

# **NEW FIBER QUALITY MEASUREMENTS**

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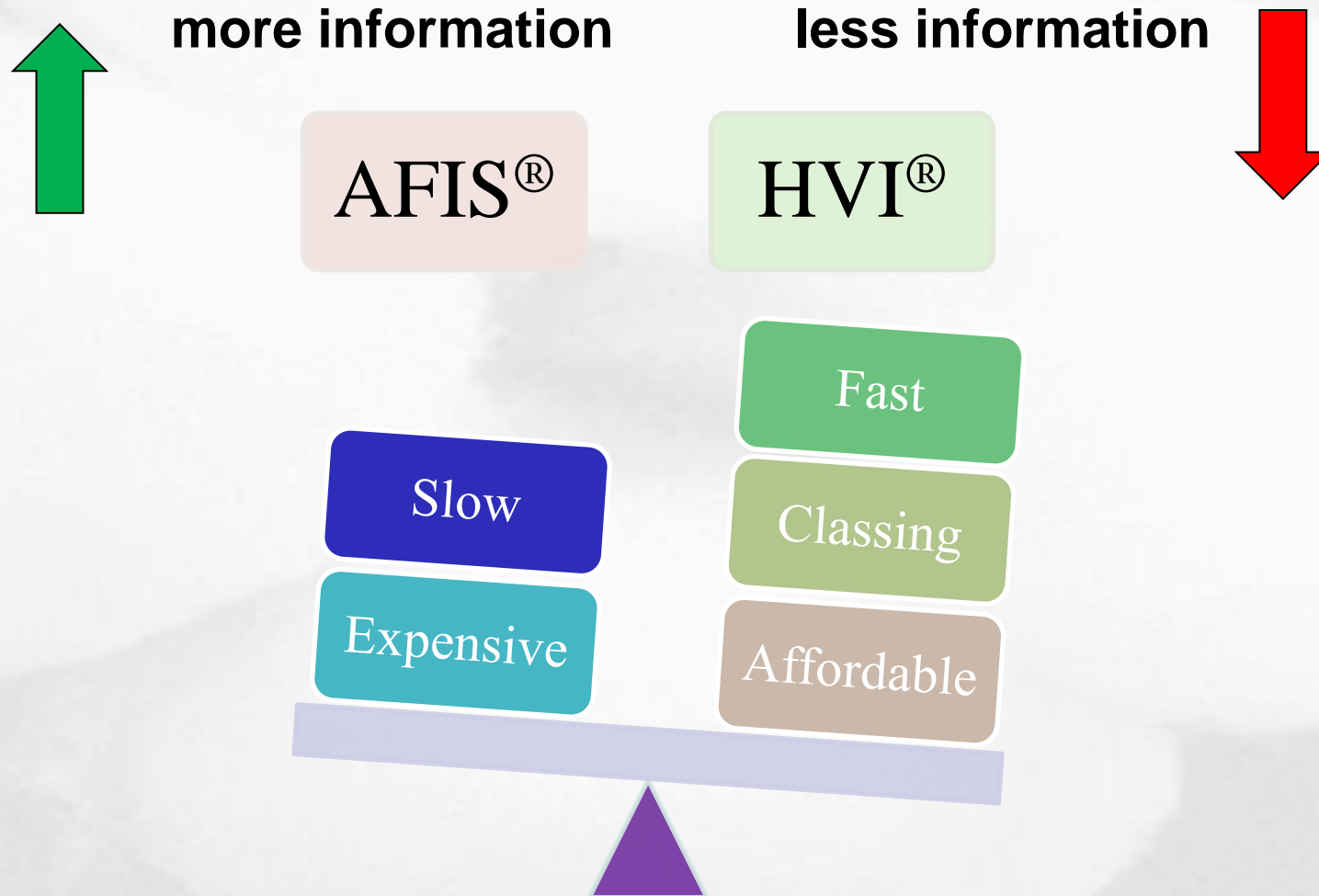
**Director- Quality Research**

# U.S. UPLAND COTTON QUALITY

- **Every individual bale of cotton produced in the U.S. is instrument tested (HVI<sup>®</sup> 1000) and graded by USDA**
- **Micronaire**
- **Strength, Length, Uniformity Index**
- **Color Rd/+b**
- **Trash Area/Count**
- **Leaf Grade**
- **Extraneous Matter (Classer)**



# BREEDING TOOLS FOR TESTING



# HVI®

Sample No	Sample	UHML (in)	UI (%)	Strength (gm/tex)	Elongation (%)	Short Fiber Index (SFI) (%)
1	992101130107	1.173	83.7	34.4	5.3	7.4

- **Micronaire**
- **Strength**
- **Elongation**
- **Upper Half Mean Length**
- **Uniformity Index**
- **Short Fiber Index**

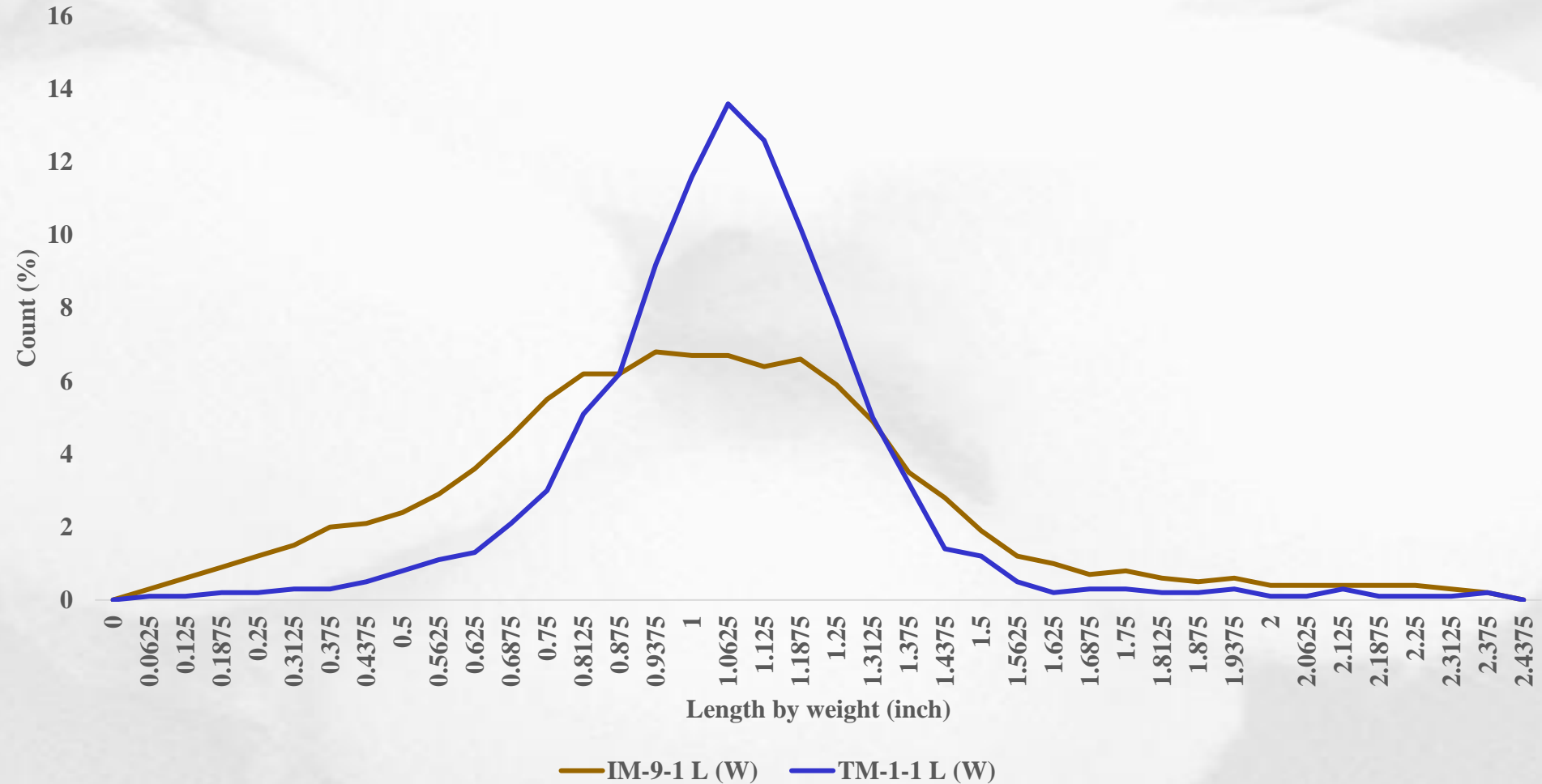
# AFIS®

AFIS										Advanced Fibre Information System				
Sample No	Sample	Nep Size [um]	Neps/g	L(w) [in]	L(w) CV [%]	UQL (w) [in]	SFC (w) [%]	L(n) [in]	L(n) CV [%]	SFC (n) [%]	L5% (n) [in]	Fine [mTex]	IFC [%]	Mat Ratio
1	991000000072	685	87	1.15	27.2	1.35	3.8	1.01	37.0	12.40	1.51	166	6.40	0.91
2	991000000033	711	91	1.15	29.3	1.37	5.2	0.98	41.8	16.70	1.52	175	7.50	0.92

- **Nep Cnt/g**
- **Nep Size**
- **Fiber Nep Size**
- **Length (N)**
- **Length (N) %CV**
- **SFC(N)**
- **L5% (N)**
- **Length (W)**
- **Length (W) %CV**
- **SFC (W)**
- **UQL (W)**
- **Fineness**
- **Maturity**
- **IFC**

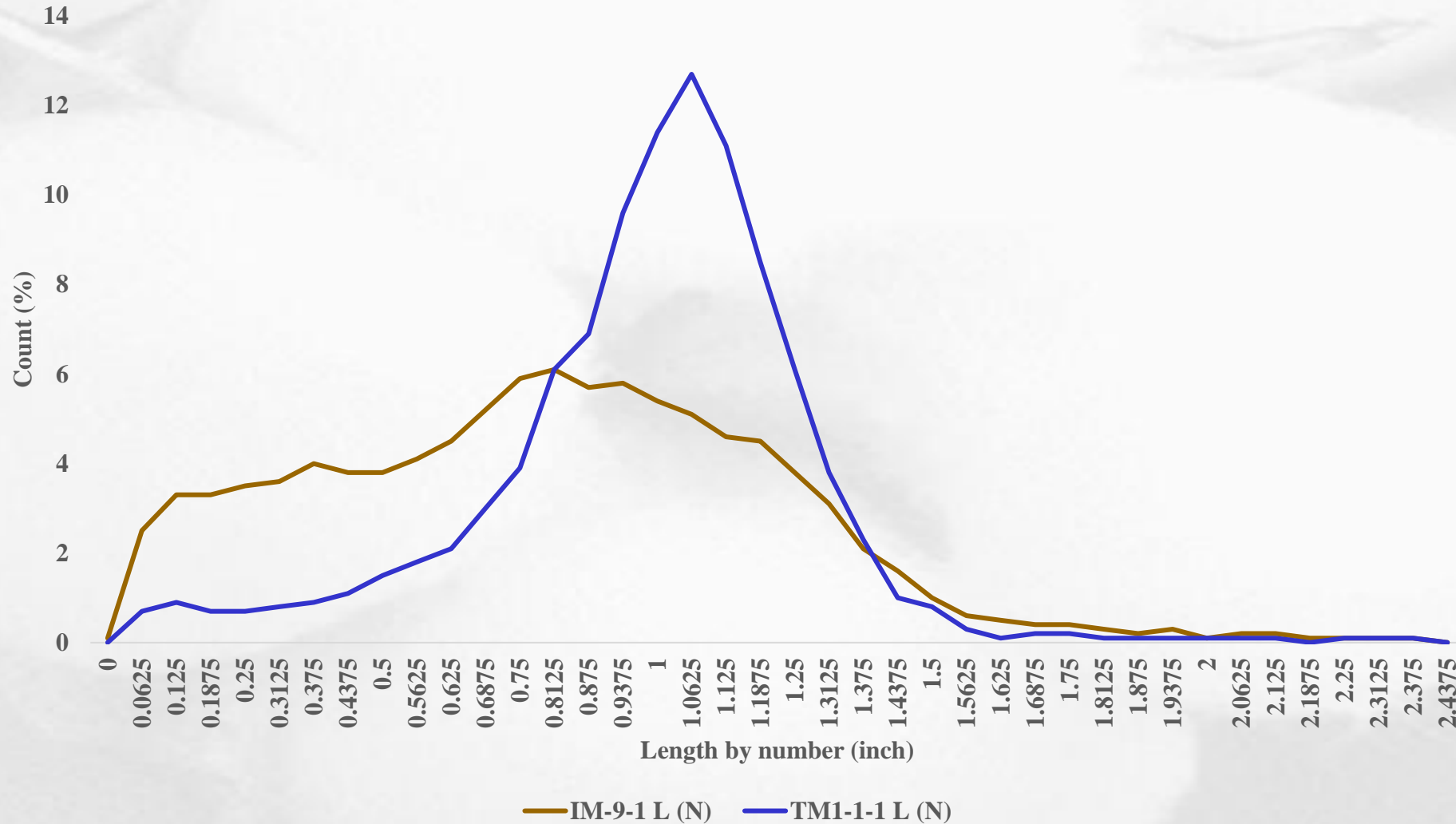
# BEYOND CLASSING: AFIS®

AFIS® Length (W) (inch) Distribution



# BEYOND CLASSING: AFIS®

AFIS® Length (N) (inch) Distribution





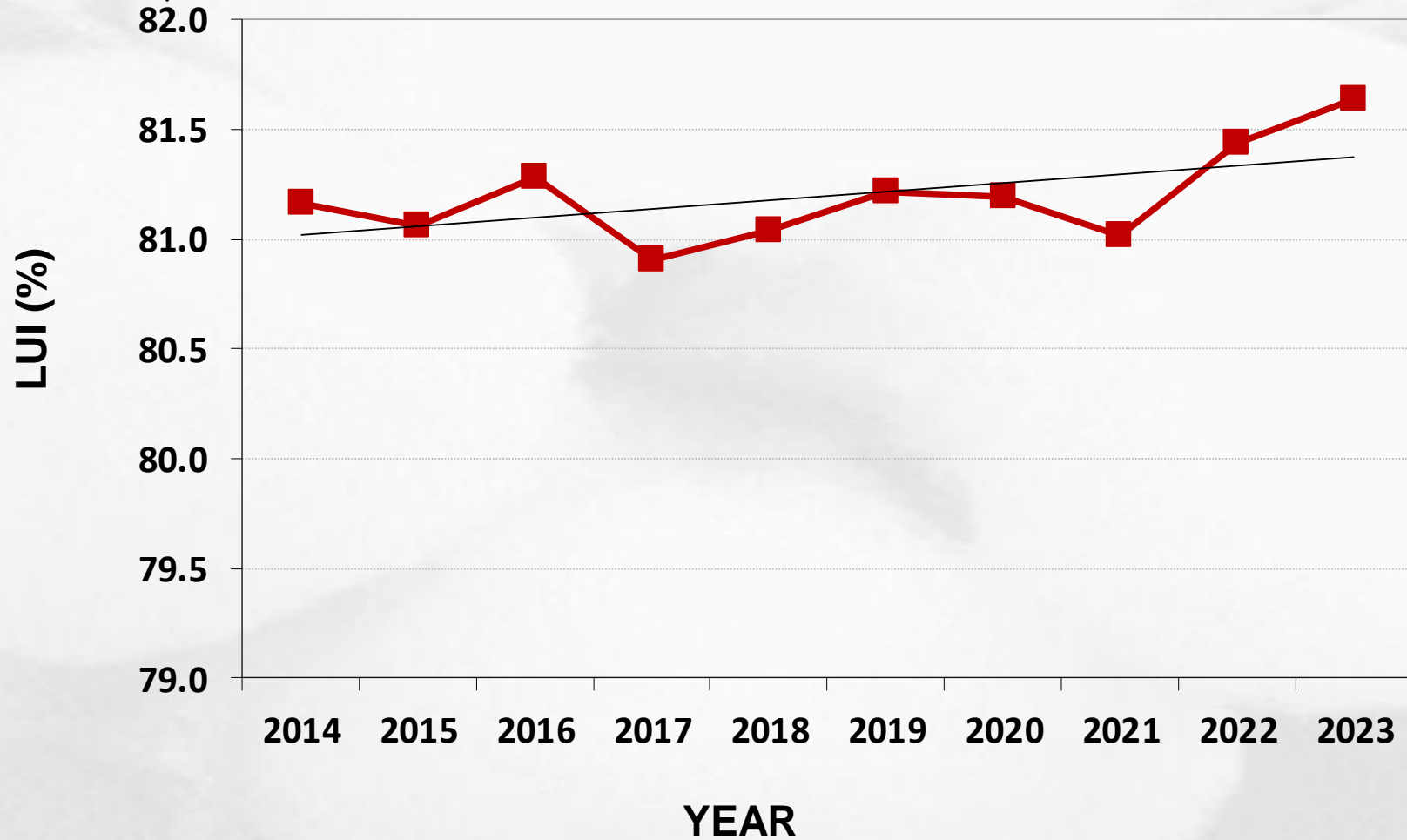
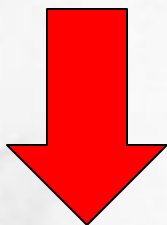
**LENGTH UNIFORMITY  
INDEX: A MULTI-  
MILLION DOLLAR  
PROBLEM**



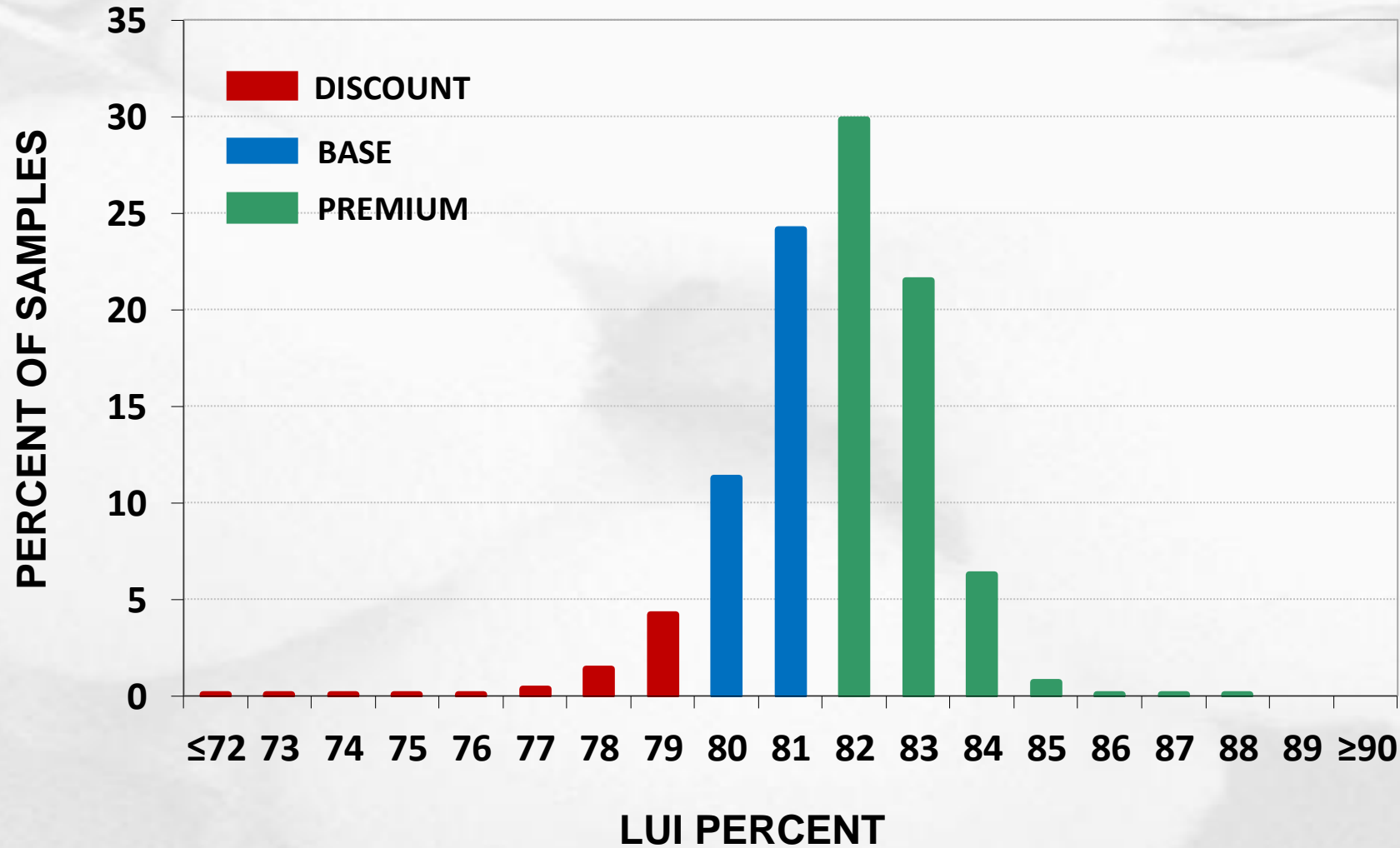
# LENGTH UNIFORMITY INDEX

- Calculated as the  $\frac{\text{Mean Length}}{UHML} \times 100$  (%)
- If all the fibers in the bale had the same ML and UHML, then UI = 100%

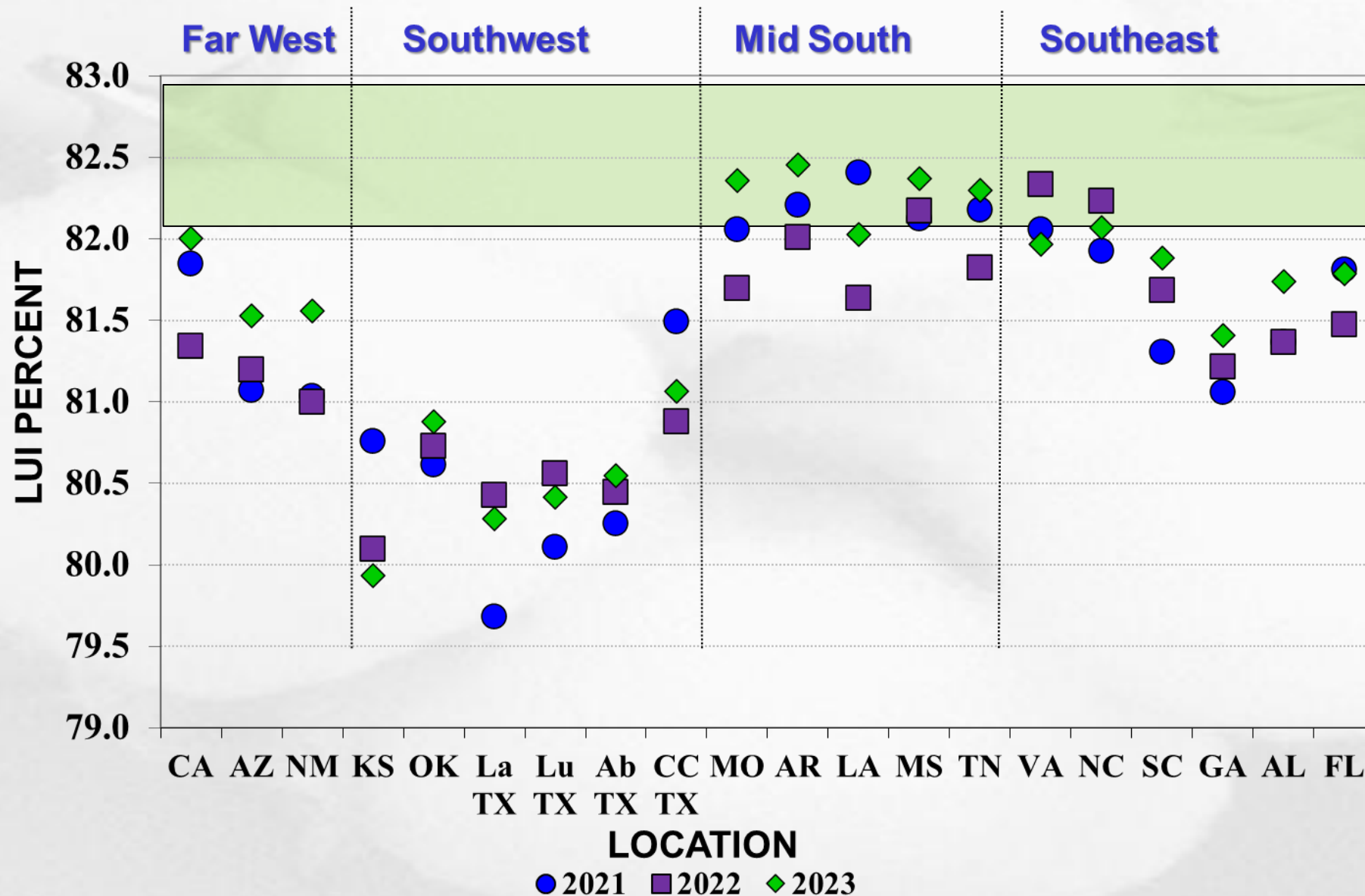
# LUI TREND U.S. UPLAND



# LENGTH UNIFORMITY DISTRIBUTION U.S. UPLAND 2023



# AVERAGE LENGTH UNIFORMITY



# WHY DOES UI MATTER?



## **SPINNING**

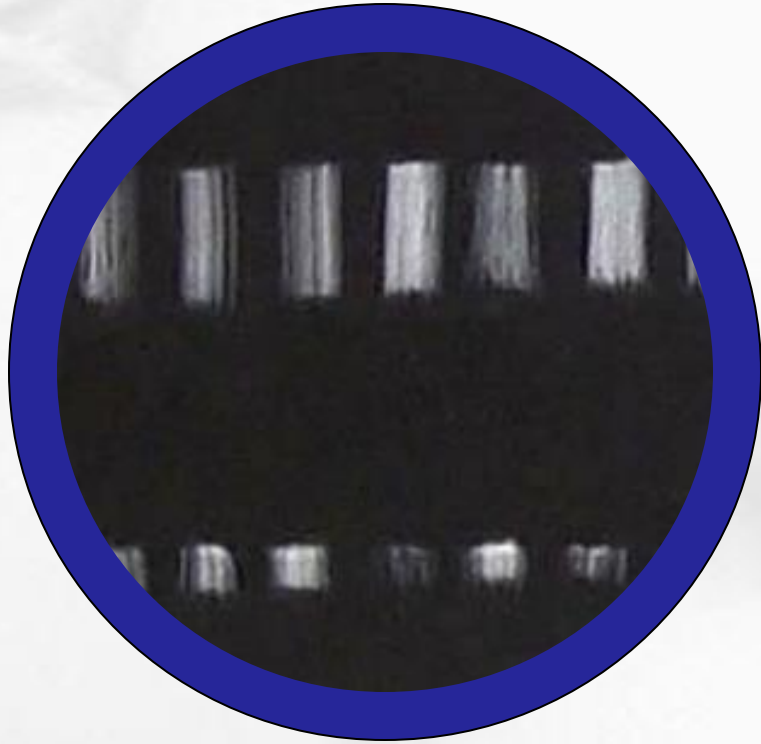
- **SPINNING EFFICIENCY**
- **CONSISTENT YARNS**

## **FABRIC**

- **FEW IMPERFECTIONS**
- **PILLING**

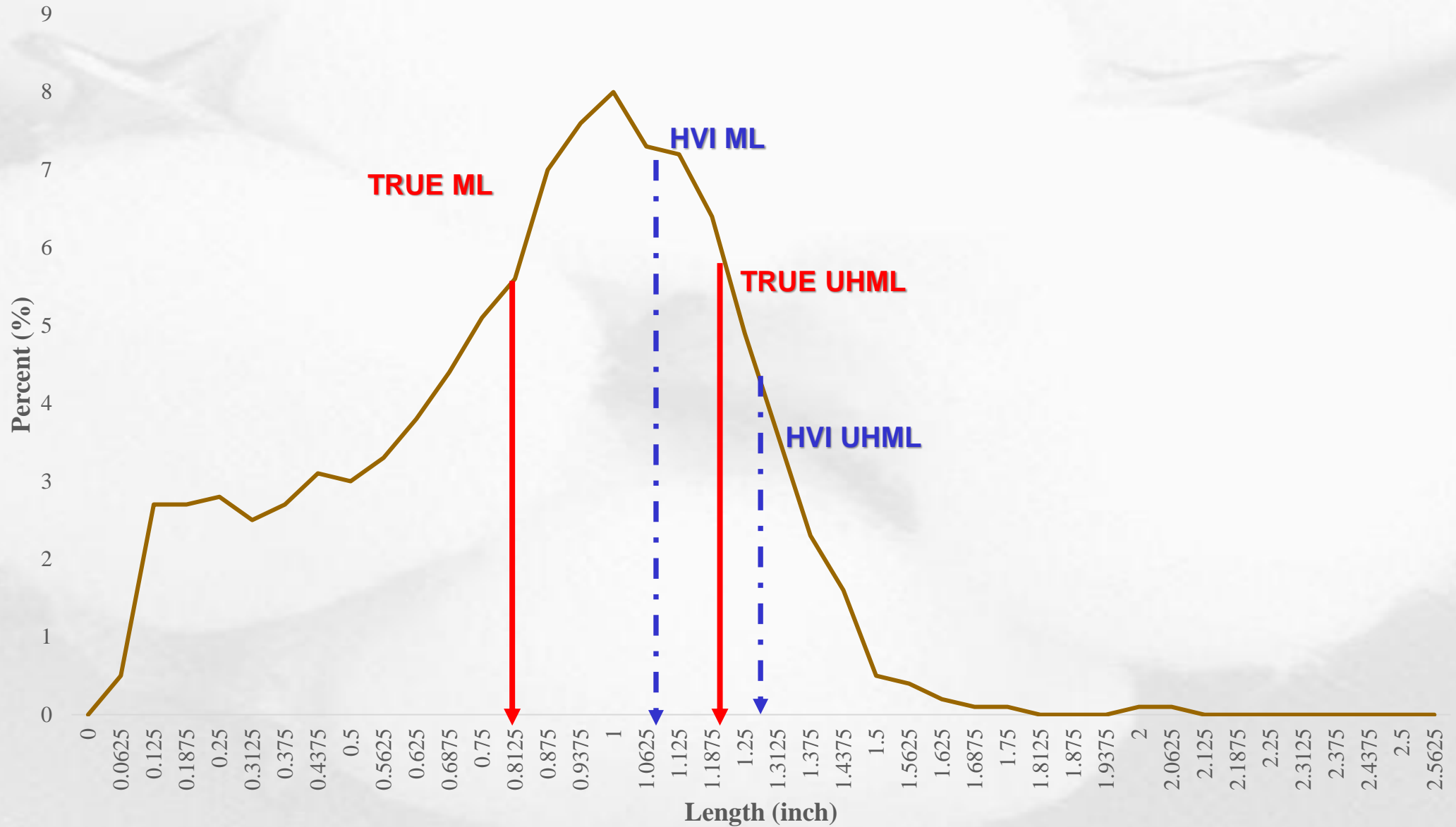


# KNOW YOUR COMPETITION



Longer fiber is typically better, but all fibers of similar length is often more critical

# GETTING BETTER ACCURACY



# NEW MEASUREMENTS

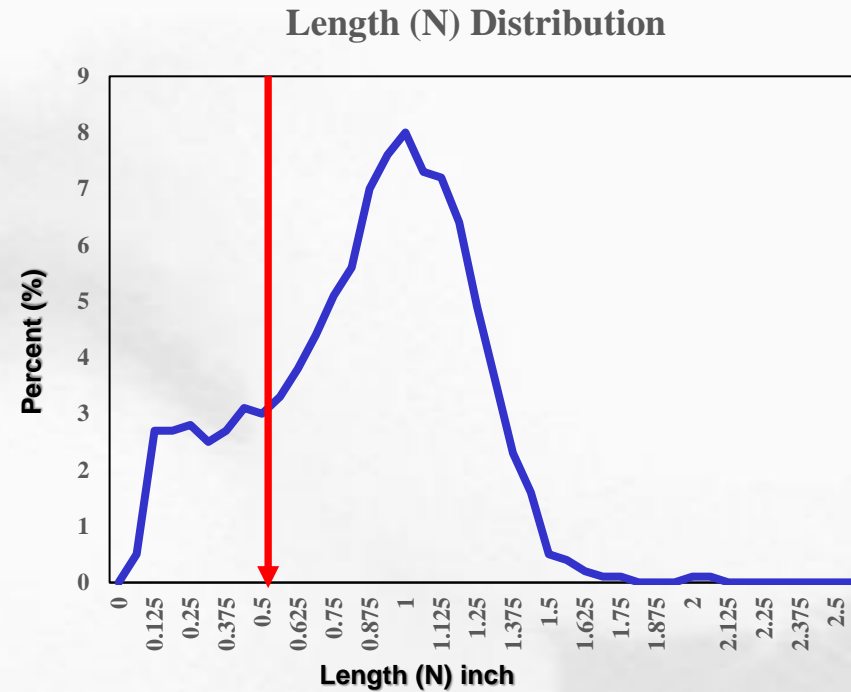
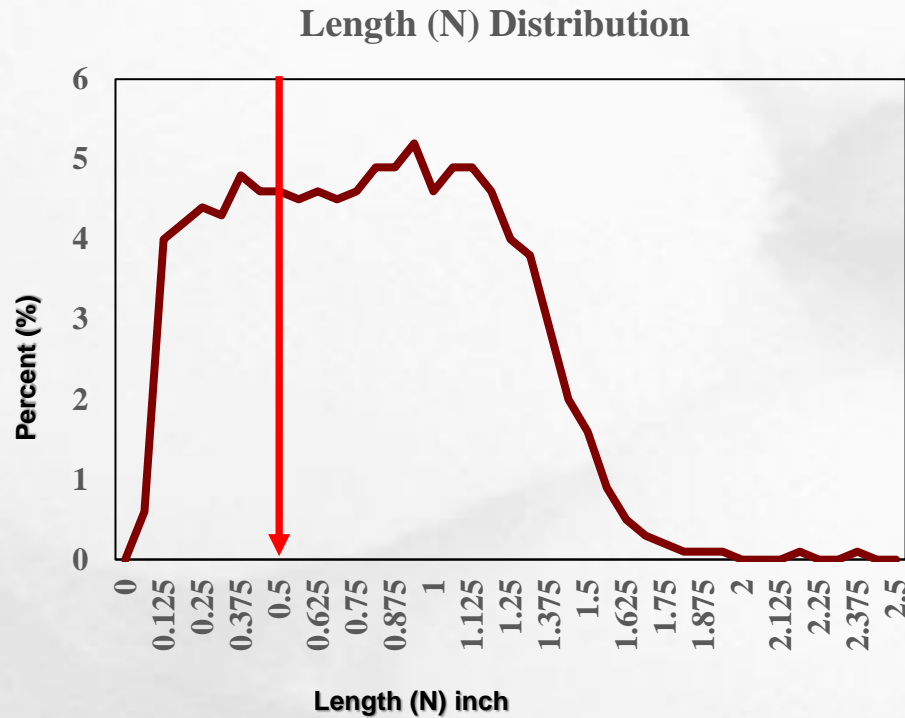
<b>UHMLf</b>	<b>Upper Half Mean Length fibrogram</b>
<b>MLf</b>	<b>Mean Length fibrogram</b>
<b>UQLf</b>	<b>Upper Quartile Length fibrogram</b>
<b>LHMLf</b>	<b>Lower Half Mean Length fibrogram</b>
<b>LQLf</b>	<b>Lower Quartile Length fibrogram</b>
<b>SFCf</b>	<b>Short Fiber Content fibrogram</b>
<b>Uif</b>	<b>Uniformity Index fibrogram</b>



# RBTN 2023

- HVI UI = 83.9 %
- HVI UIf = 72%

- HVI UI = 82.8 %
- HVI UIf = 71.2%



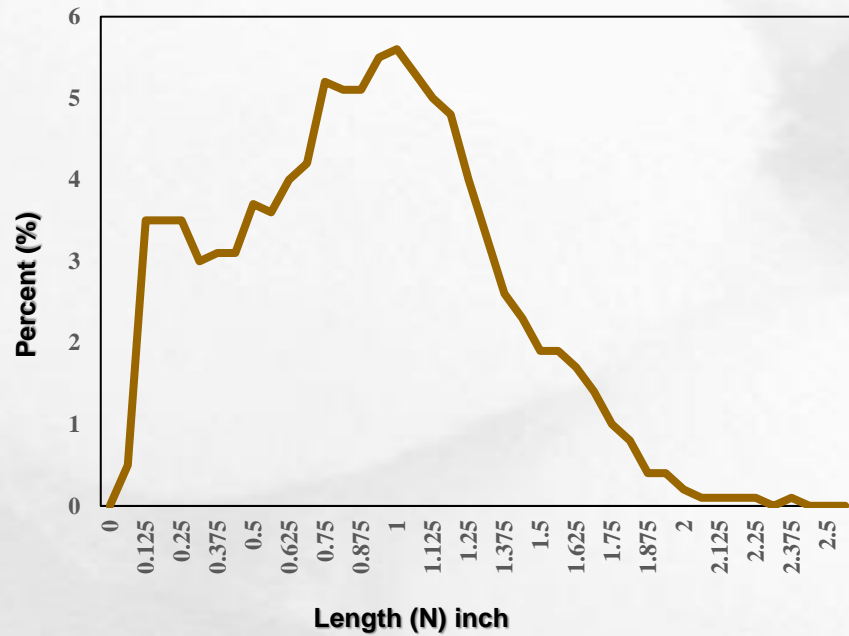
UI Difference: 11.1 and 11.6

# RBTN 2023

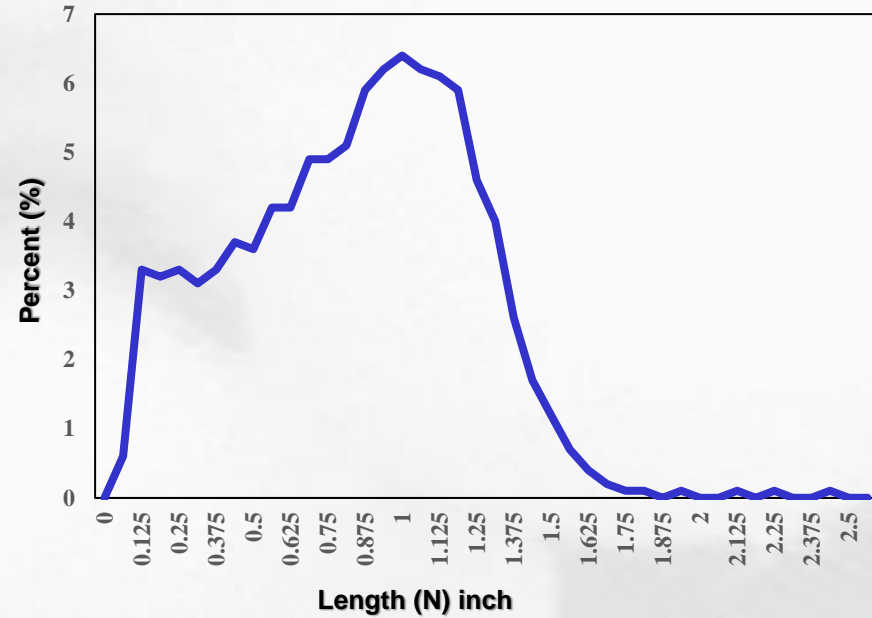
- HVI UI = 78.6 %
- HVI UIf = 73.6%

- HVI UI = 83.2 %
- HVI UIf = 75.5%

Length (N) Distribution



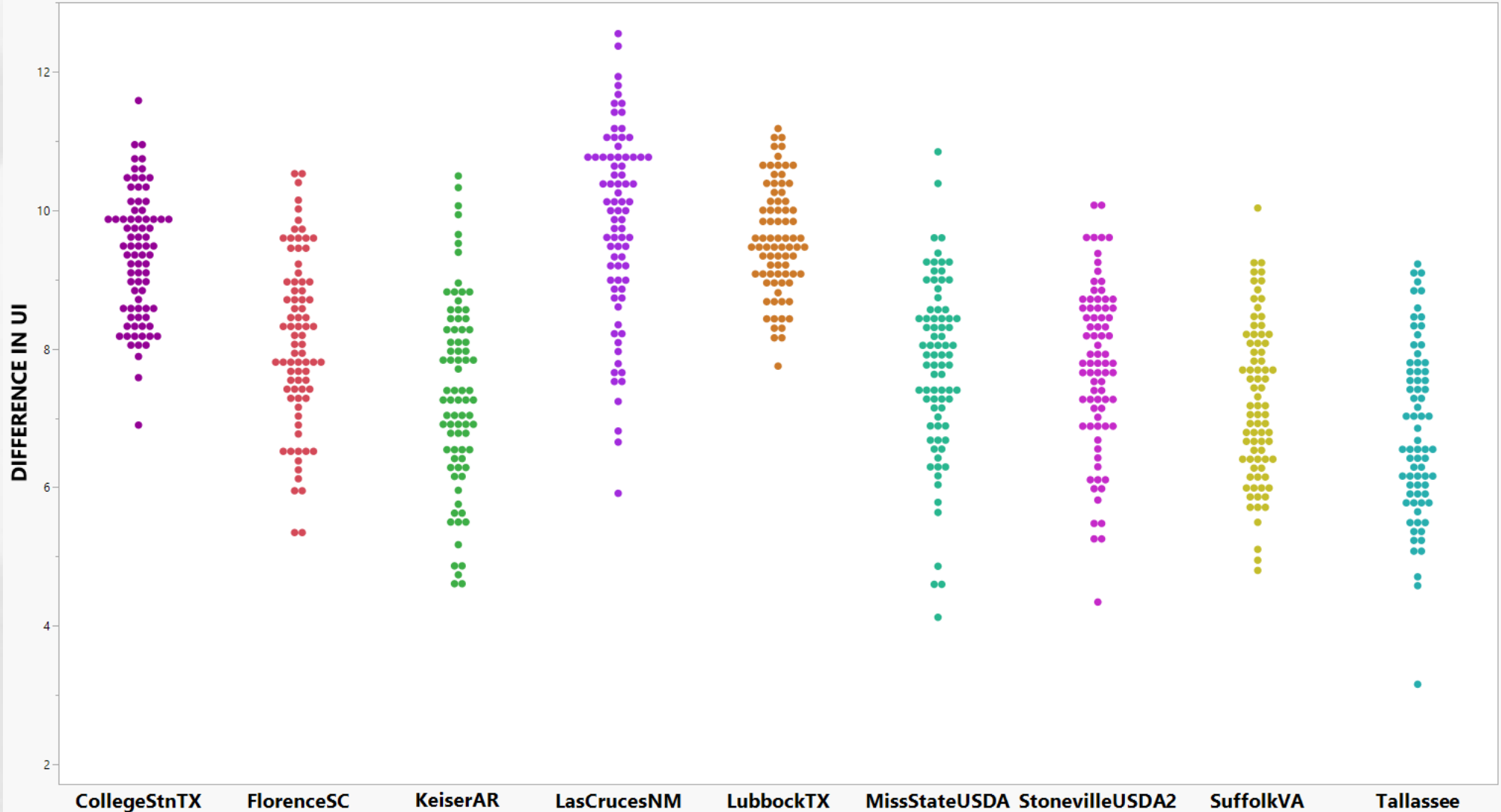
Length (N) Distribution



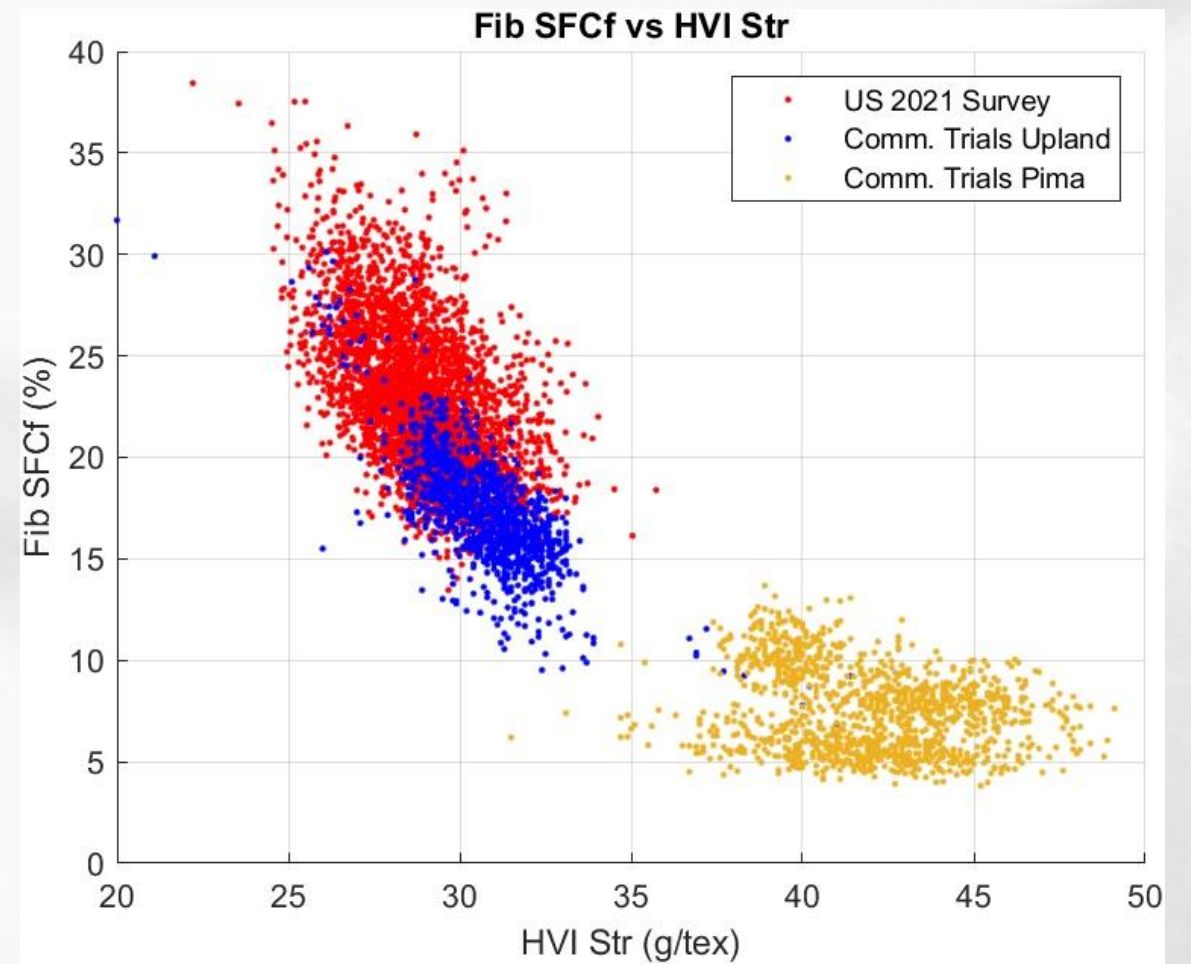
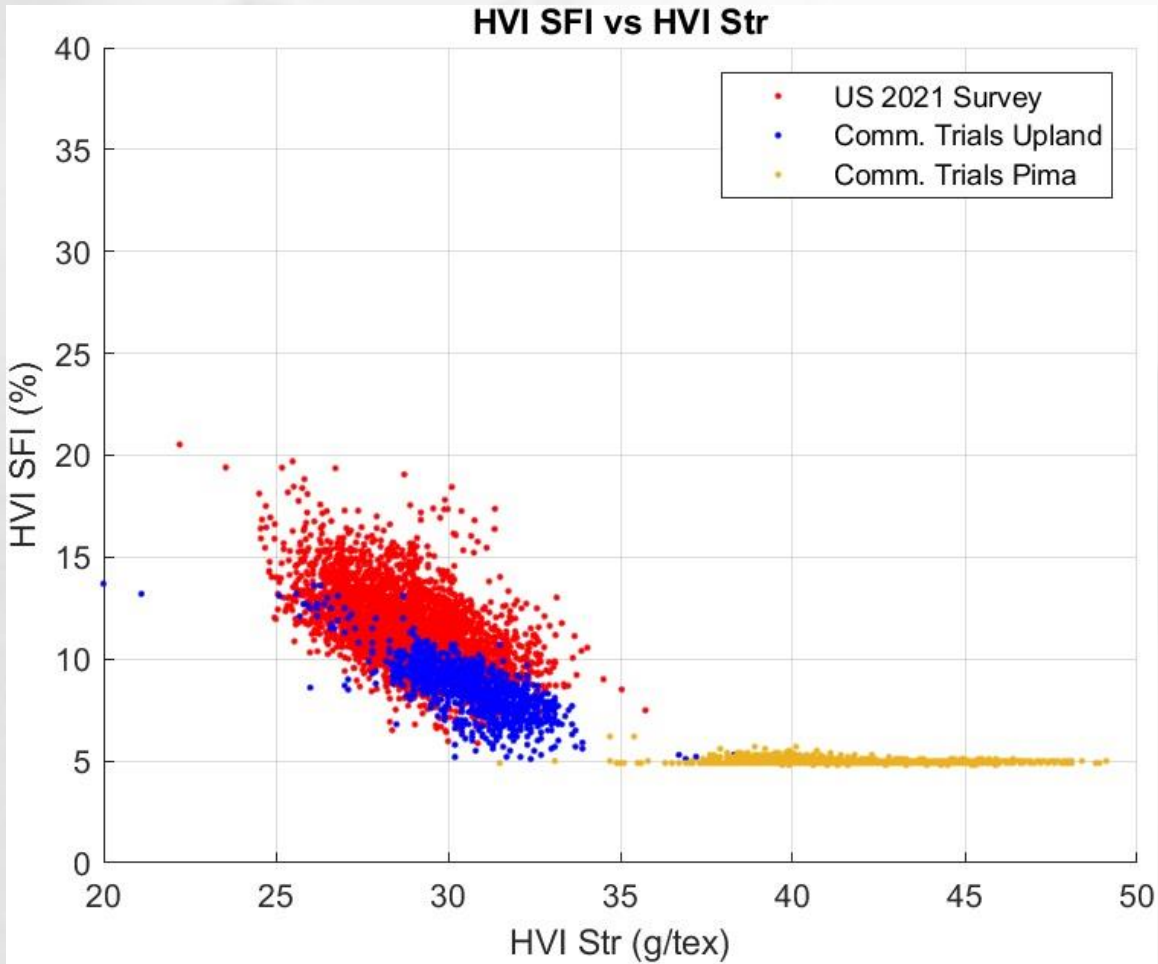
UI Difference: 5 and 7.75

# RBTN 2023: UI DIFFERENCES

UI DIFFERENCES BY LOCATION RBTN 2023

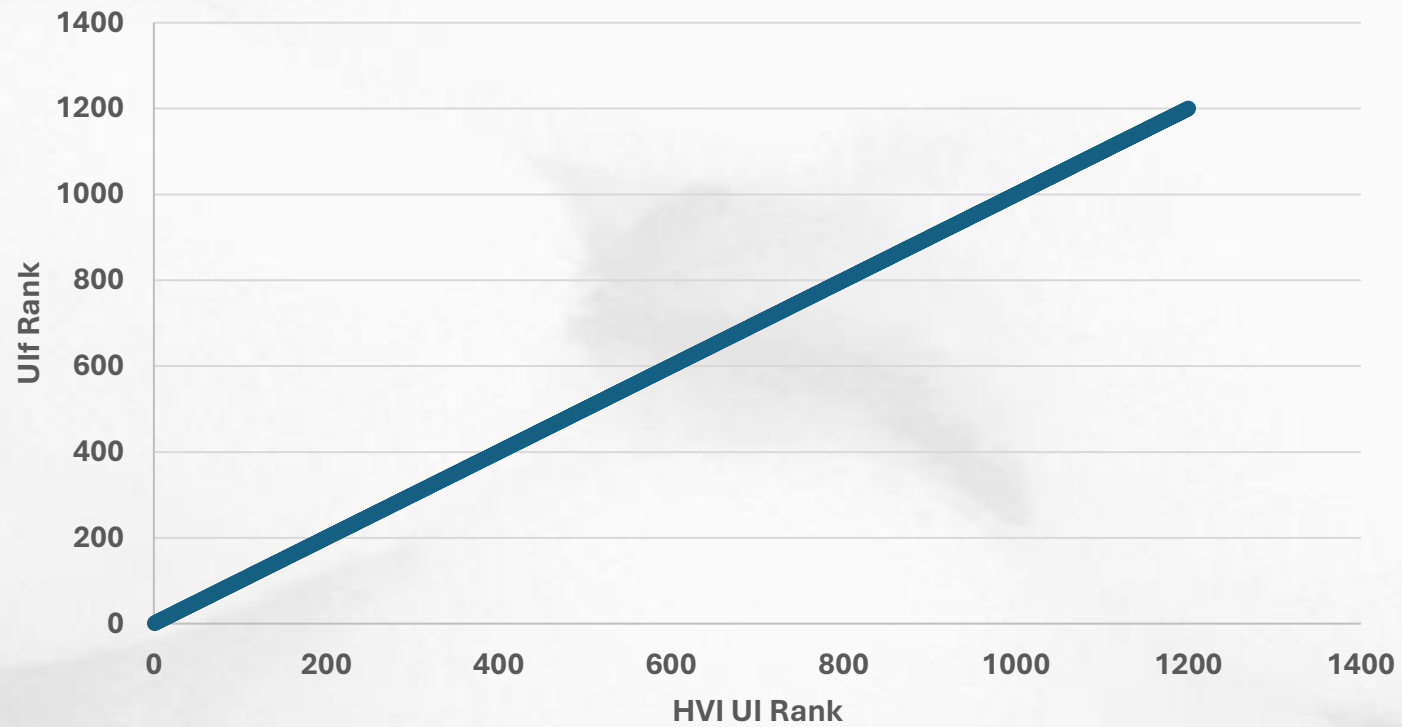


# VALIDATION WORK

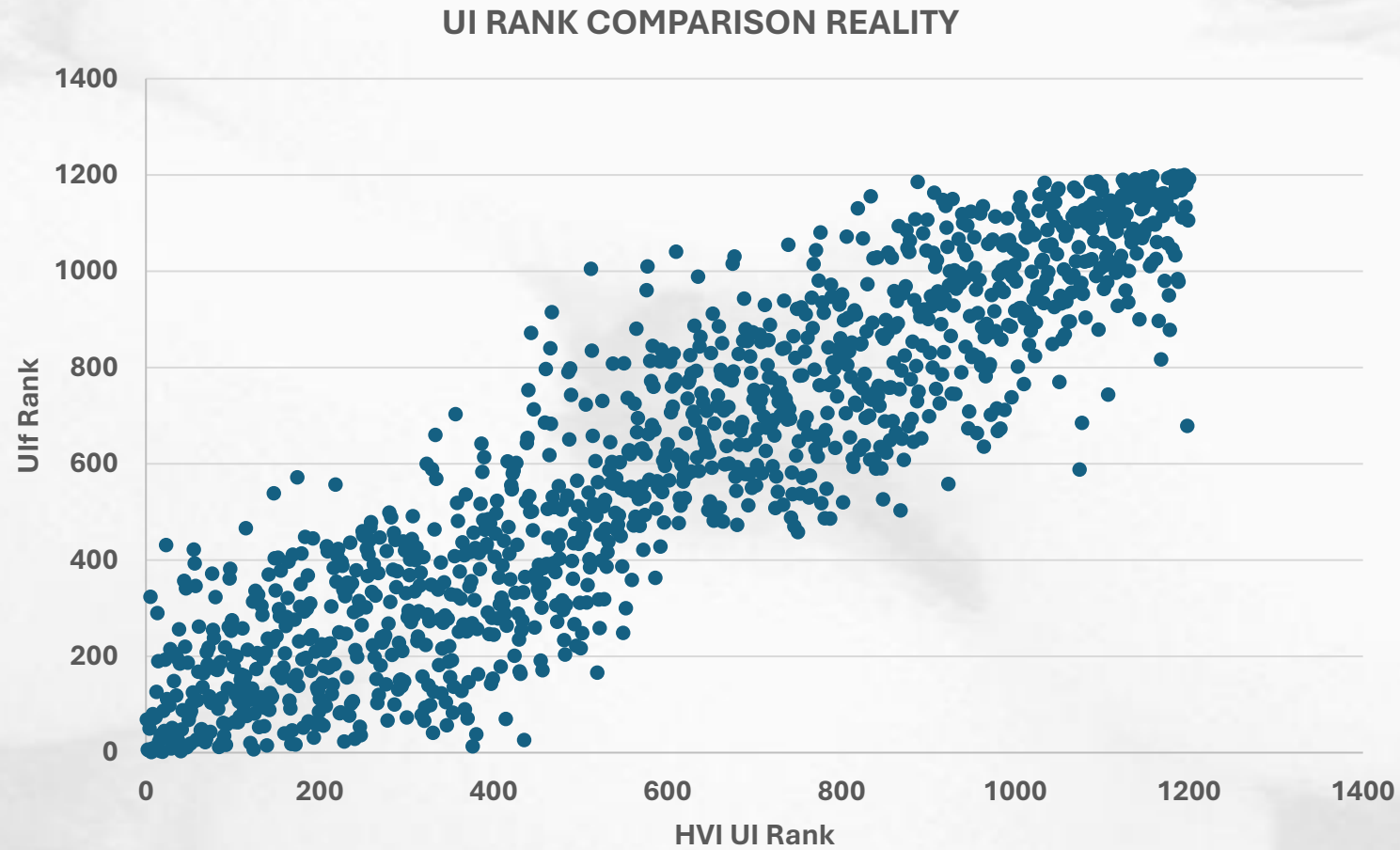


# VALIDATION WORK: RANK EXPECTATION

UI RANK COMPARISON IDEAL WORLD

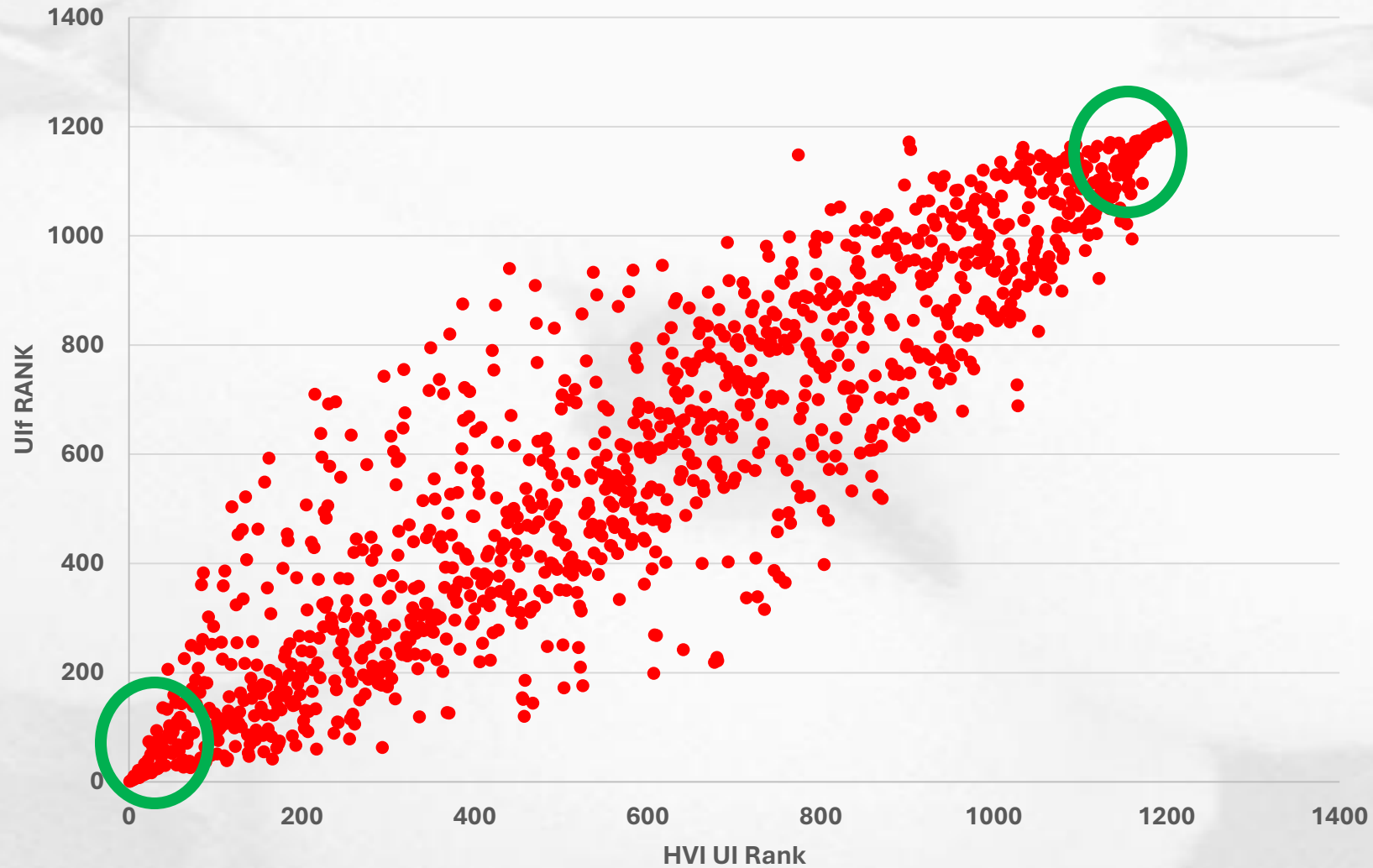


# VALIDATION WORK: PIMA

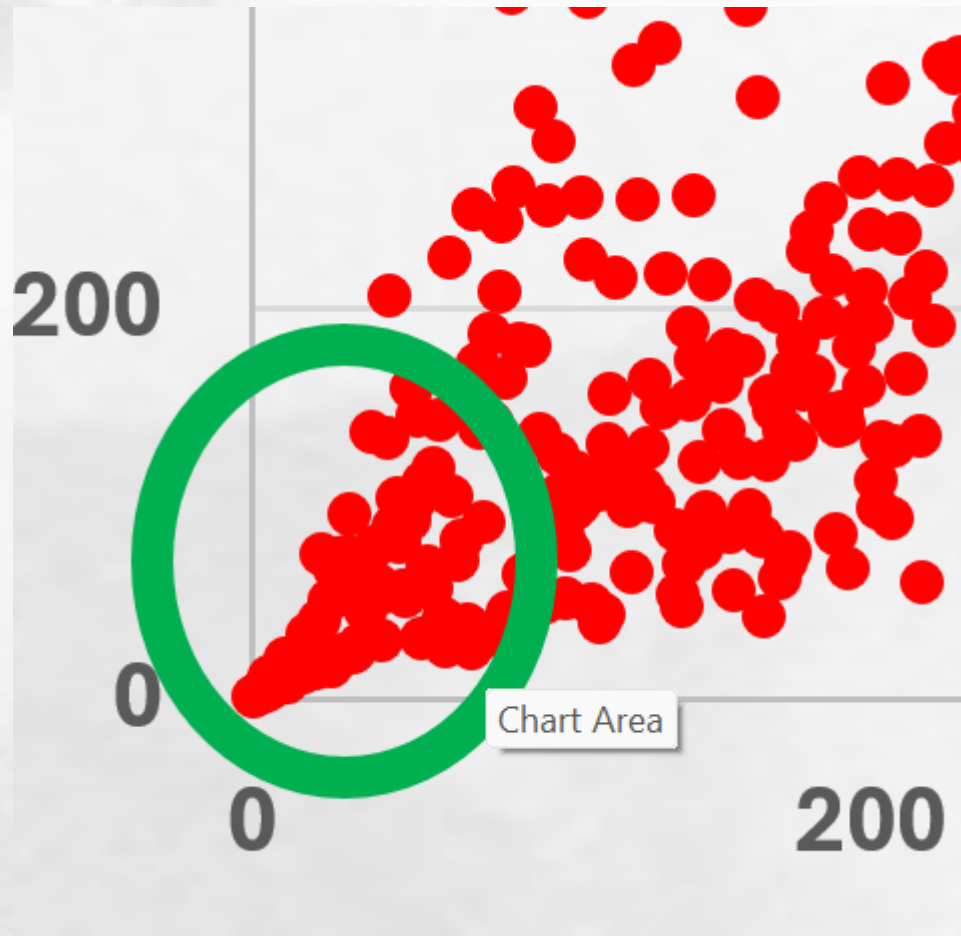


# VALIDATION WORK: UPLAND

UI RANKS COMPARISON



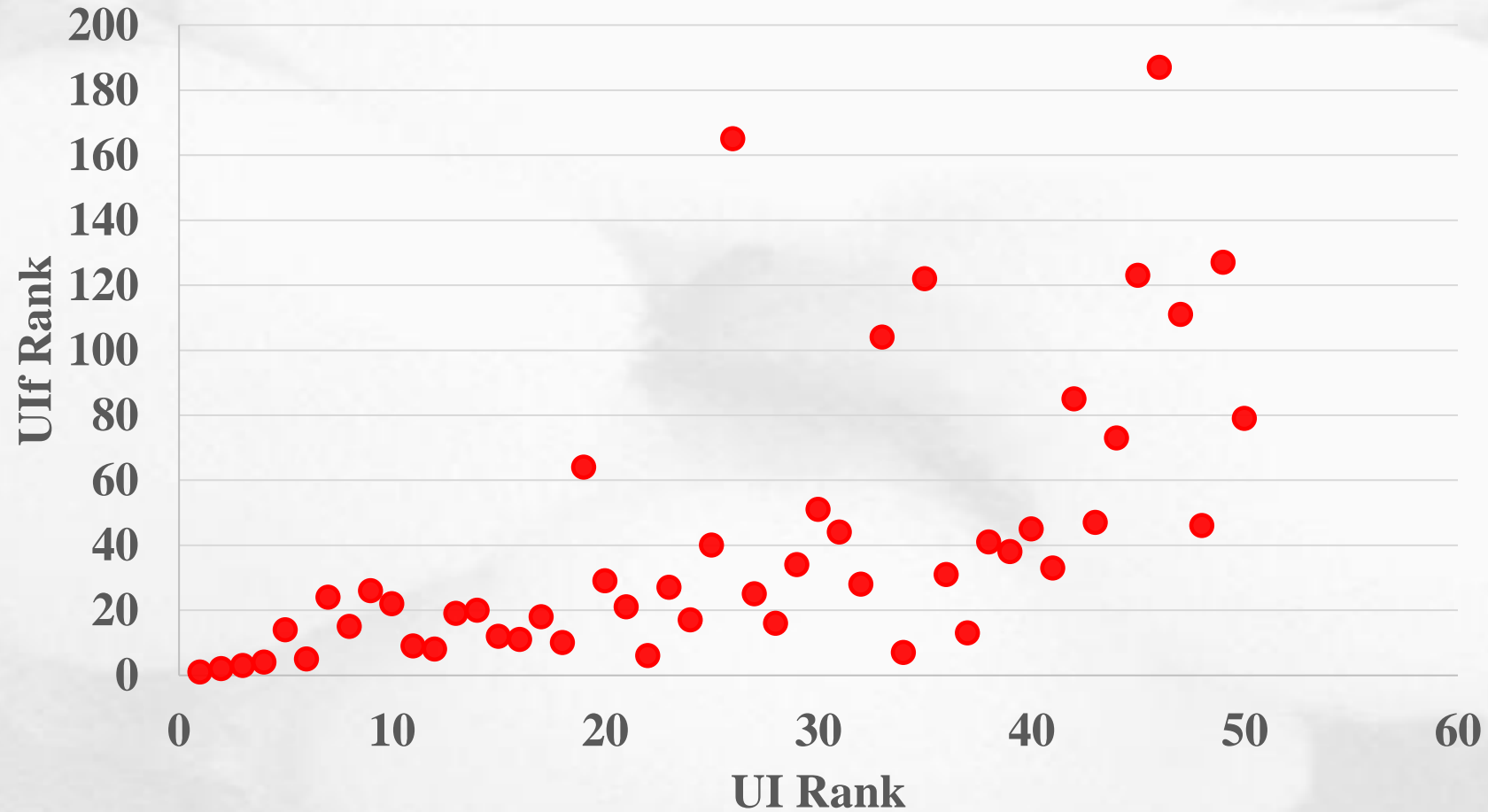
# VALIDATION WORK: UPLAND



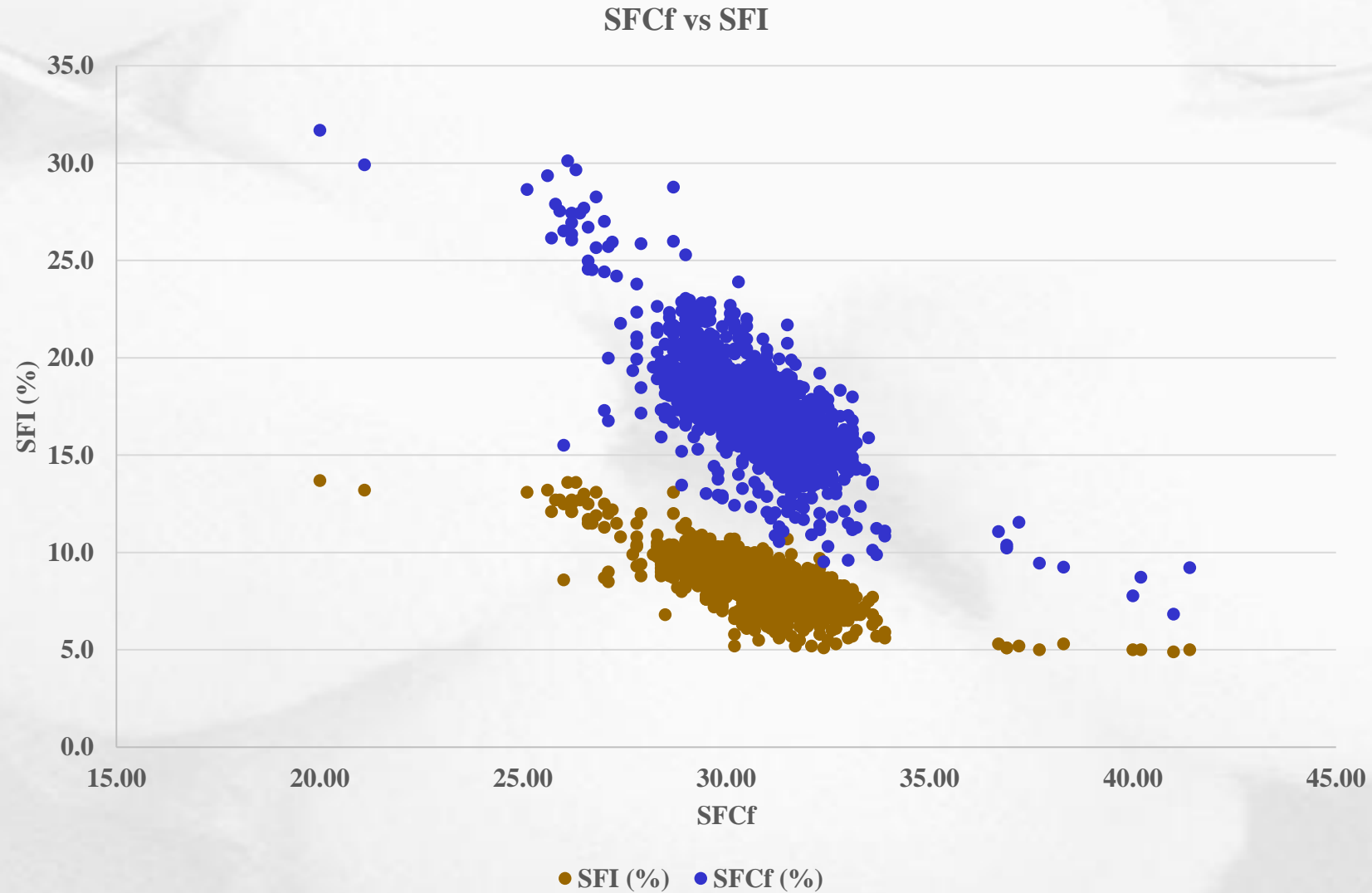


# VALIDATION WORK: UPLAND

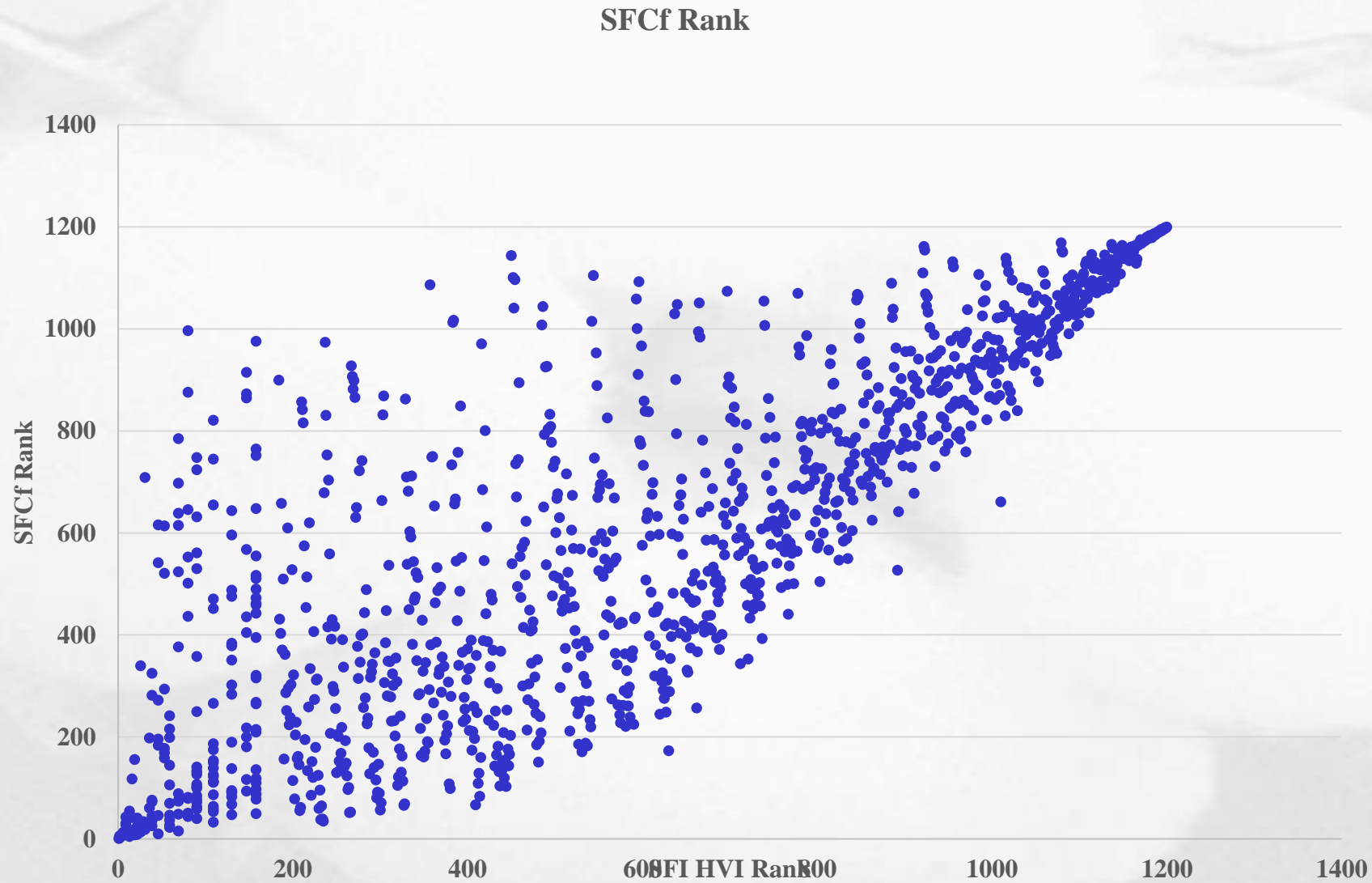
## TOP 4% OF THE POPULATION BY UI



# VALIDATION WORK: UPLAND

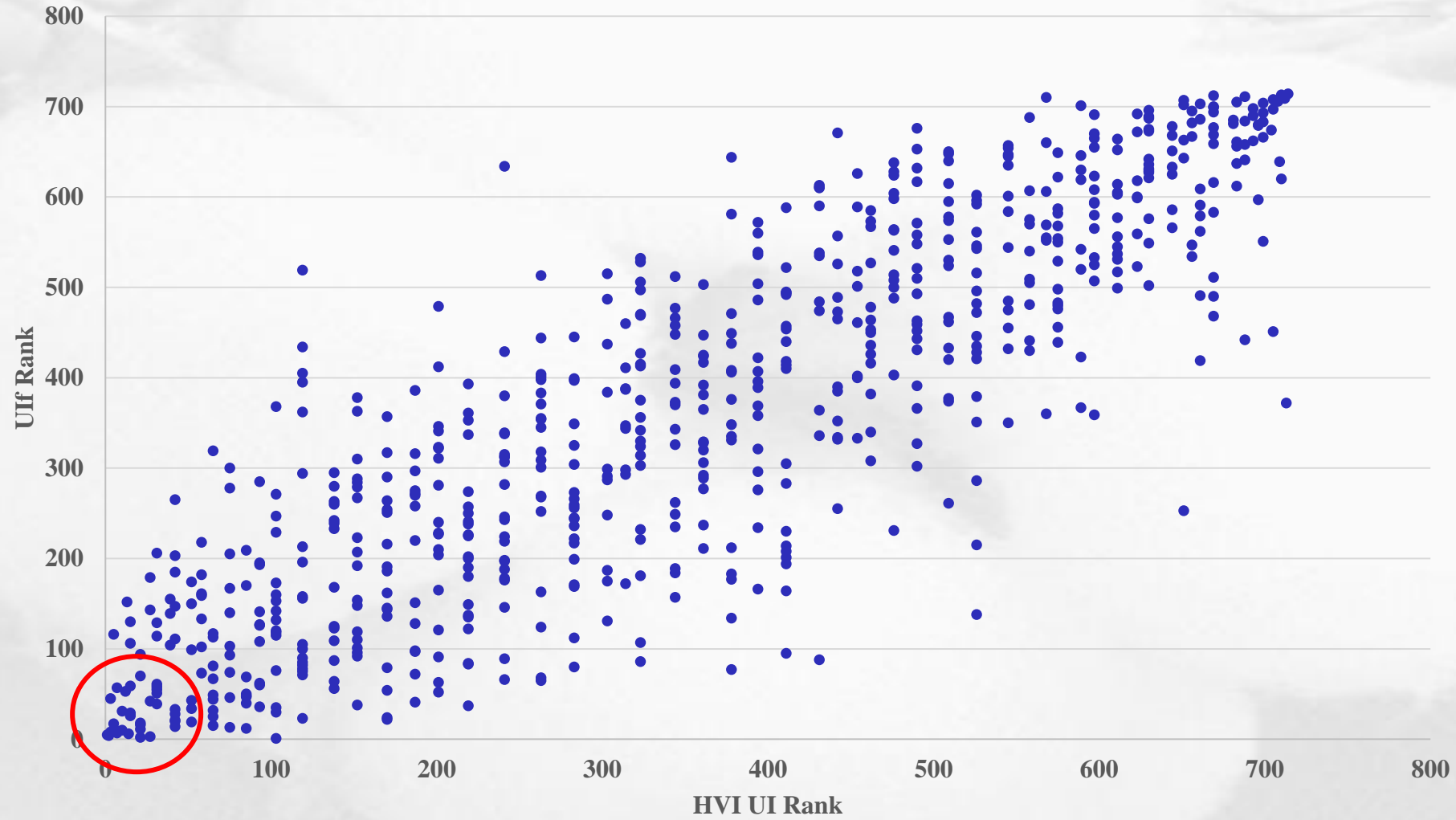


# VALIDATION WORK: UPLAND

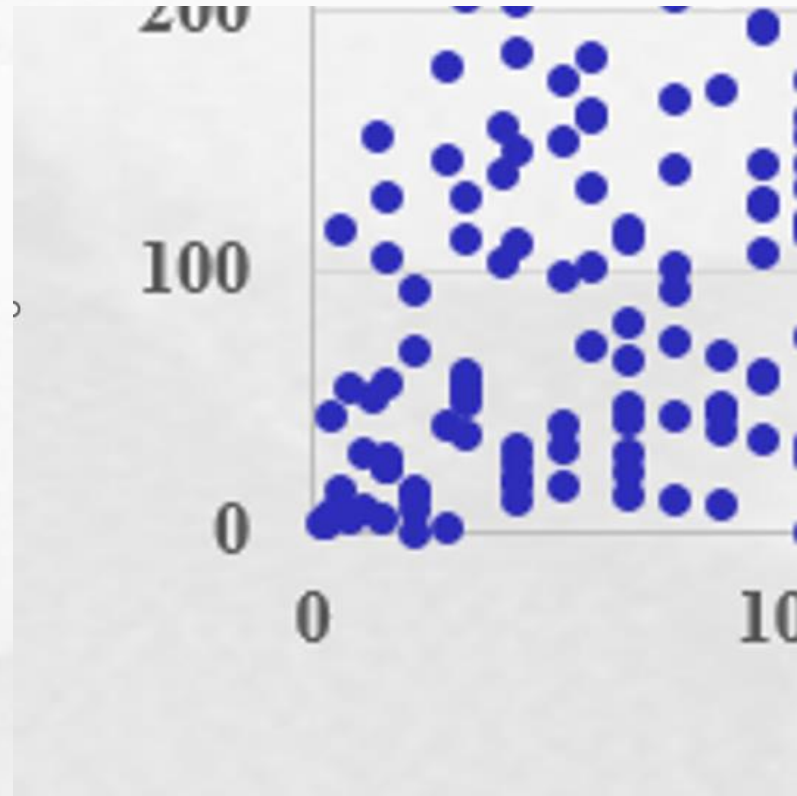


# RBTN RANKED FOR UI

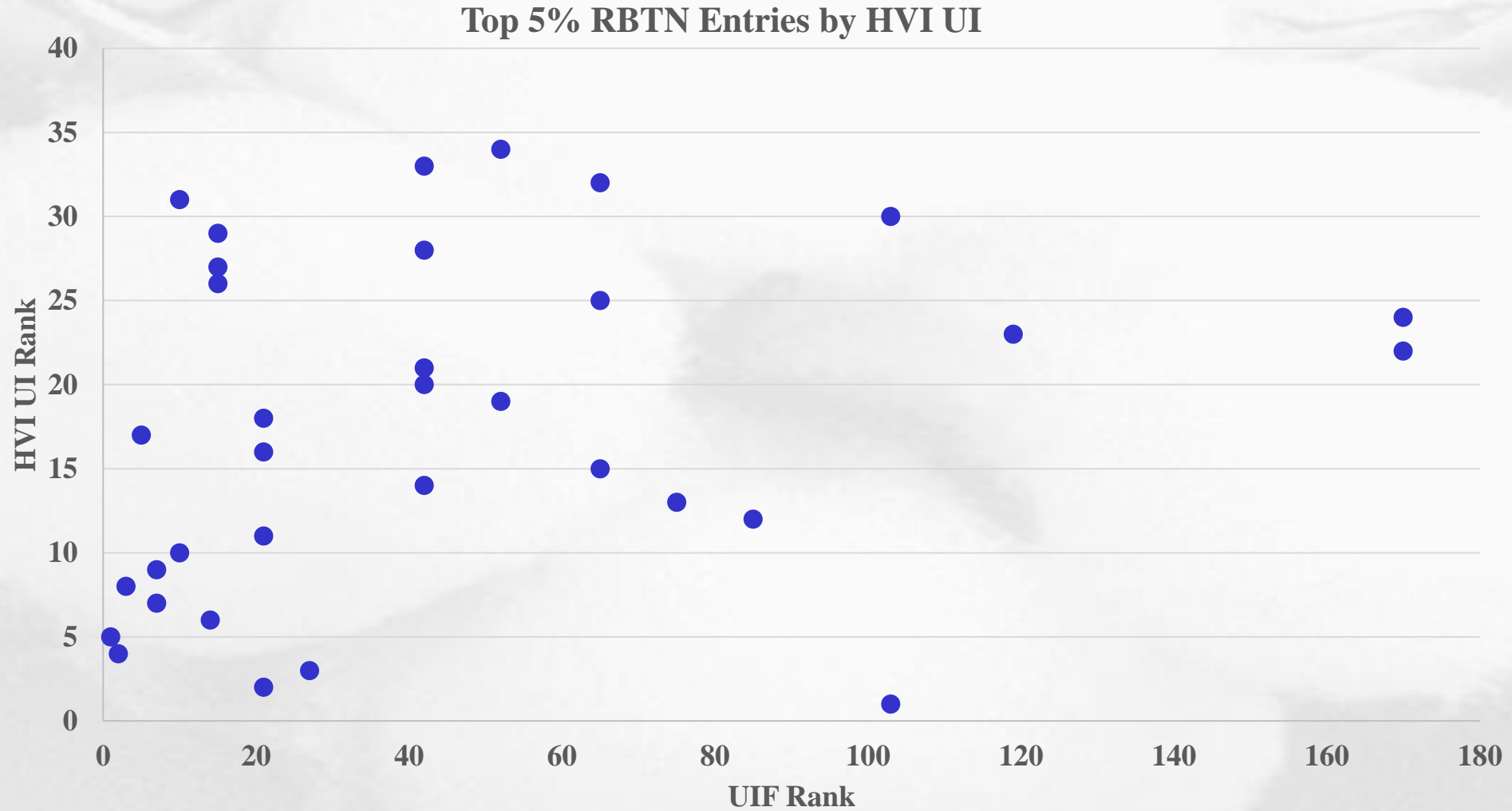
UI RANK COMPARISONS



# RBTN RANKED FOR UI



# RBTN RANKED FOR UI



# NEXT PROPERTY



- **High quality population tails comparable**
- **But everything in the middle needs a new lens**



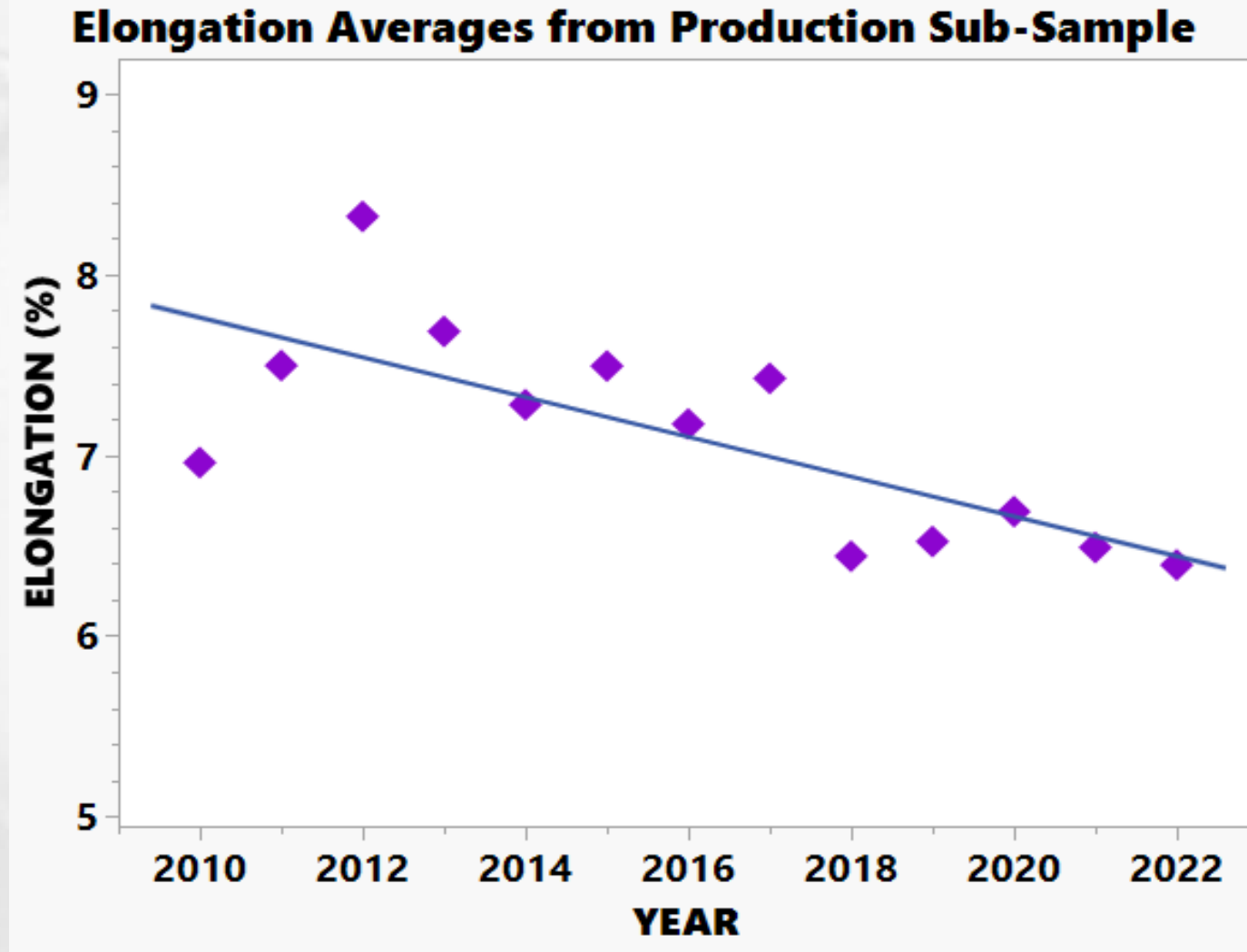
# ELONGATION

- **Elongation is a fiber property that contributes to fiber and yarn's tenacity**
- **How elastic is the fiber bundle before it breaks?**
- **Improved elongation = improved yarn quality**

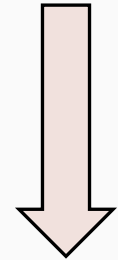
**ISSUE: HVI<sup>®</sup> provides the measurement, but it is not calibrated**



# ELONGATION

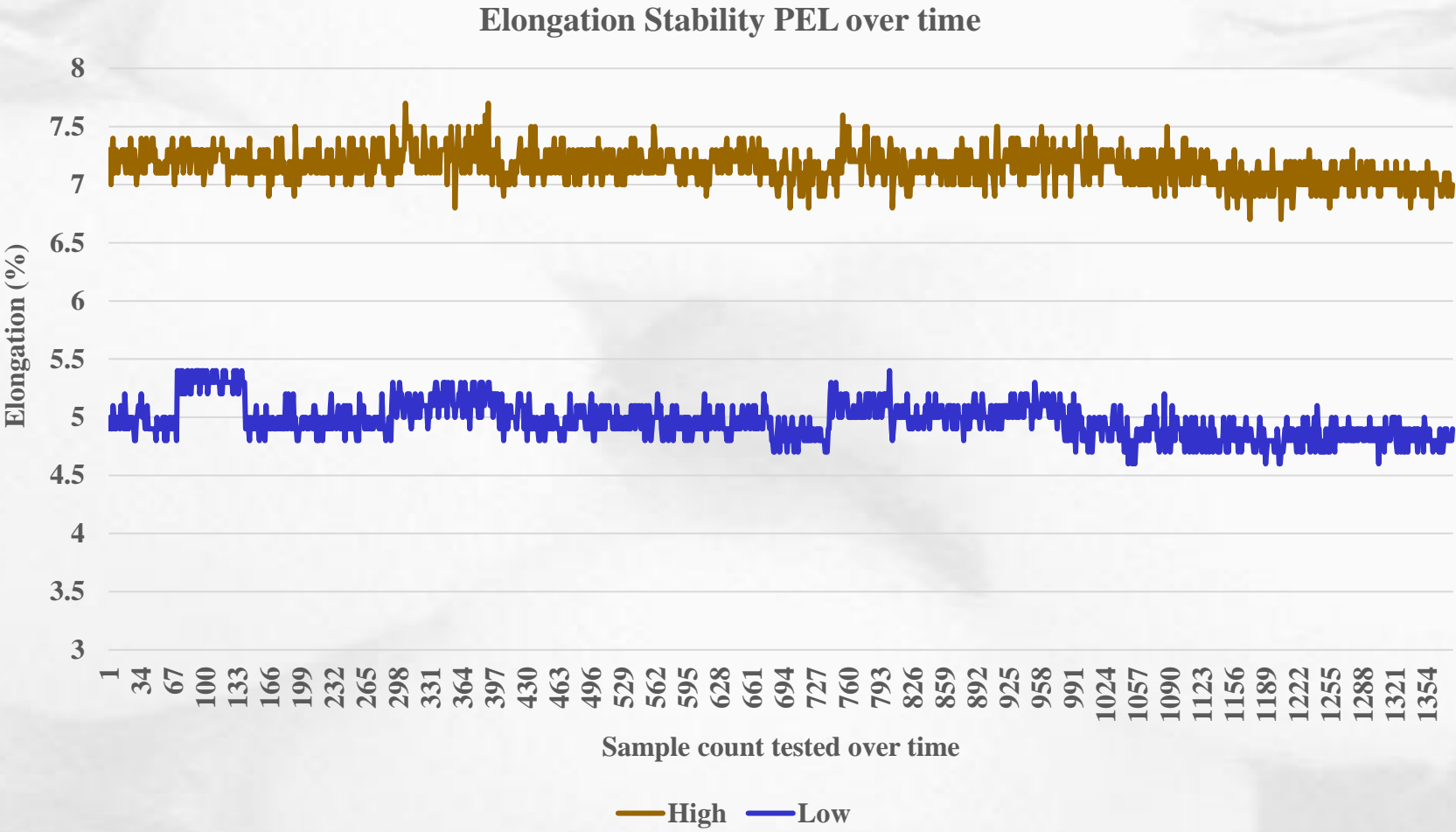


**Yarn properties**



**Elongation**

# ELONGATION



# Thank you

