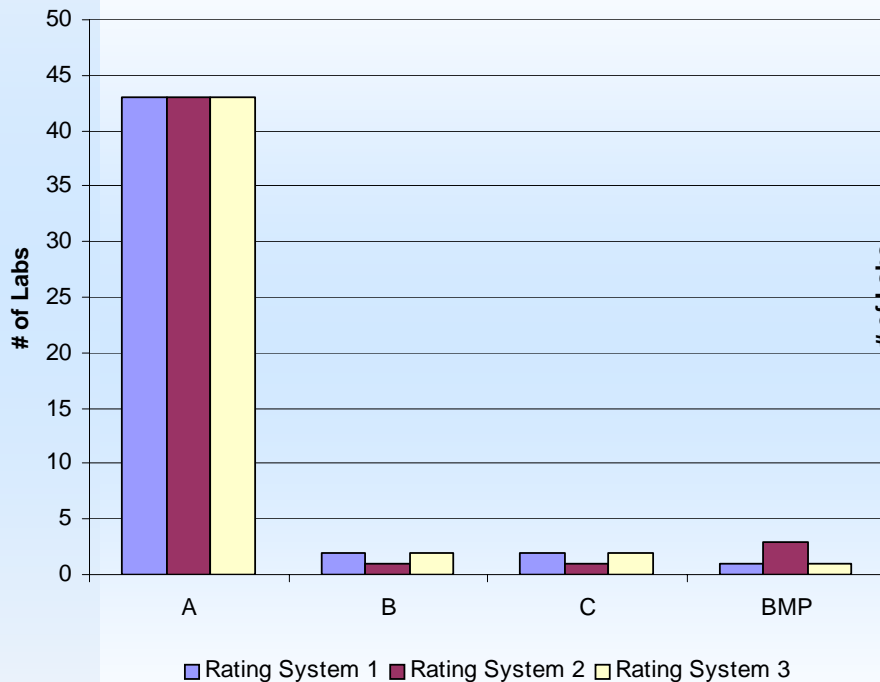
# How to evaluate the performance of laboratories in ISTA Proficiency Tests?

- A No problem has been detected in this test
- B There are small problems, but no specific look or action is suggested to the participant
- C Problems, ISTA indicates there might be things to consider by the laboratory to explain or correct things
- BMP Below Minimum of Performance, ISTA indicates that the results were poor and the laboratory need to find explanations and to improve/correct

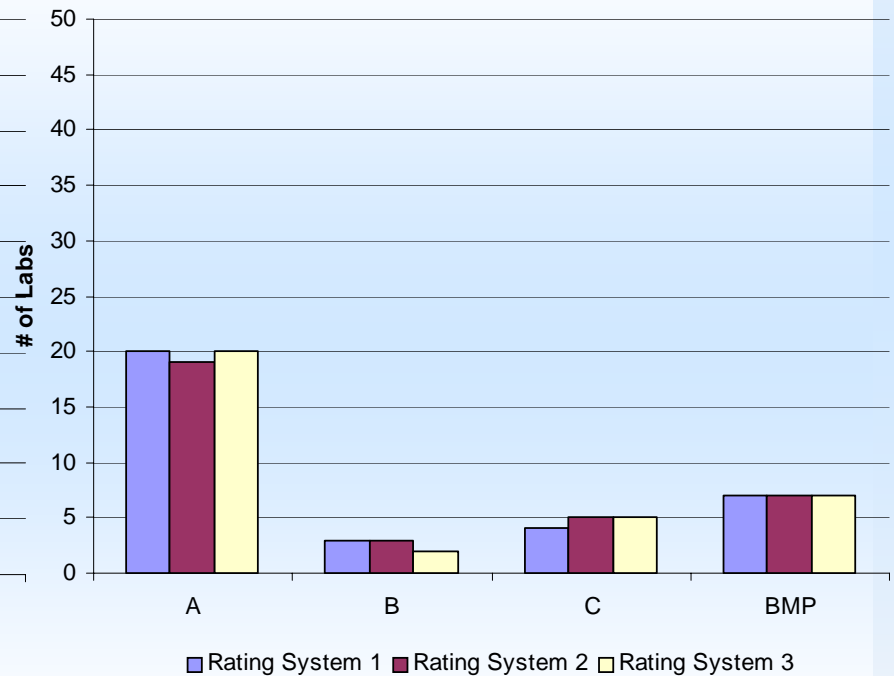


# PT06 Rating

## Qualitative Test (49 labs)



## Quantitative and Sub-sampling Quantitative Tests (35 labs)



RS1: % seed number, RS2: % mass of seed, RS3: median



# Summary PT06

## PT06 - Qualitative Results:

- The percentage of laboratories reporting correct results for all samples is higher as in the previous tests
- >90% of labs made no missclassification,
- >97% of samples are reported correctly

## PT06 - Quantitative Results:

- The results show similar variation for the the spiking level (VC = ~50%)
- Most laboratories overestimated the true level



# Design of the ISTA Proficiency Tests

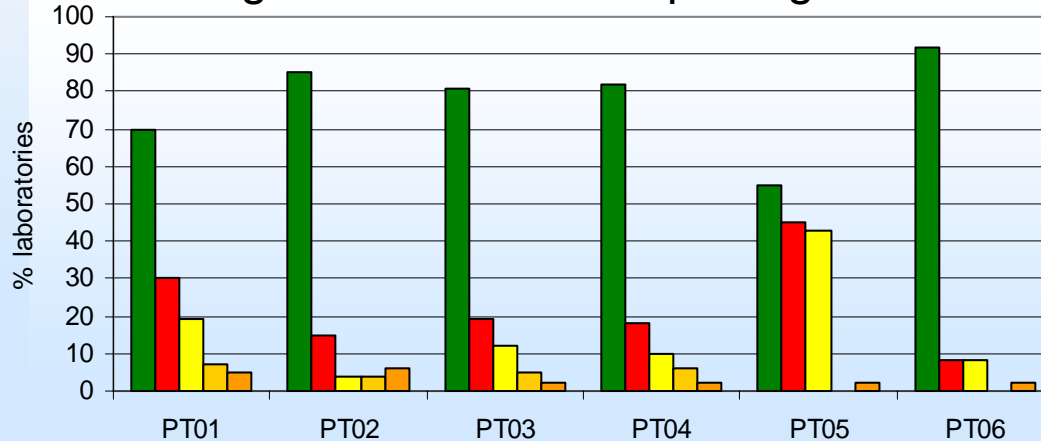
	PT01	PT02	PT03	PT04	PT05	PT06
# of samples per lab	30	10	12	12	12	10
negative	12	3	3	3	3	3
positive	18	7	9	9	9	7
0.1%	-	-	-	3	-	-
0.2%	-	-	3	-	2	-
0.3%	-	-	-	-	-	2
0.5%	-	-	-	3	3	-
0.6%	-	-	-	-	-	3
0.7%	-	3	-	-	-	-
1.0%	18	-	-	3	3	-
1.2%	-	-	-	-	-	2
1.4%	-	4	-	-	-	-
1.5%	-	-	-	-	3	-
2.0%	-	-	3	-	-	-
4.0%	-	-	3	-	-	-
Events	T25/Mon810 (maize)	Mon810 (maize)	T25/Mon810 (maize)	GTS-40-3-2 (soybean)	GTS40/A2704 (soybean)	GT73 (rapeseed)
Sample size	300	3000	1500	3000	3000	3000
Qualitative	X	X	X	X	X	X
Sub-sampl.	-	(X)	(X)	X	X	X
Quant. test	-	(X)	(X)	X	X	X

110 laboratories from 42 countries



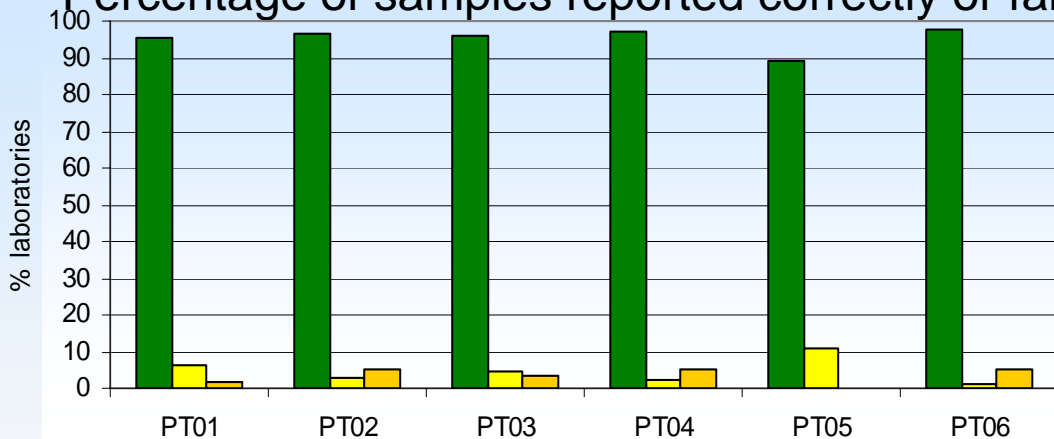
# PT01 – PT06: Qualitative Tests

Percentage of laboratories reporting results correctly or falsely:



- PT01:** maize, MON810 & T25; 1%
- PT02:** maize; MON810; 0.7% & 1.4%
- PT03:** maize; MON810 & T25; 0.2%, 2% & 4%
- PT04:** soybean; GTS40; 0.1%, 0.5% & 1.0%
- PT05:** soybean; GTS40 & A2704; 0.2%, 0.5%, 1.0%, 1.5%
- PT06:** rapeseed; GT70; 0.3%, 0.6% & 1.2%

Percentage of samples reported correctly or falsely:

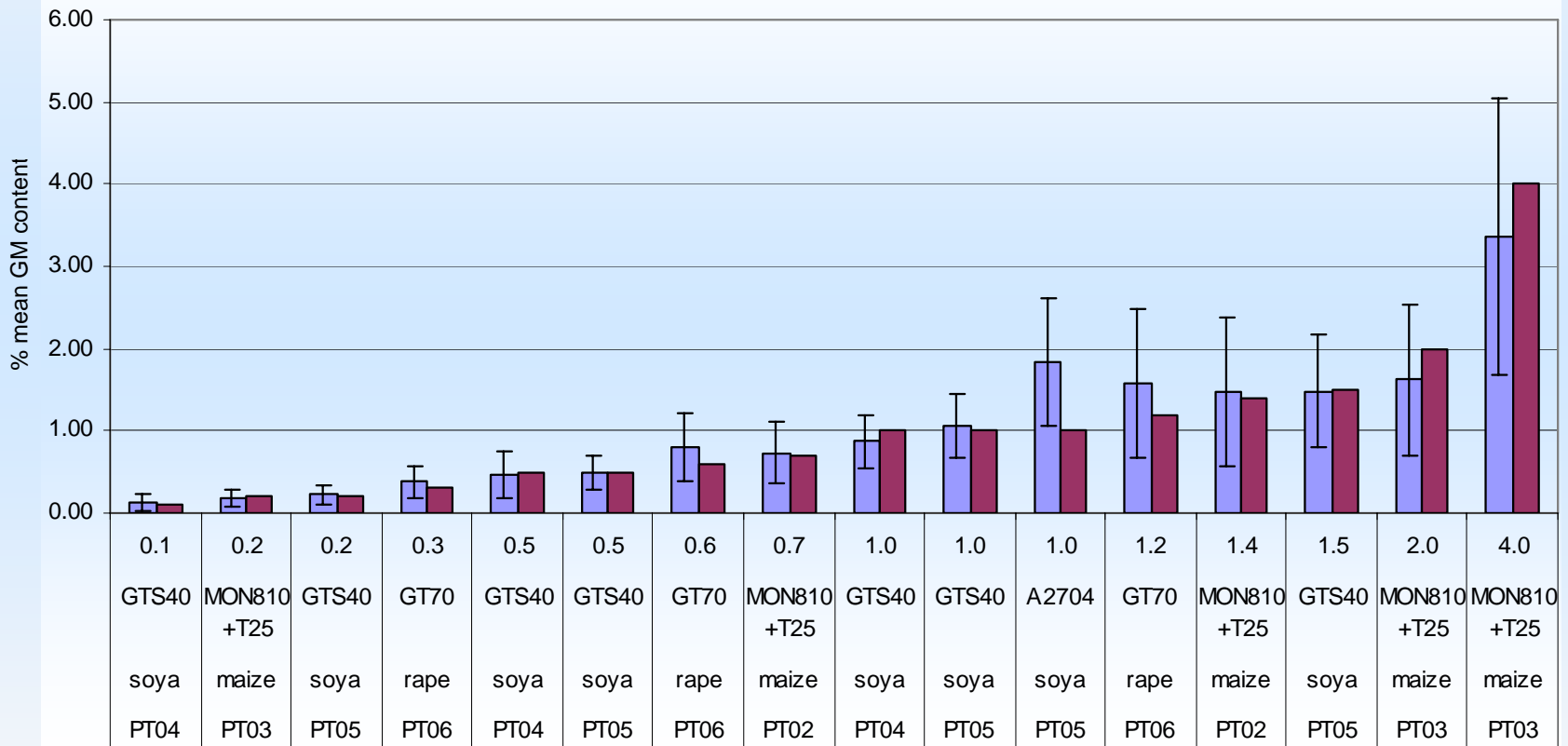


- correct results
- false results
- false negative
- false positive
- both false positive and false negative



# PT01 – PT06: Quantitative Test

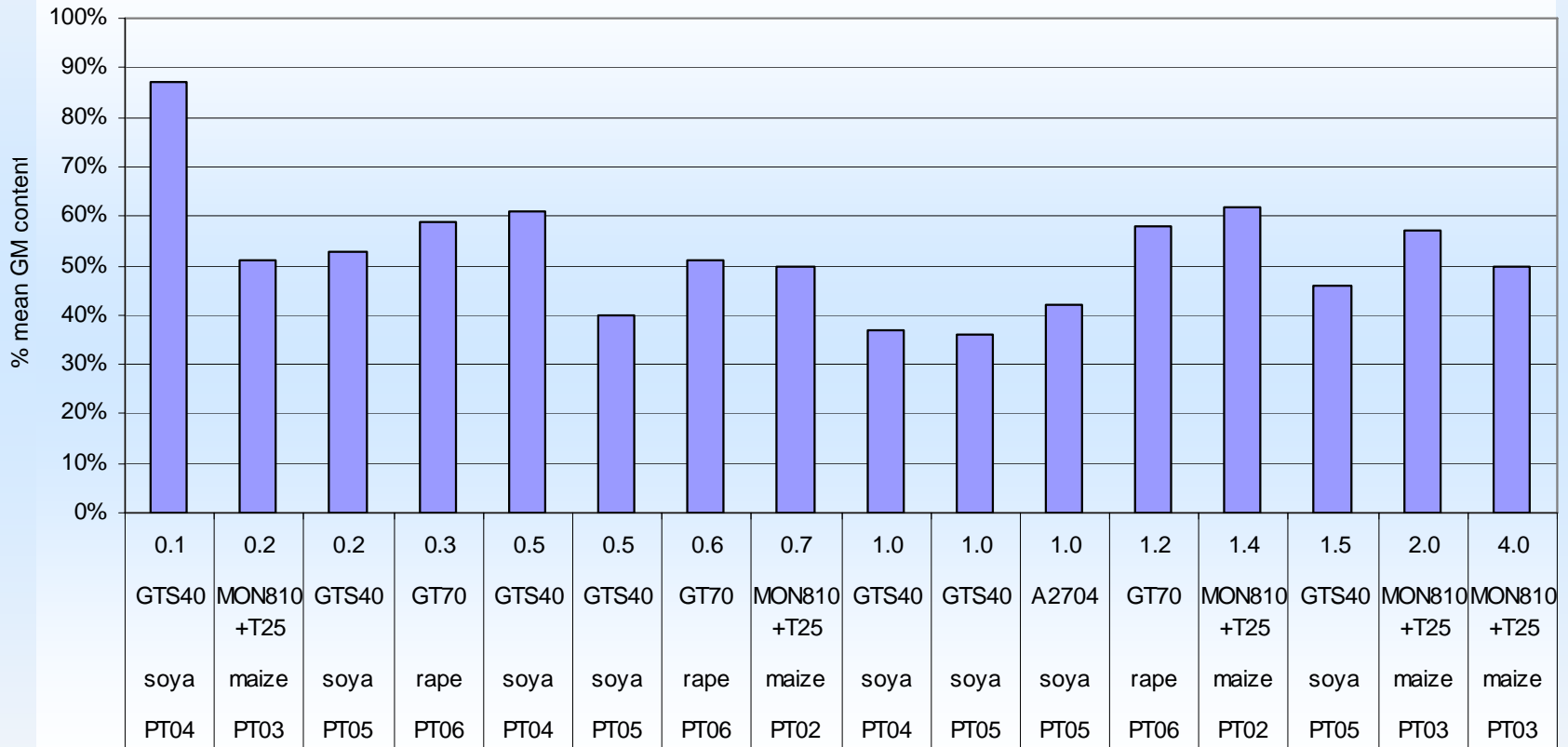
(Overall) mean of the quantitative test results for each spiking level





# PT01 – PT06: Quantitative Test

## Variation coefficient of the quantitative test results

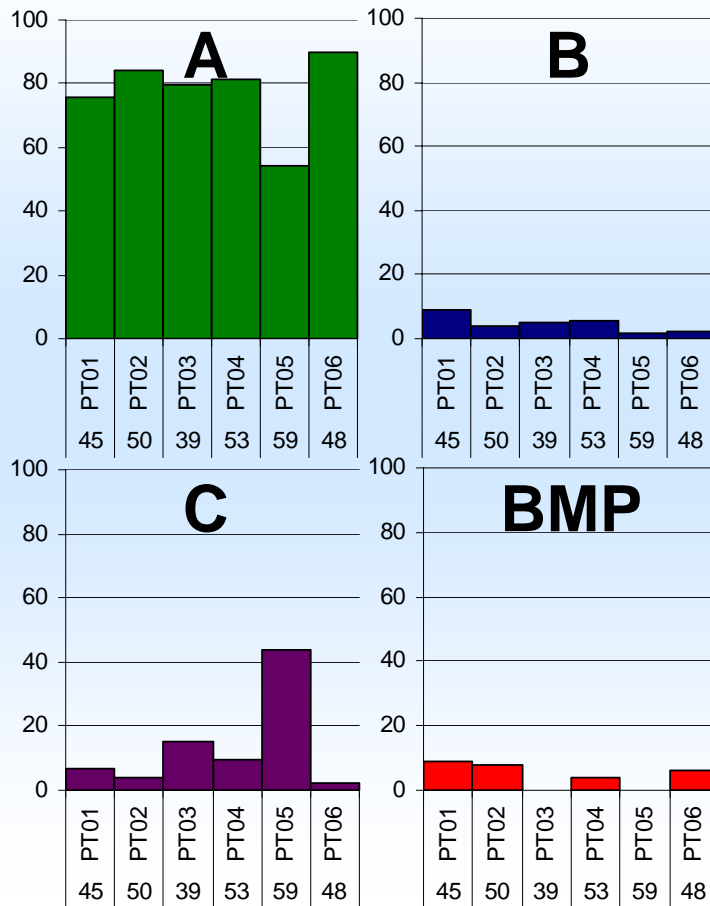




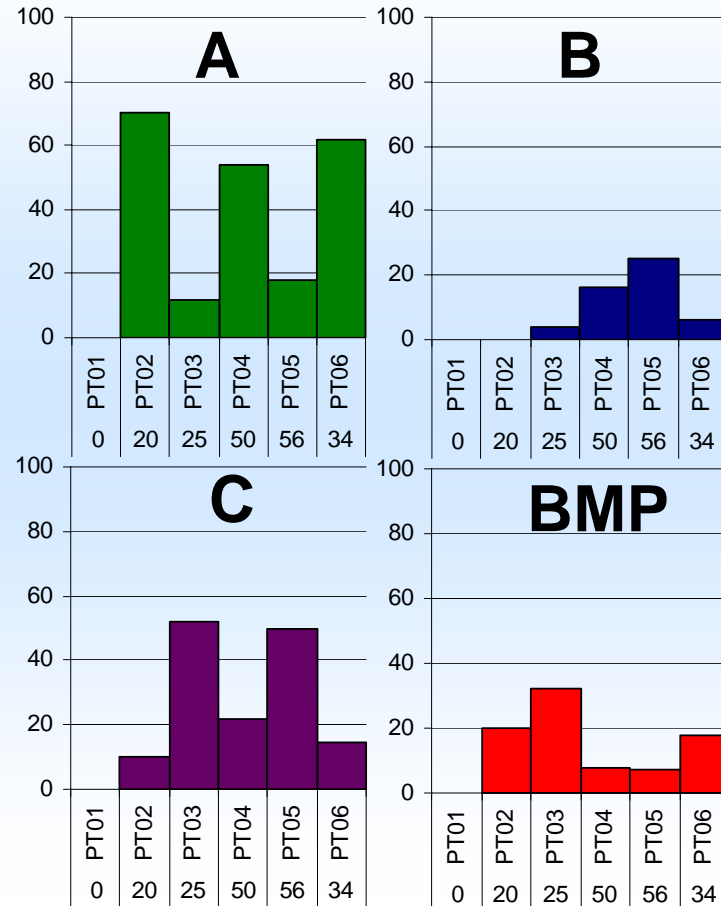
# PT01-PT06: In-round Rating

% of laboratories which reported an A, B, C or BMP

## Qualitative Results



## Quantitative Results





# PT01-PT06: Overall Rating

Rating System for 6 PTs based on the in-round rating values

## Qualitative Results

Overall rating on six tests	# of labs (min. 4 rounds)		
		5	6
A	10	10	10
B	14	14	2
C	8	2	-
BMP	2	-	-

## Quantitative Results

Overall rating on six tests	# of labs (min. 4 rounds)		
		5	6
A	0		
B	5	5	
C	5	1	
BMP	9	2	



# Summary PT01-PT06

## Qualitative Results:

Better results when

- only one transgenic event involved
- transgenic events are well known

Better results for negative samples than for positive samples

## Quantitative Results:

Reported values close to the true value

- when spiking level between 0.2% and 1.5%
- when transgenic event and reference material are well known



# International Seed Testing Association

Thank you for your attention!