

NEW FIBER QUALITY MEASUREMENTS

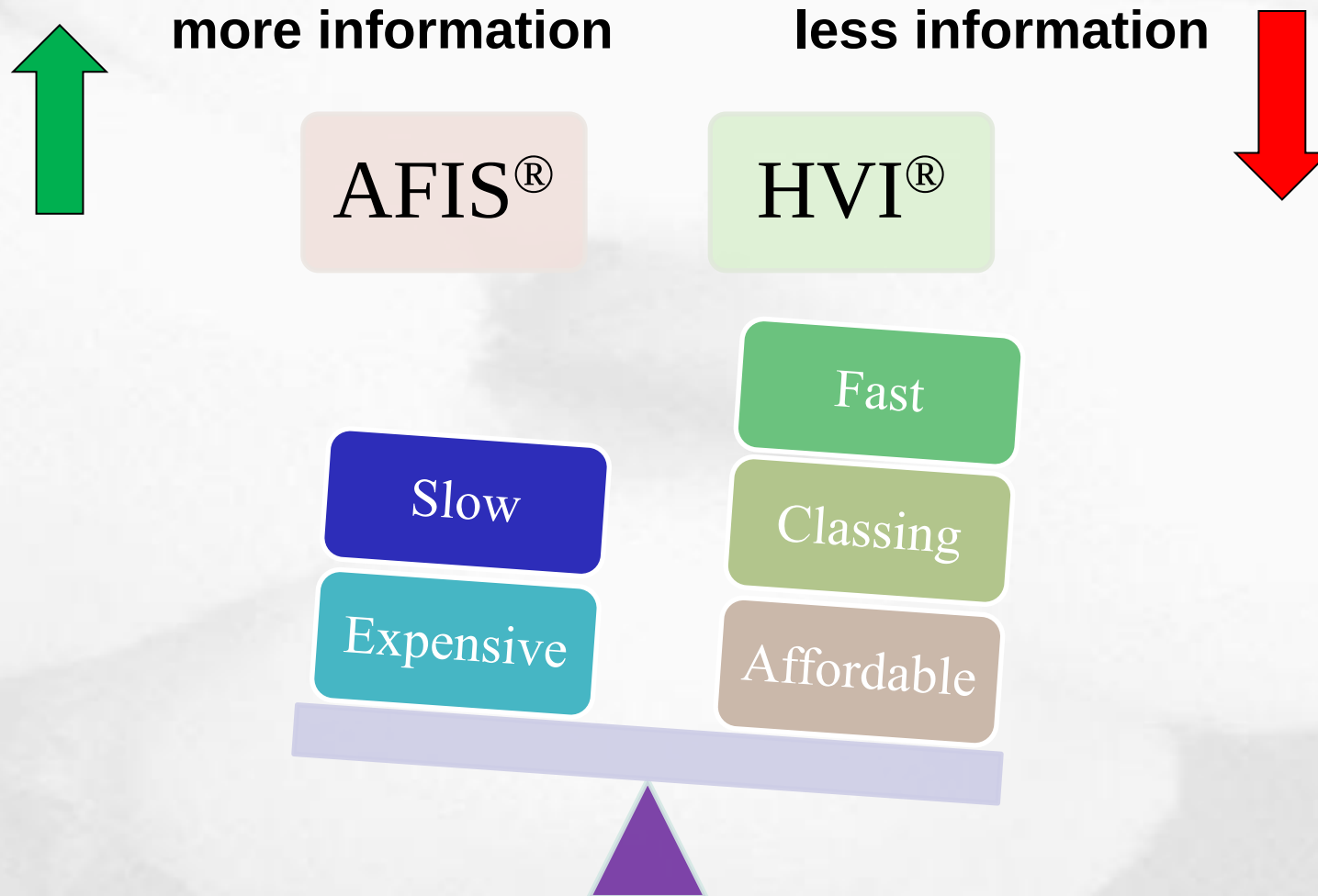
Neha Kothari, Ph.D.
Director- Quality Research

U.S. UPLAND COTTON QUALITY

- Every individual bale of cotton produced in the U.S. is instrument tested (HVI® 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

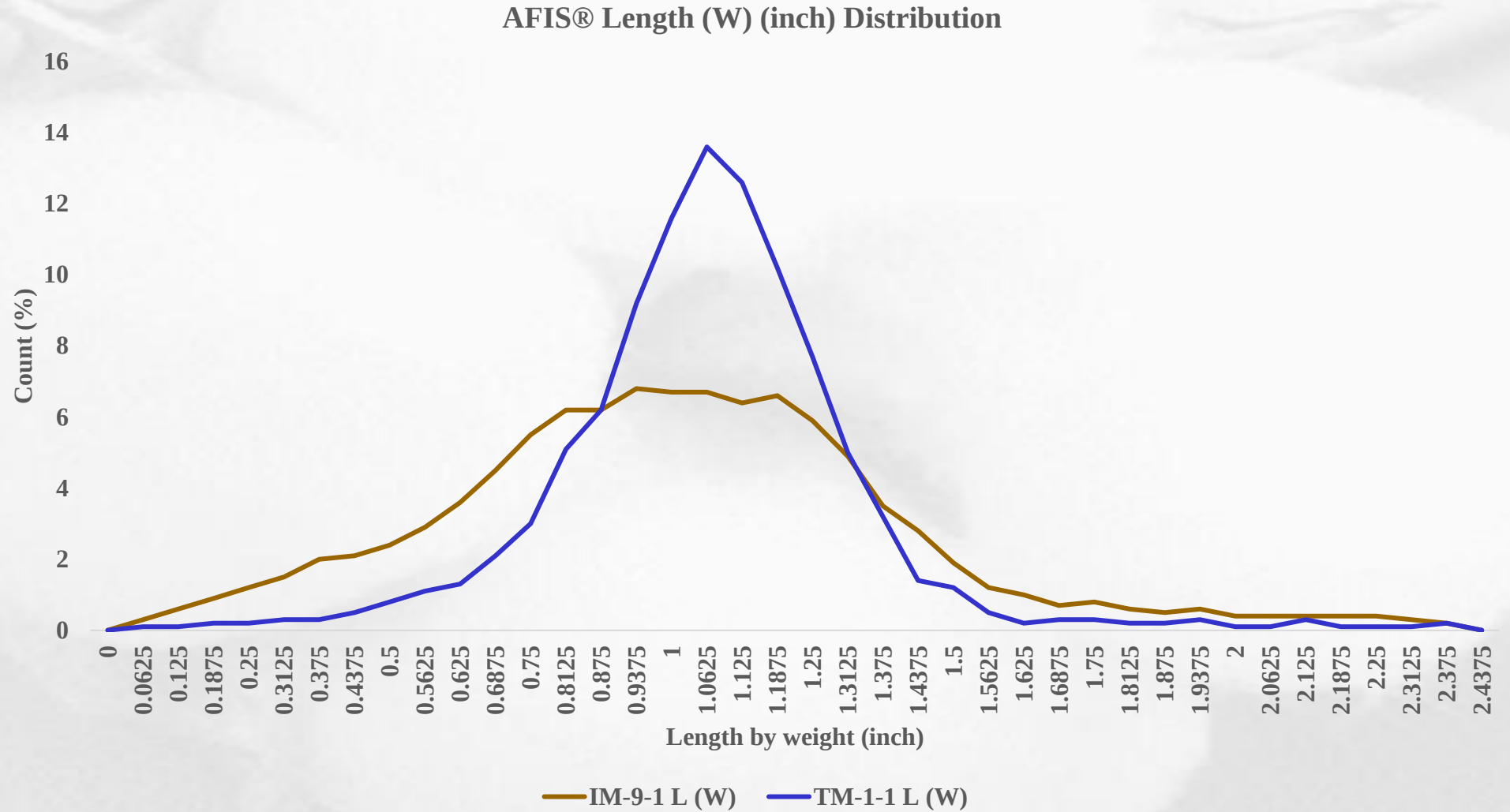
- **Micronaire**
- **Strength**
- **Elongation**
- **Upper Half Mean Length**
- **Uniformity Index**
- **Short Fiber Index**

AFIS®

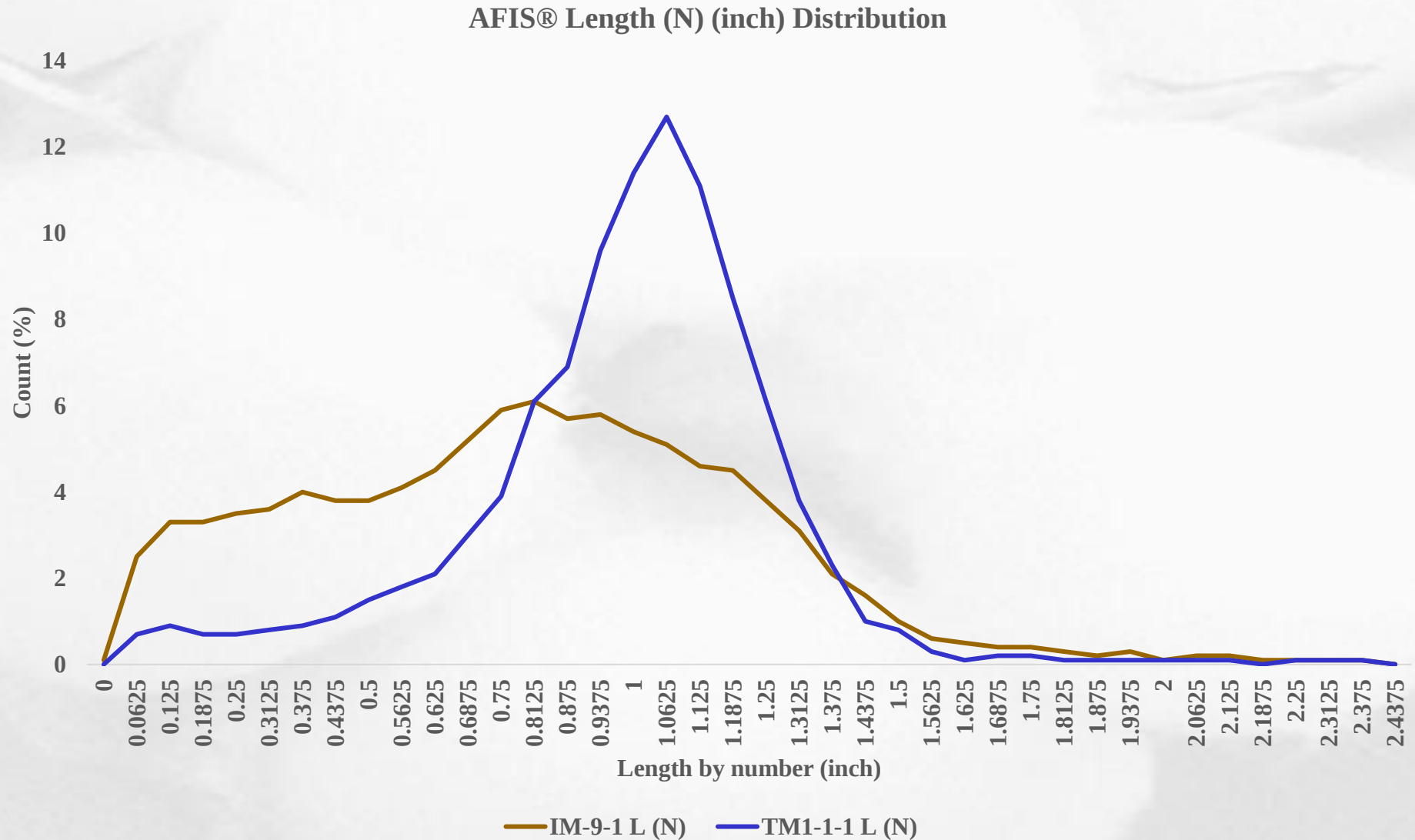
AFIS										Advanced Fibre Information System				
Sample No	Sample	Nep Size [um]	Neps/g	L(w) [in]	L(w) CV [%]	UQL (w) [in]	SFC (w) [%]	L(n) [in]	L(n) CV [%]	SFC (n) [%]	L5% (n) [in]	Fine [mTex]	IFC [%]	Mat Ratio
1	991000000072	685	87	1.15	27.2	1.35	3.8	1.01	37.0	12.40	1.51	166	6.40	0.91
2	991000000033	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®



BEYOND CLASSING: AFIS®



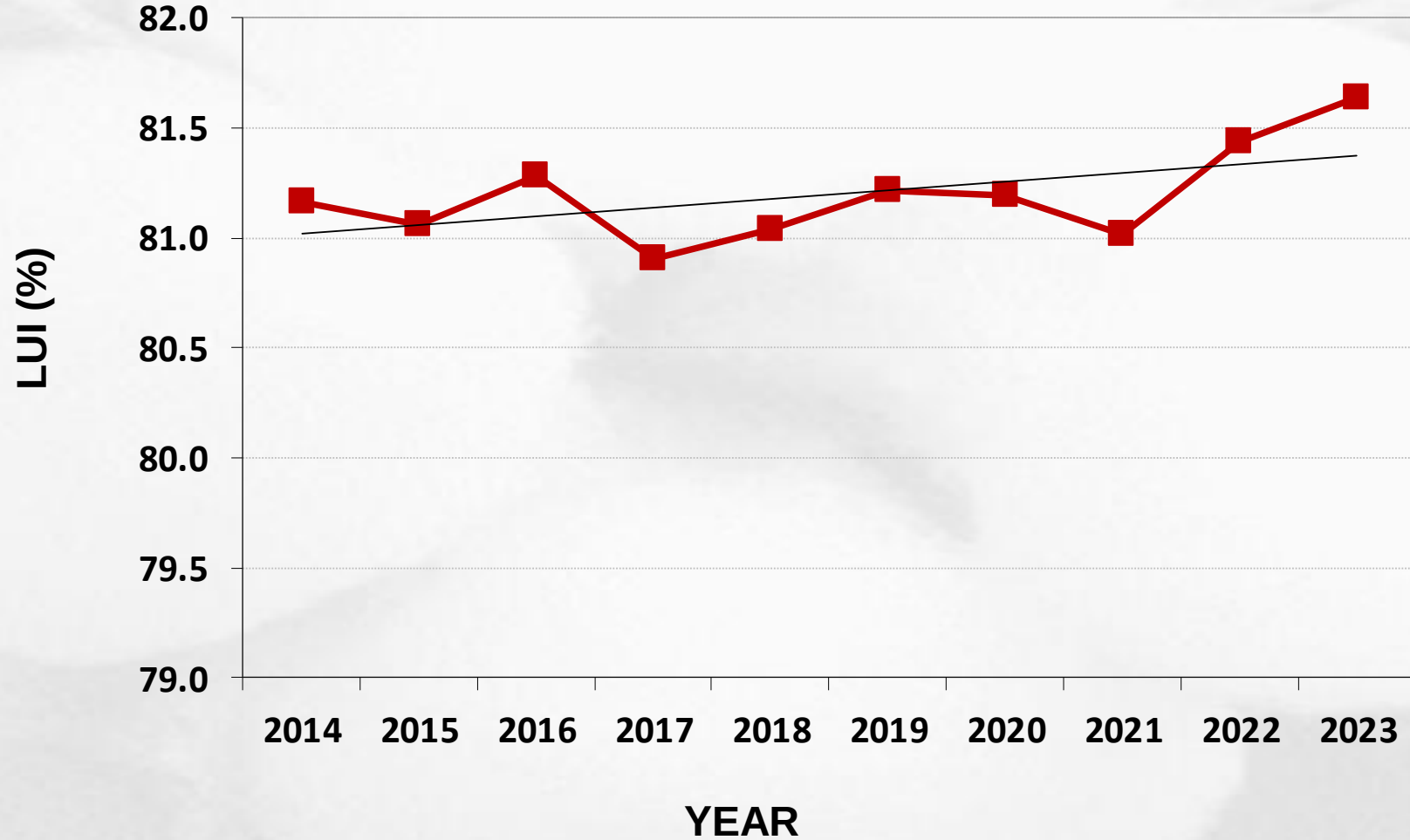
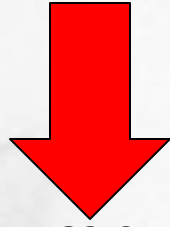
**LENGTH UNIFORMITY
INDEX: A MULTI-
MILLION DOLLAR
PROBLEM**

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%

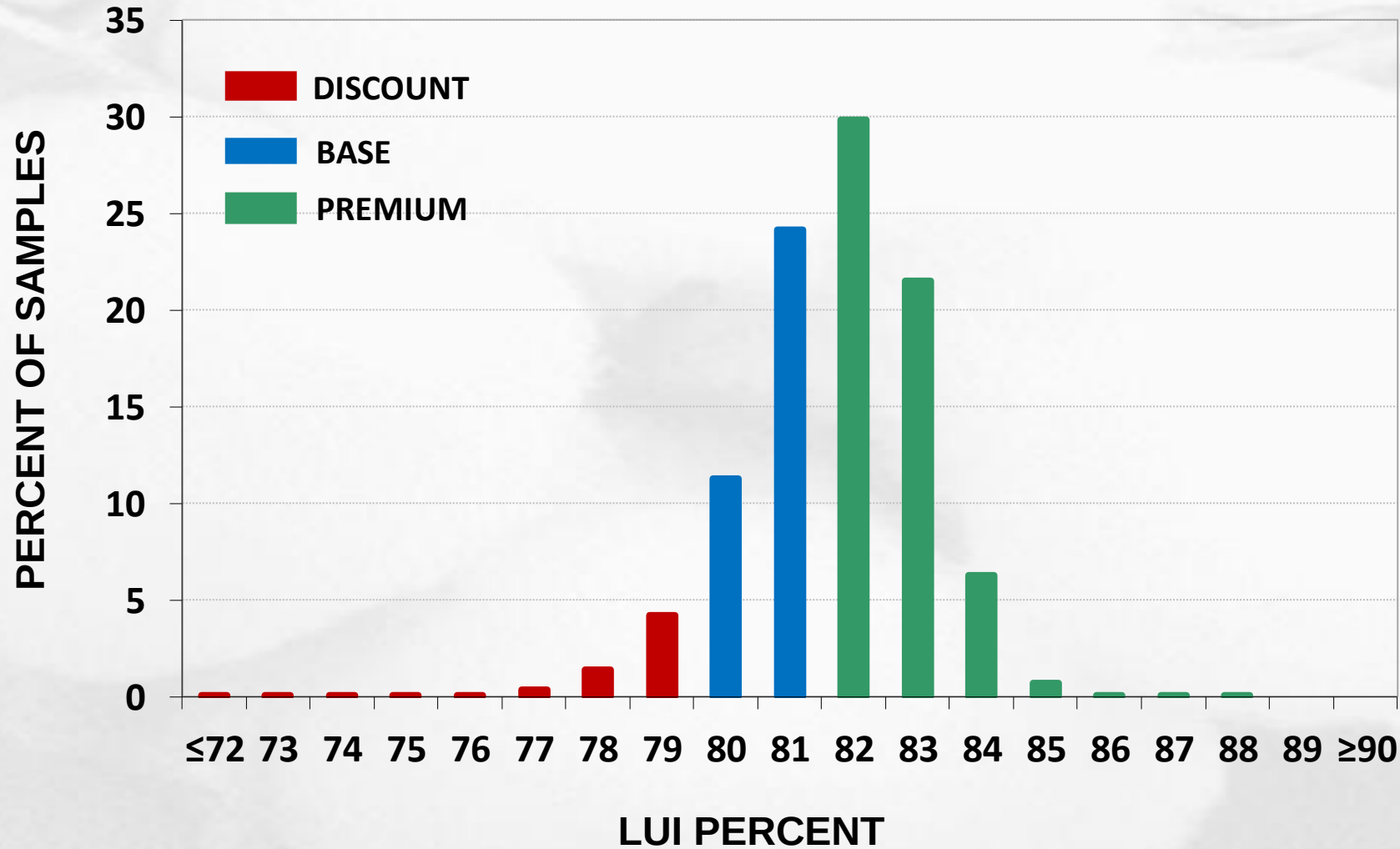
LUI TREND

U.S. UPLAND

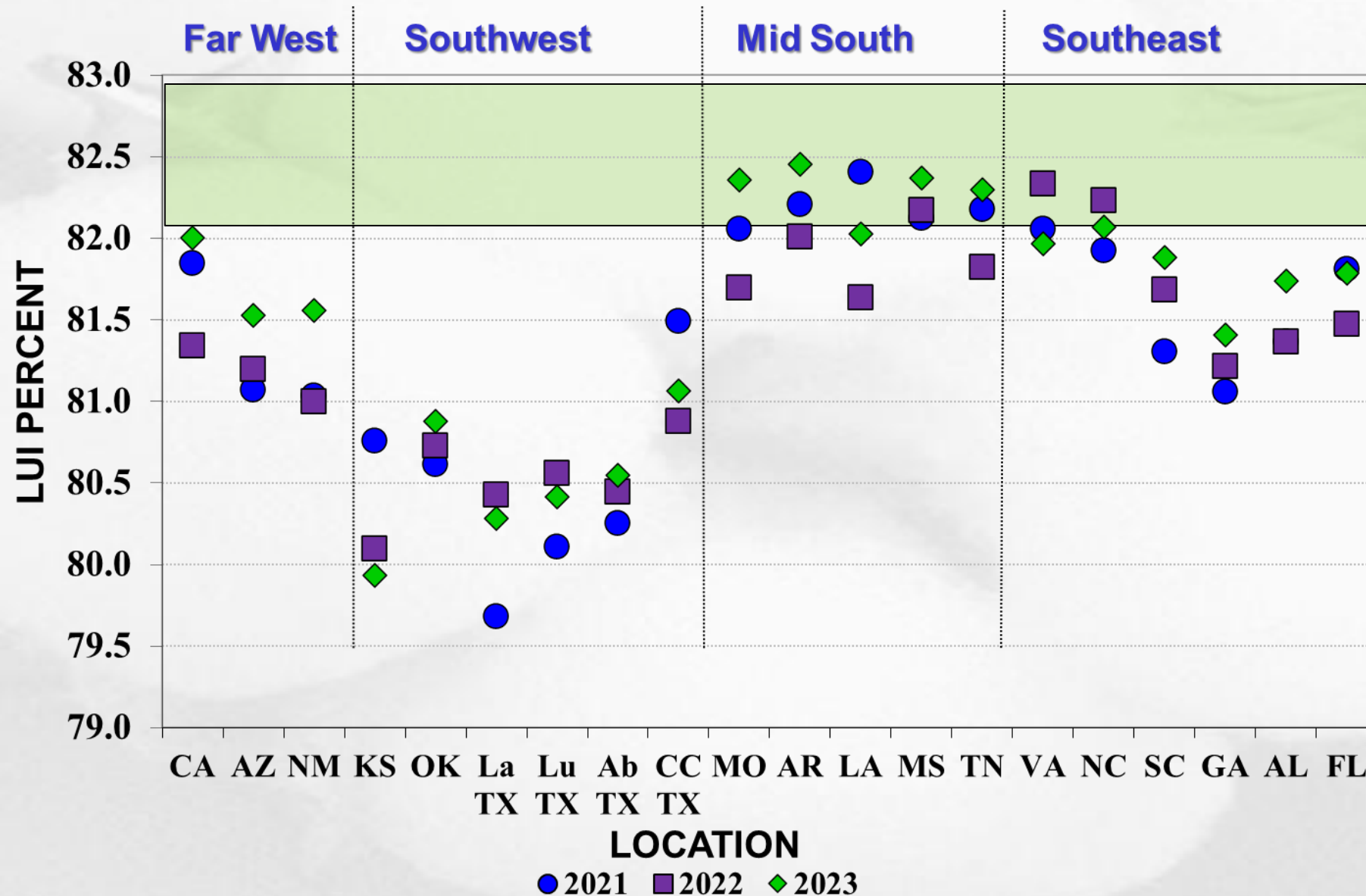


LENGTH UNIFORMITY DISTRIBUTION

U.S. UPLAND 2023



AVERAGE LENGTH UNIFORMITY



WHY DOES UI MATTER?



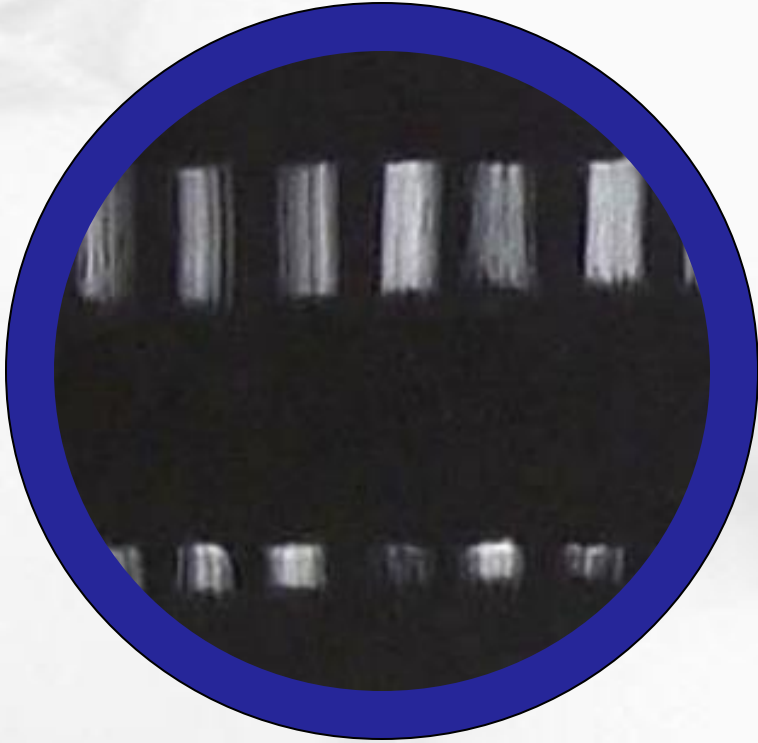
SPINNING

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

FABRIC

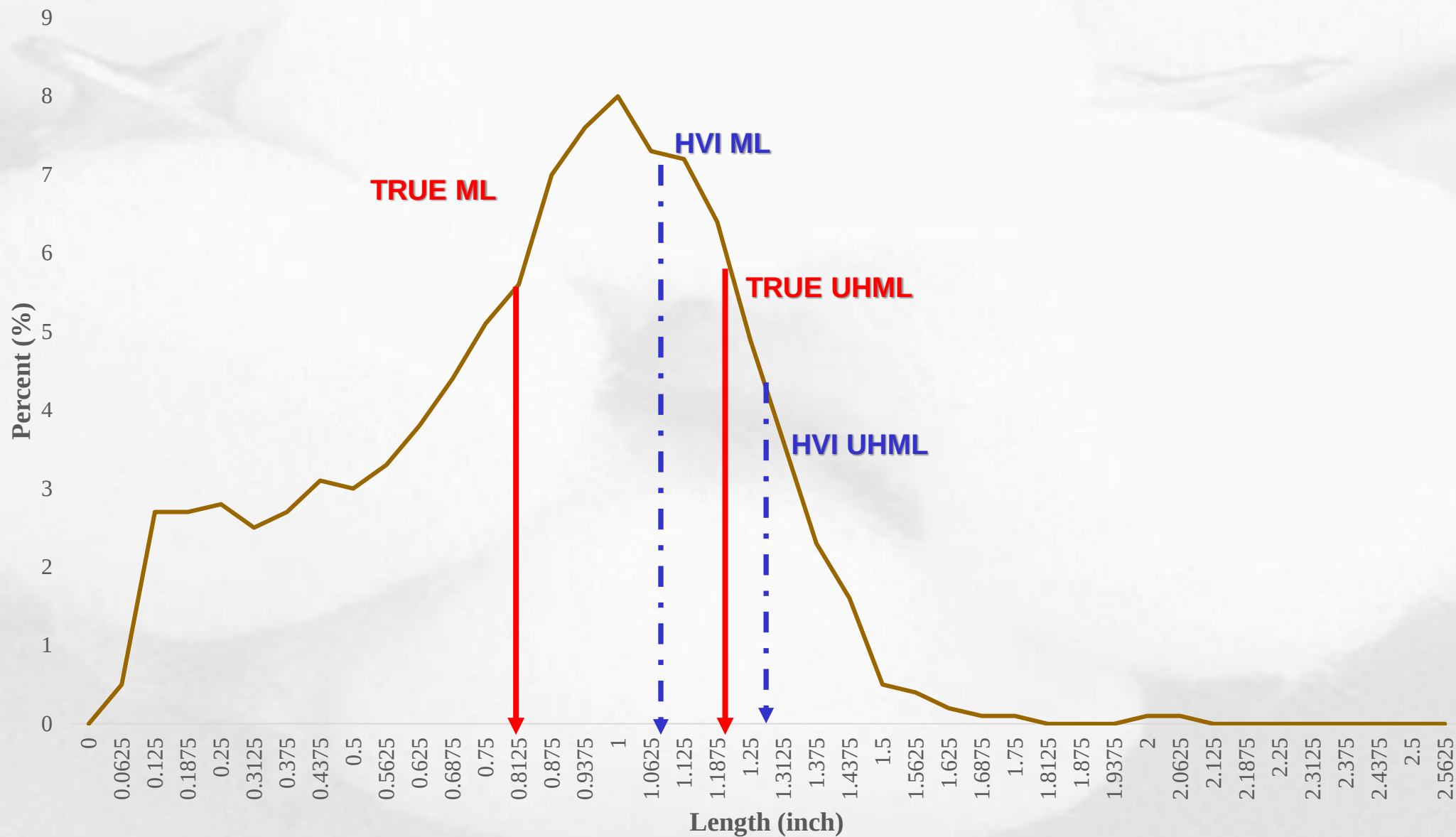
- **FEW IMPERFECTIONS**
- **PILLING**

KNOW YOUR COMPETITION



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

GETTING BETTER ACCURACY



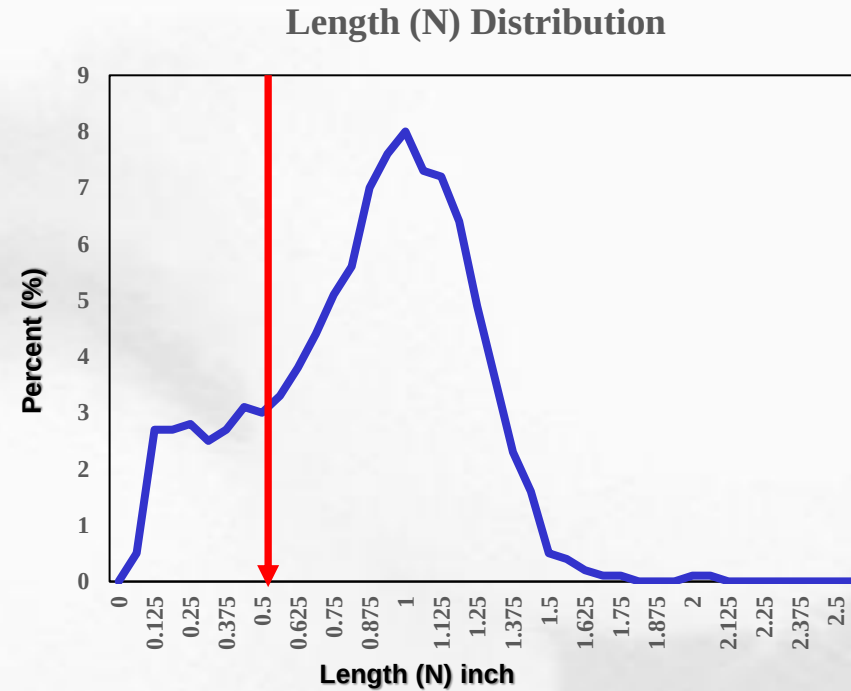
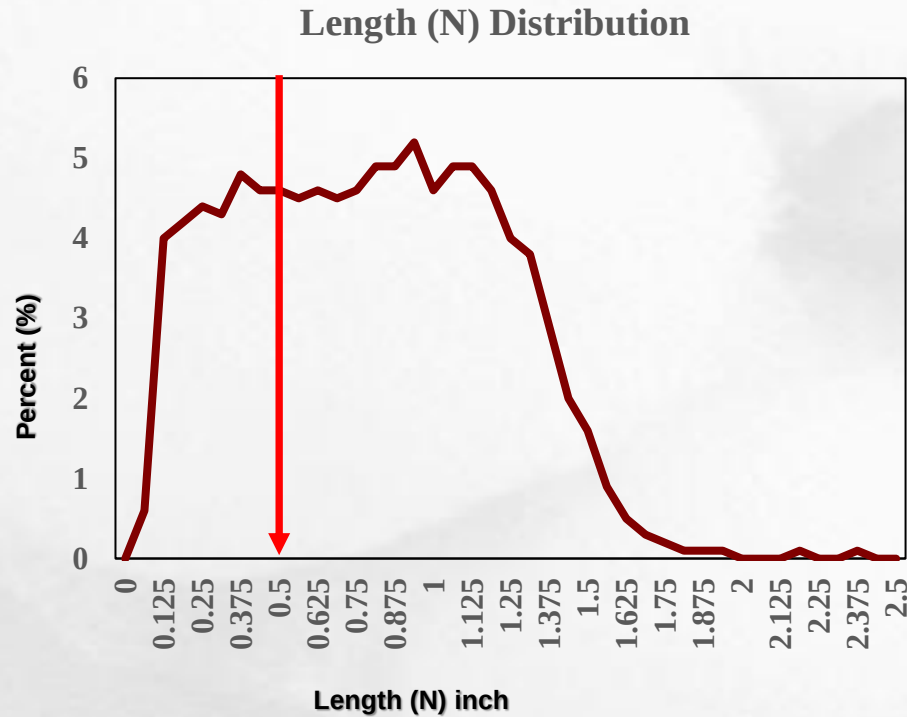
NEW MEASUREMENTS

UHMLf	Upper Half Mean Length fibrogram
MLf	Mean Length fibrogram
UQLf	Upper Quartile Length fibrogram
LHMLf	Lower Half Mean Length fibrogram
LQLf	Lower Quartile Length fibrogram
SFCf	Short Fiber Content fibrogram
UIf	Uniformity Index fibrogram

RBTN 2023

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

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

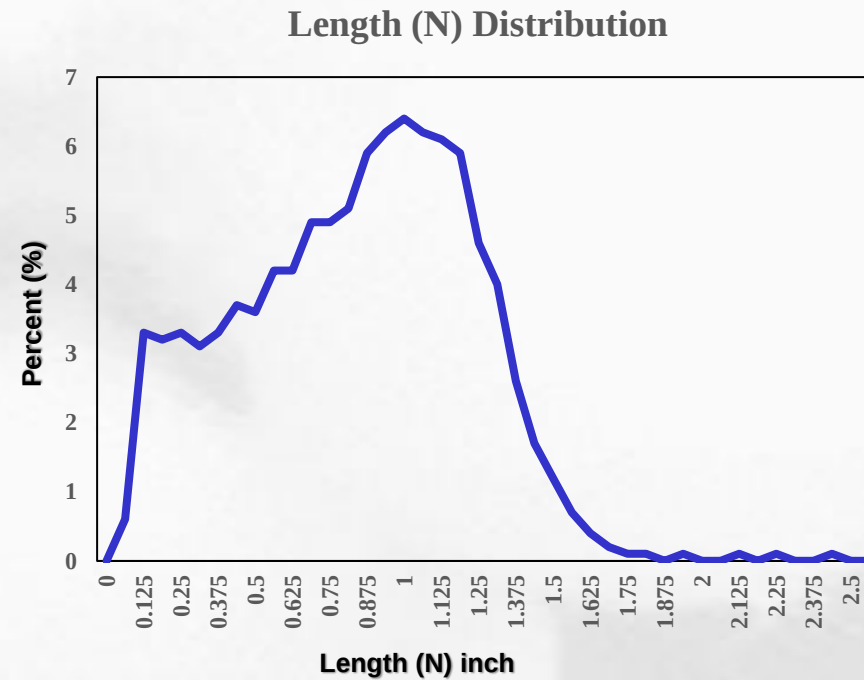
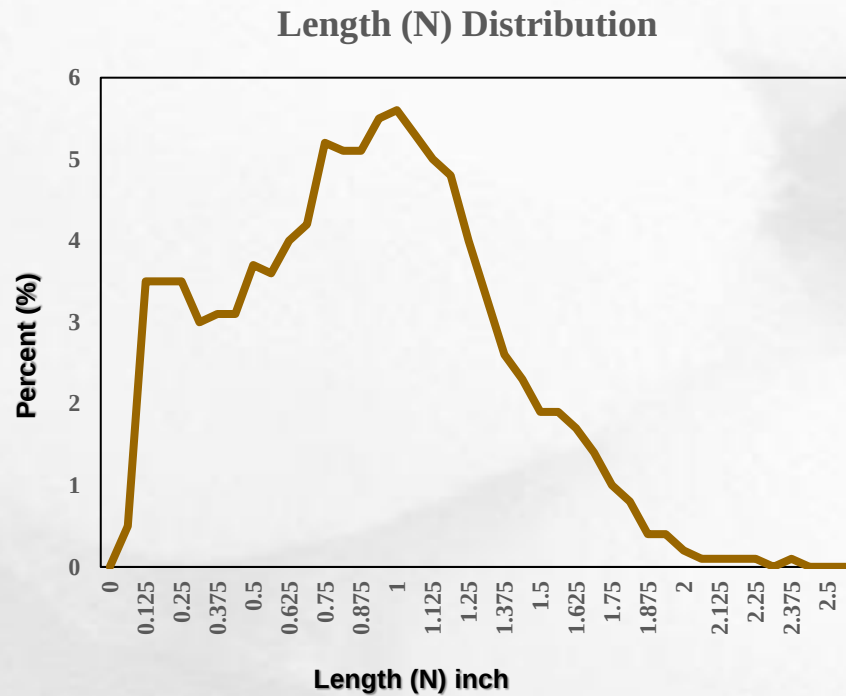


UI Difference: **11.1** and **11.6**

RBTN 2023

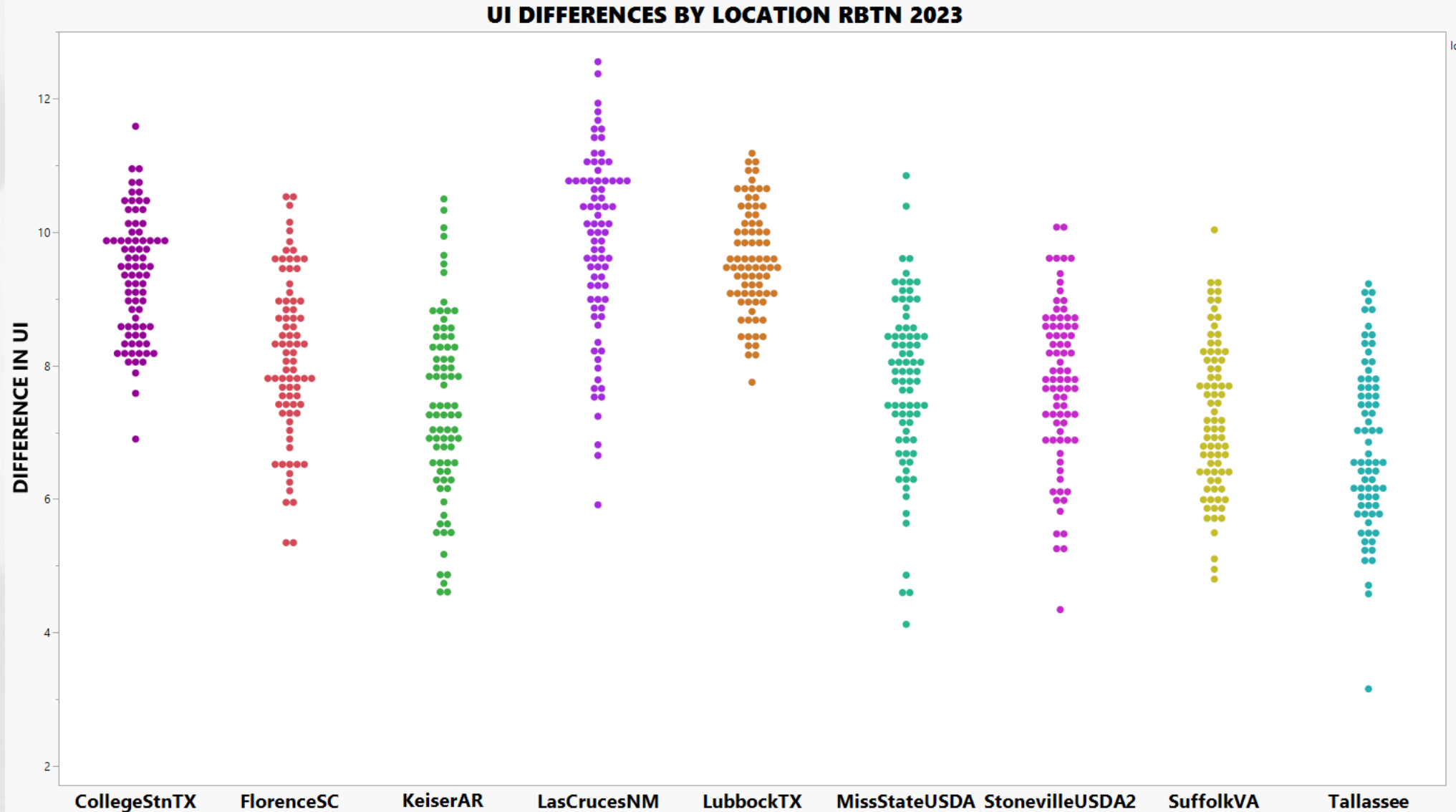
- HVI UI = 78.6 %
- HVI UIf = 73.6%

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

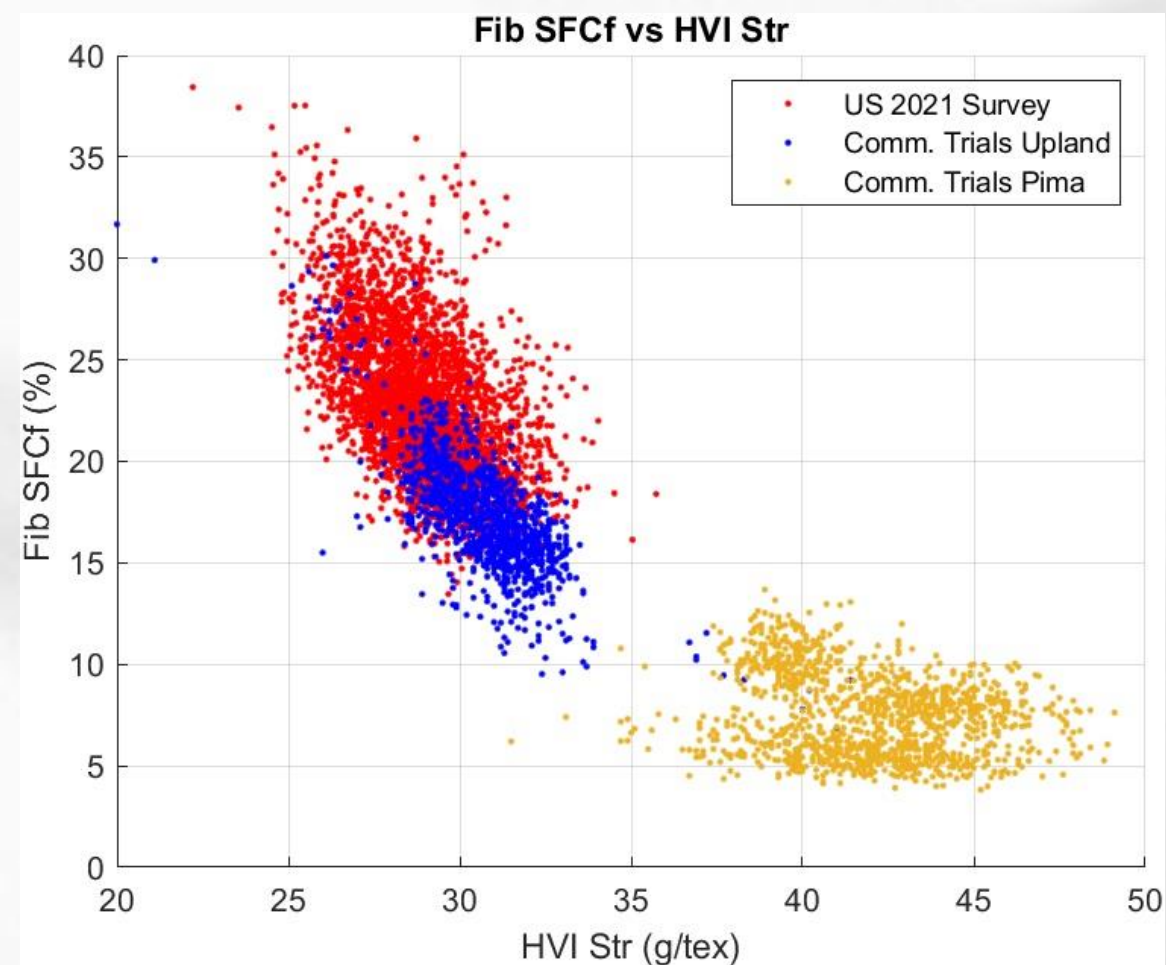
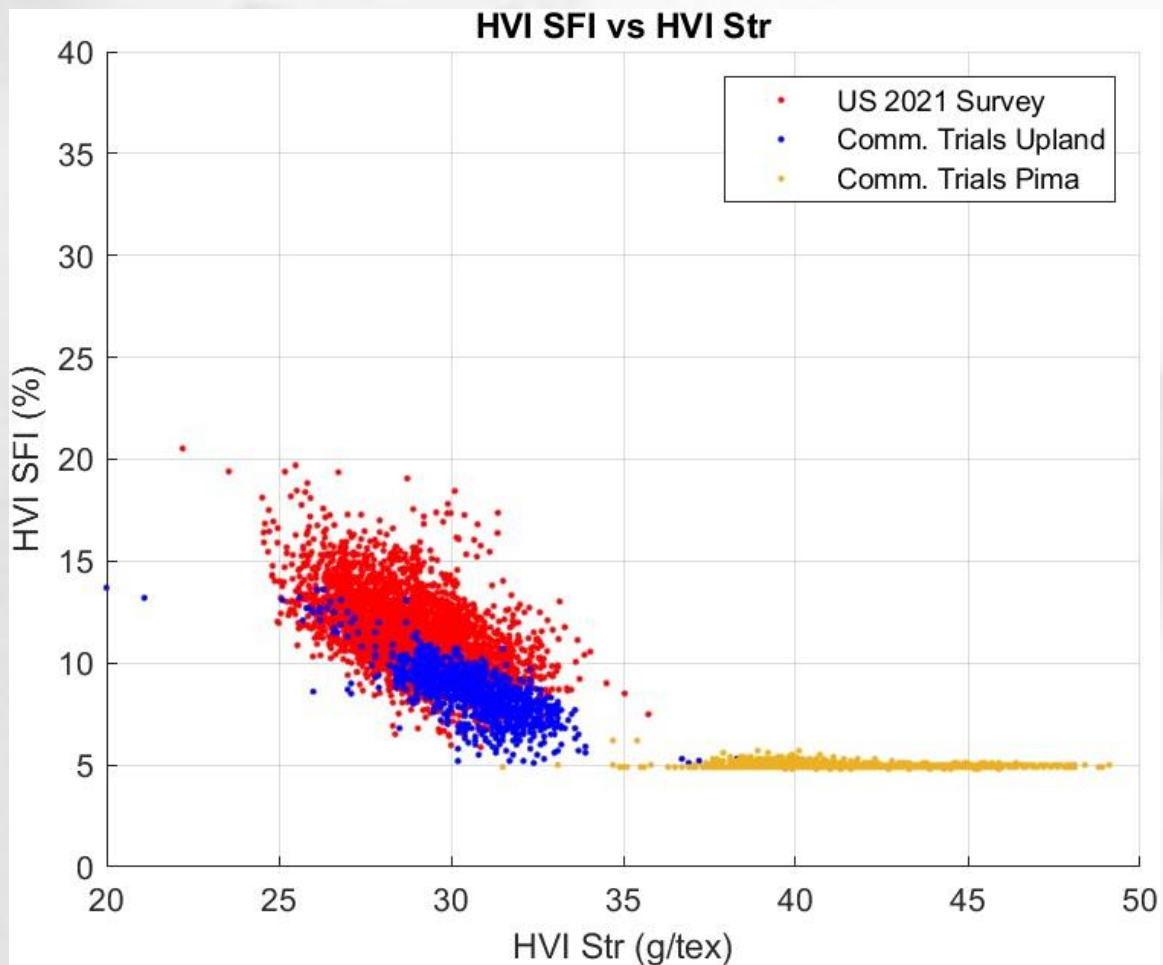


UI Difference: 5 and 7.75

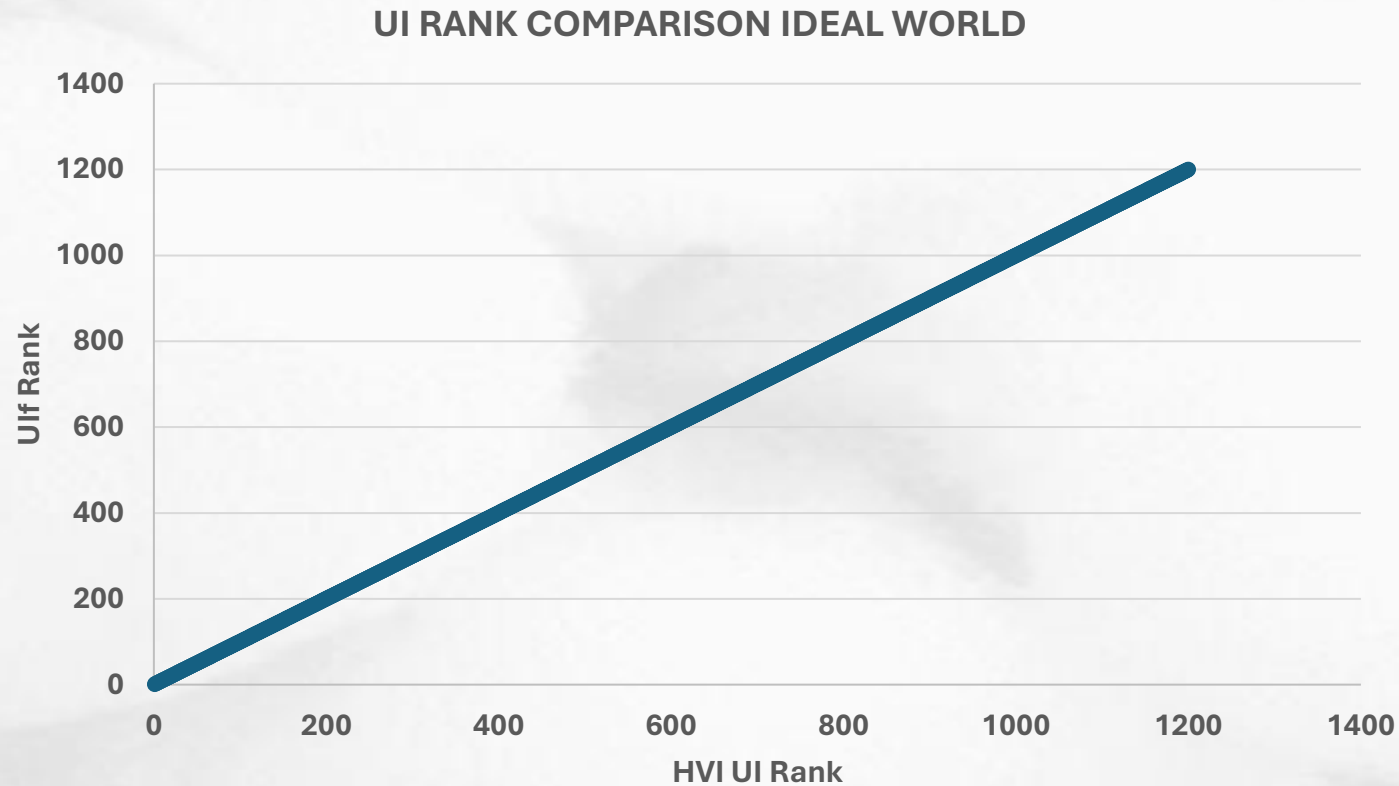
RBTN 2023: UI DIFFERENCES



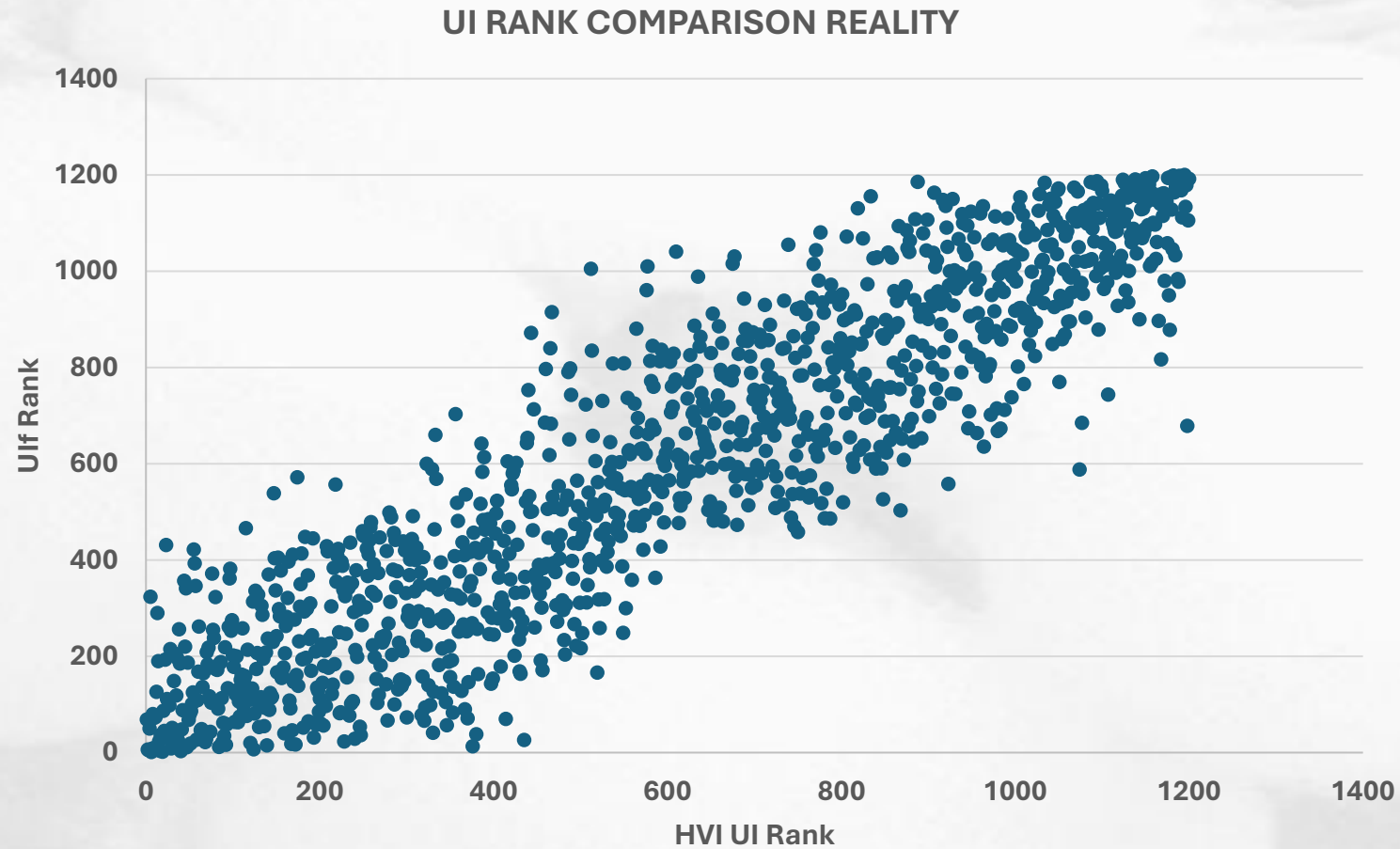
VALIDATION WORK



VALIDATION WORK: RANK EXPECTATION

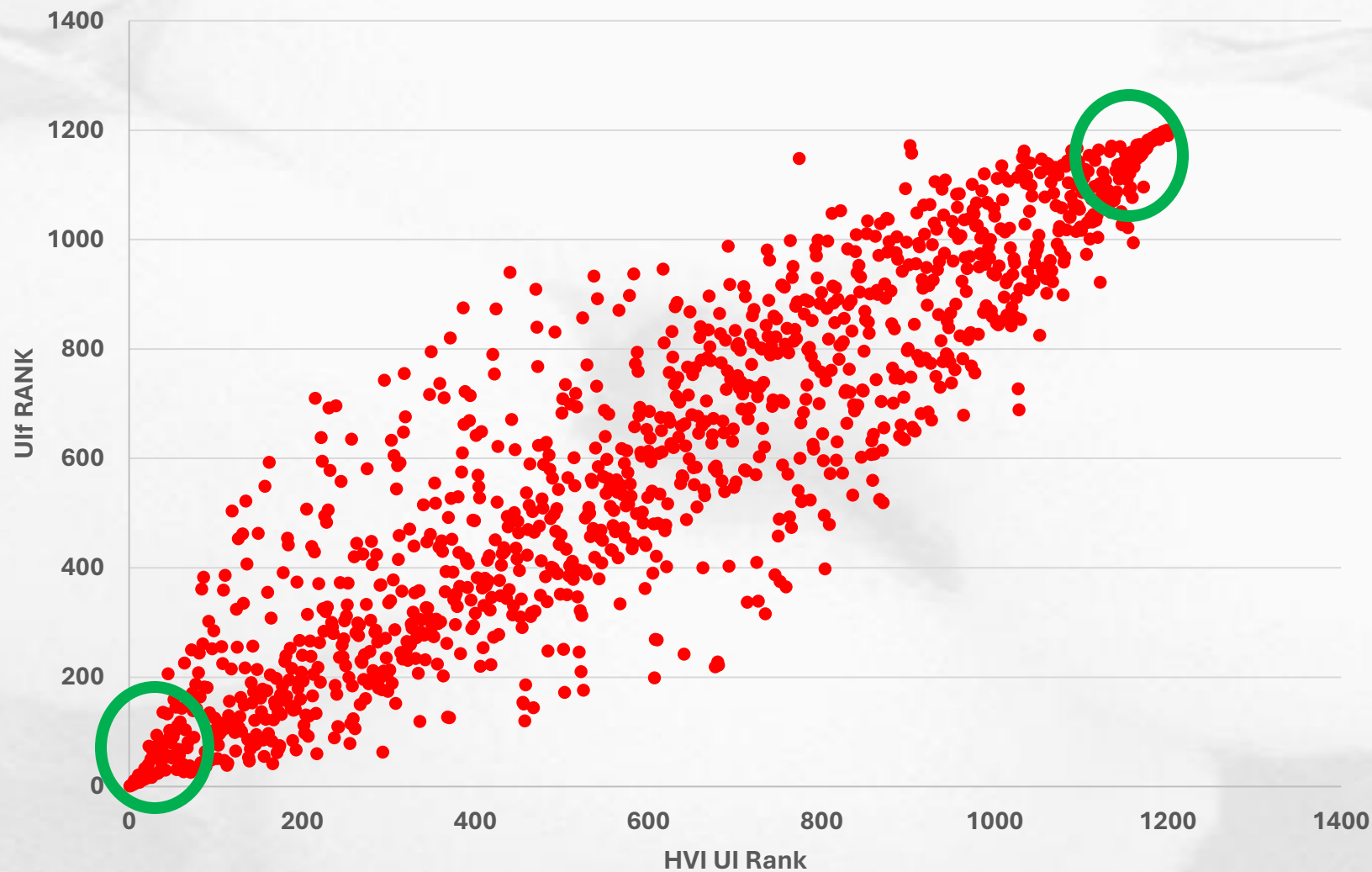


VALIDATION WORK: PIMA

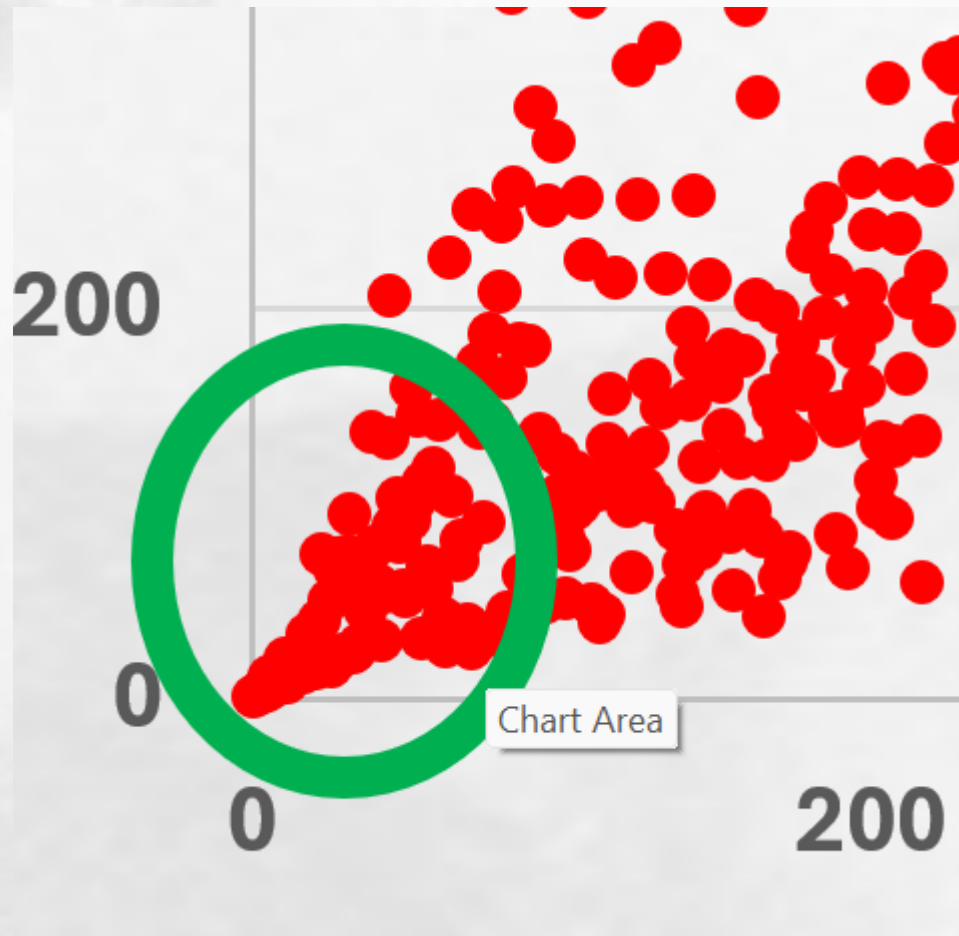


VALIDATION WORK: UPLAND

UI RANKS COMPARISON

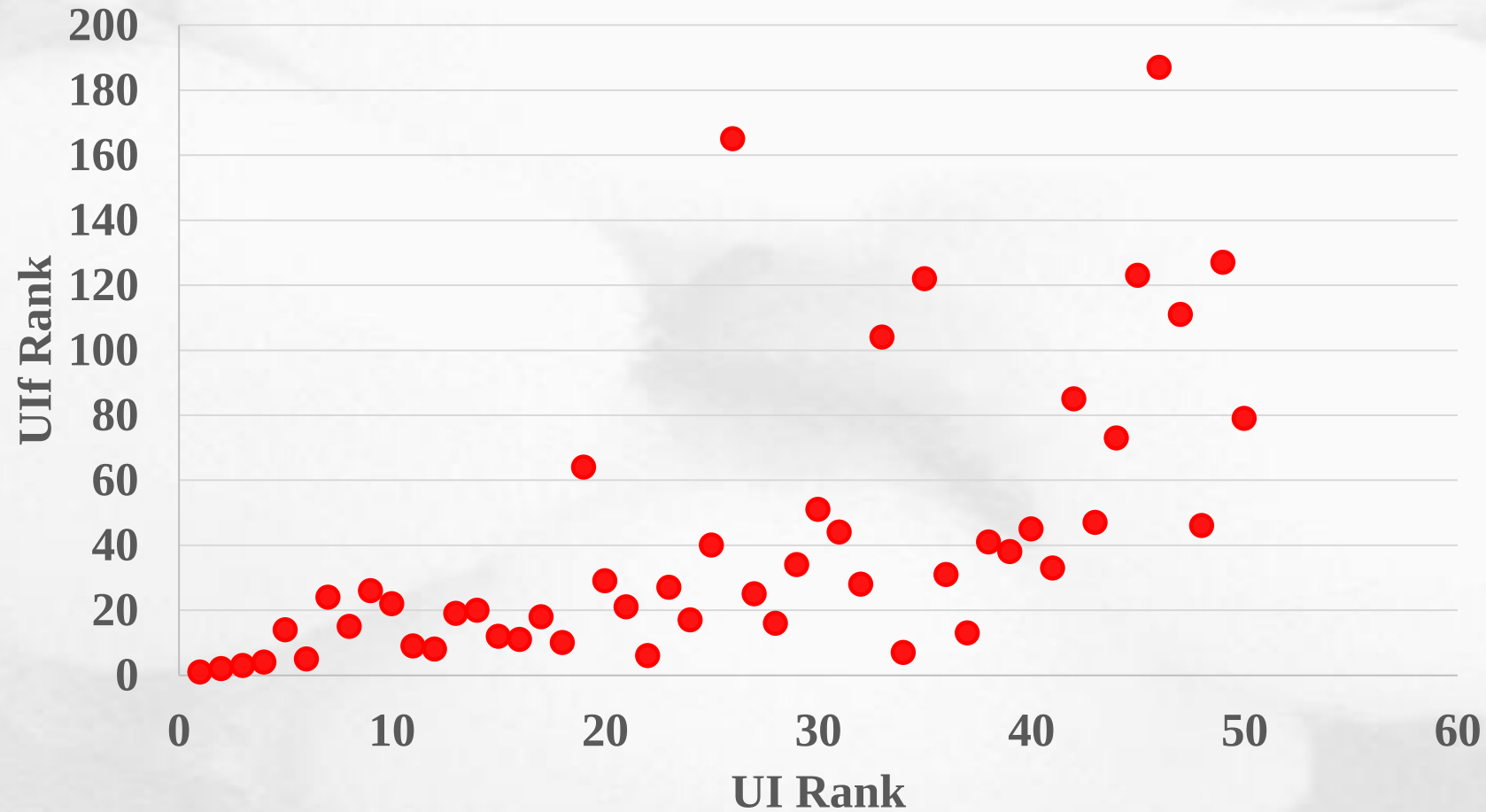


VALIDATION WORK: UPLAND

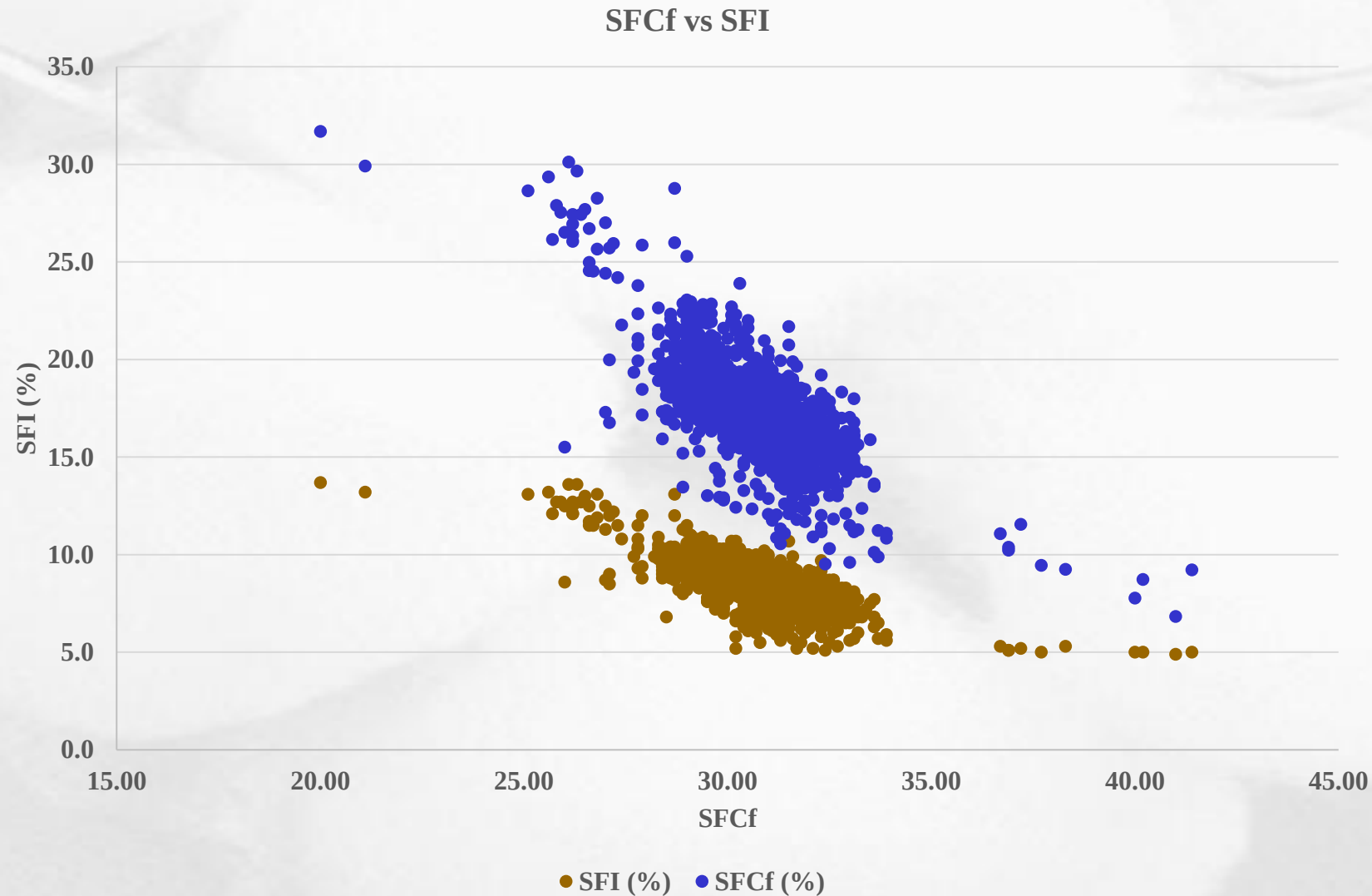


VALIDATION WORK: UPLAND

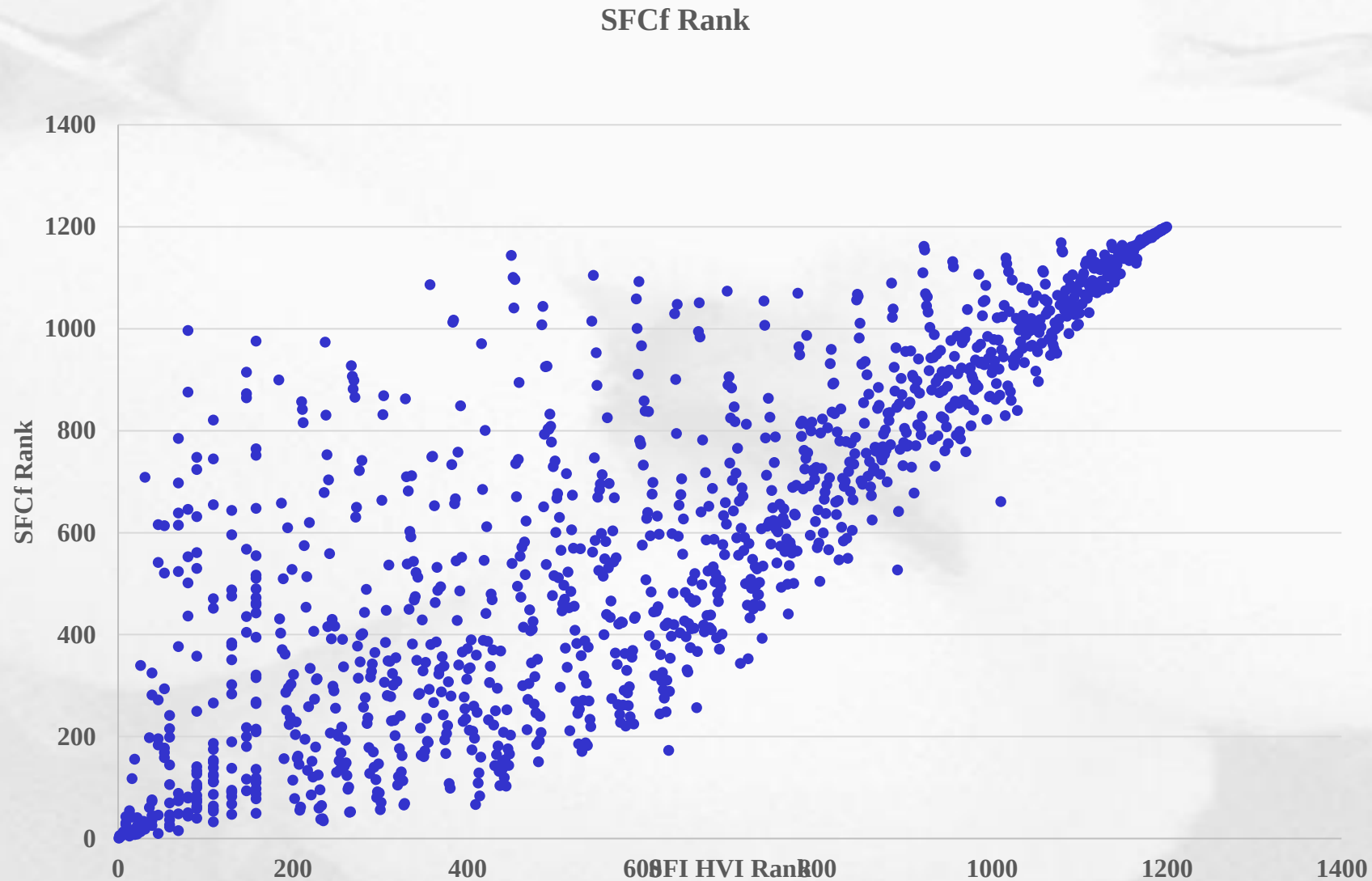
TOP 4% OF THE POPULATION BY UI



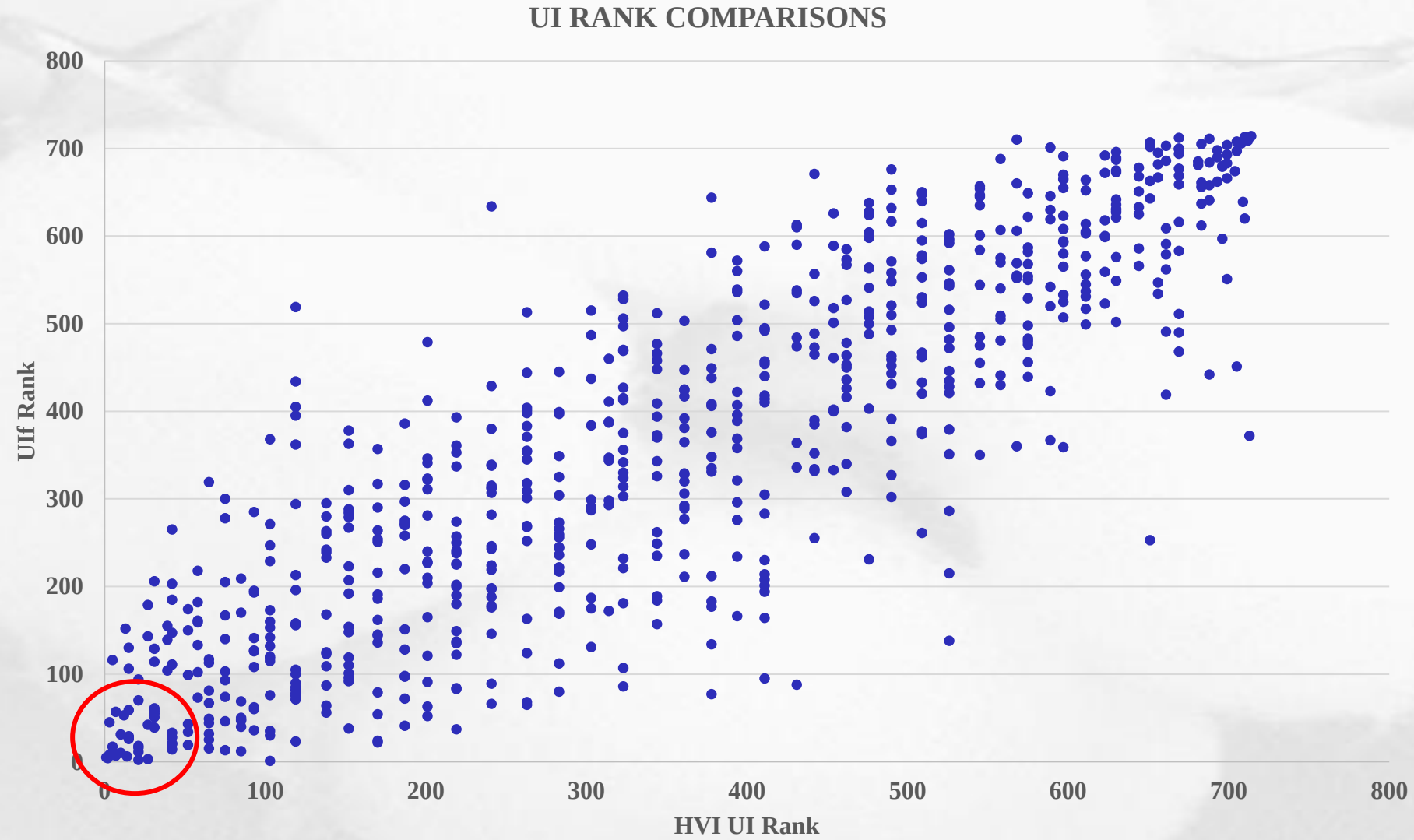
VALIDATION WORK: UPLAND



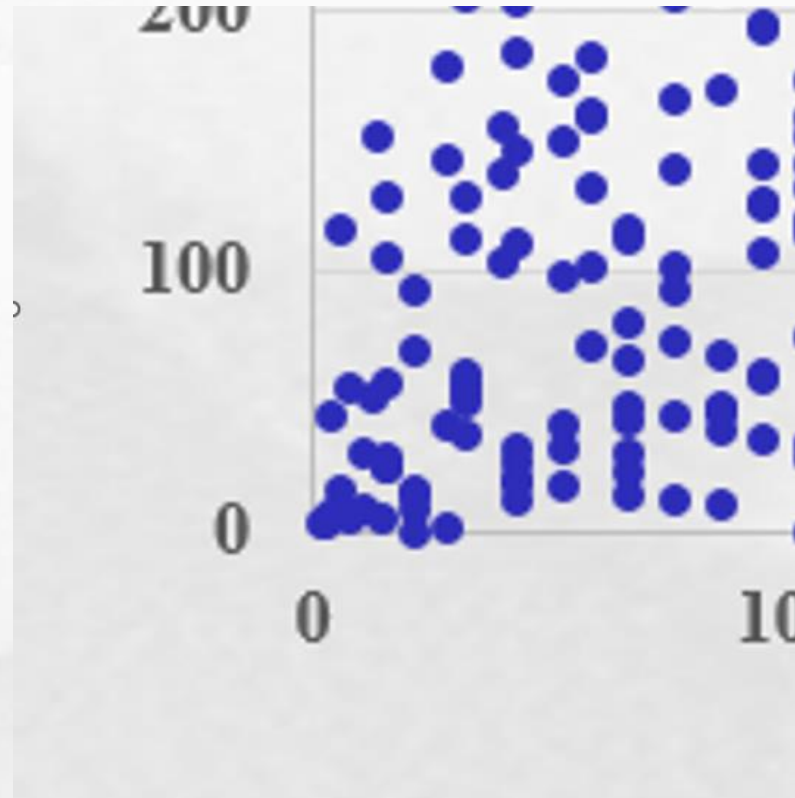
VALIDATION WORK: UPLAND



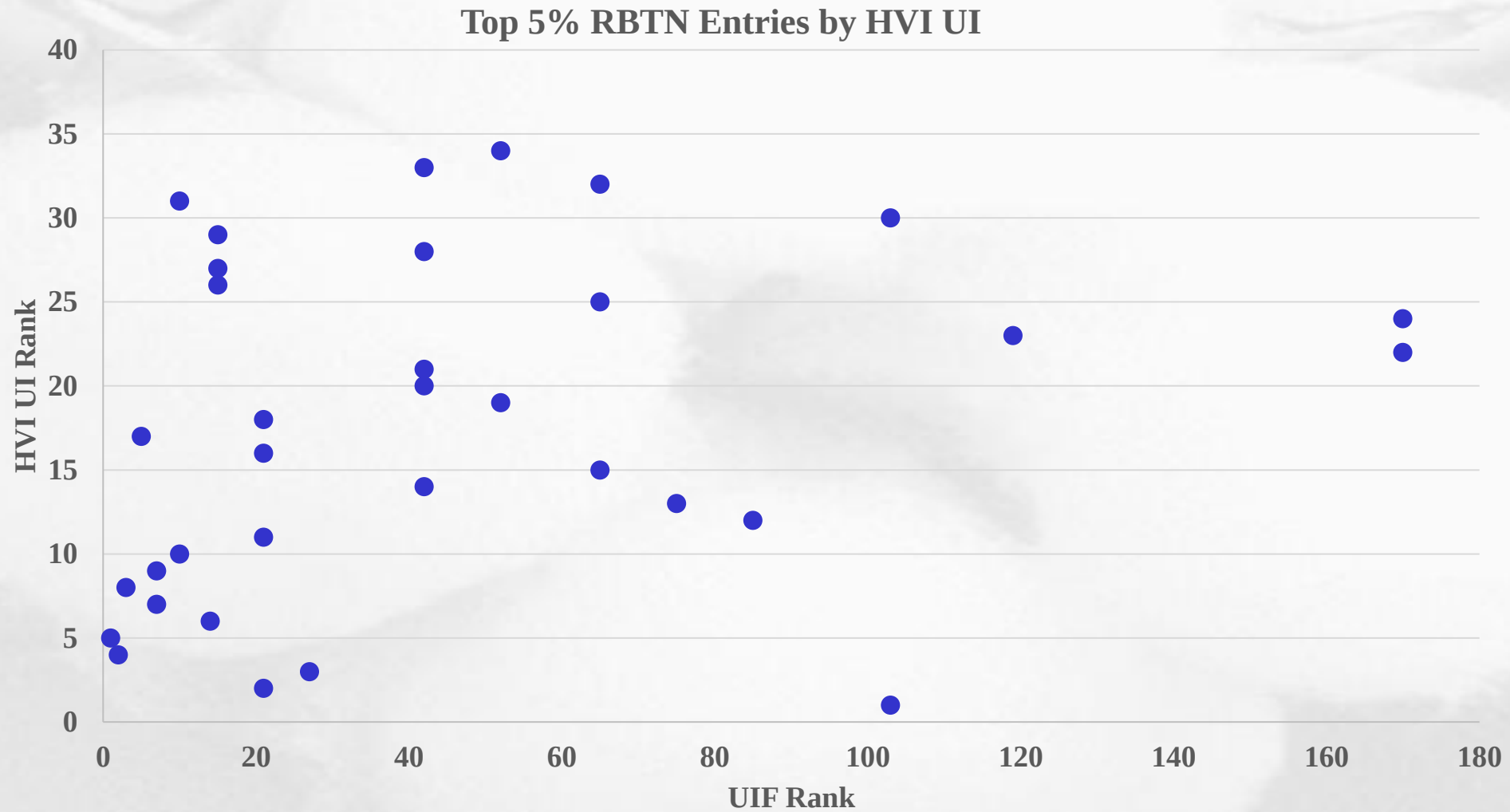
RBTN RANKED FOR UI



RBTN RANKED FOR UI



RBTN RANKED FOR UI



NEXT PROPERTY



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

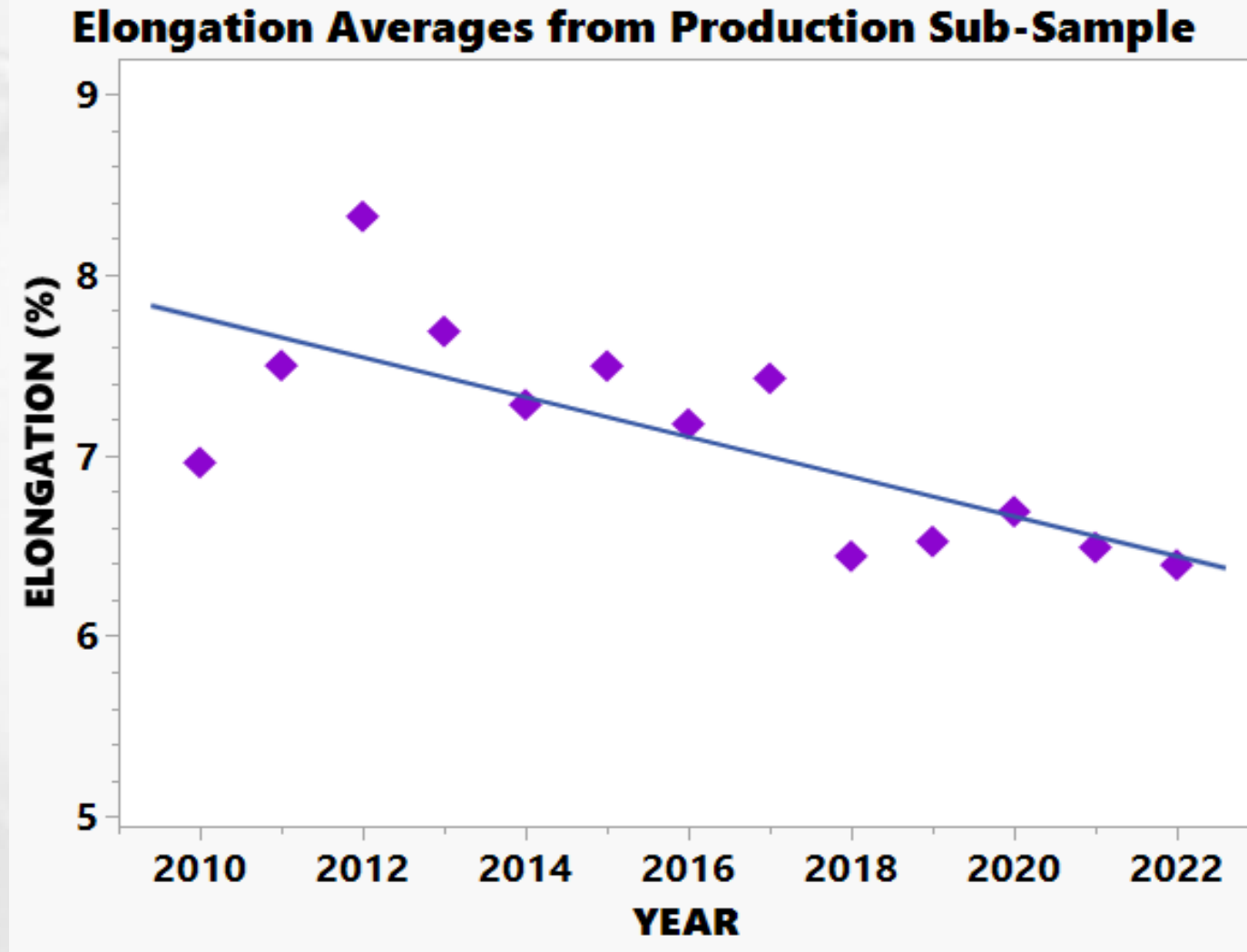


ELONGATION

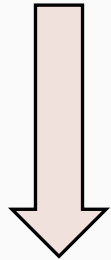
- **Elongation is a fiber property that contributes to fiber and yarn's tenacity**
- **How elastic is the fiber bundle before it breaks?**
- **Improved elongation = improved yarn quality**

ISSUE: HVI[®] provides the measurement, but it is not calibrated

ELONGATION

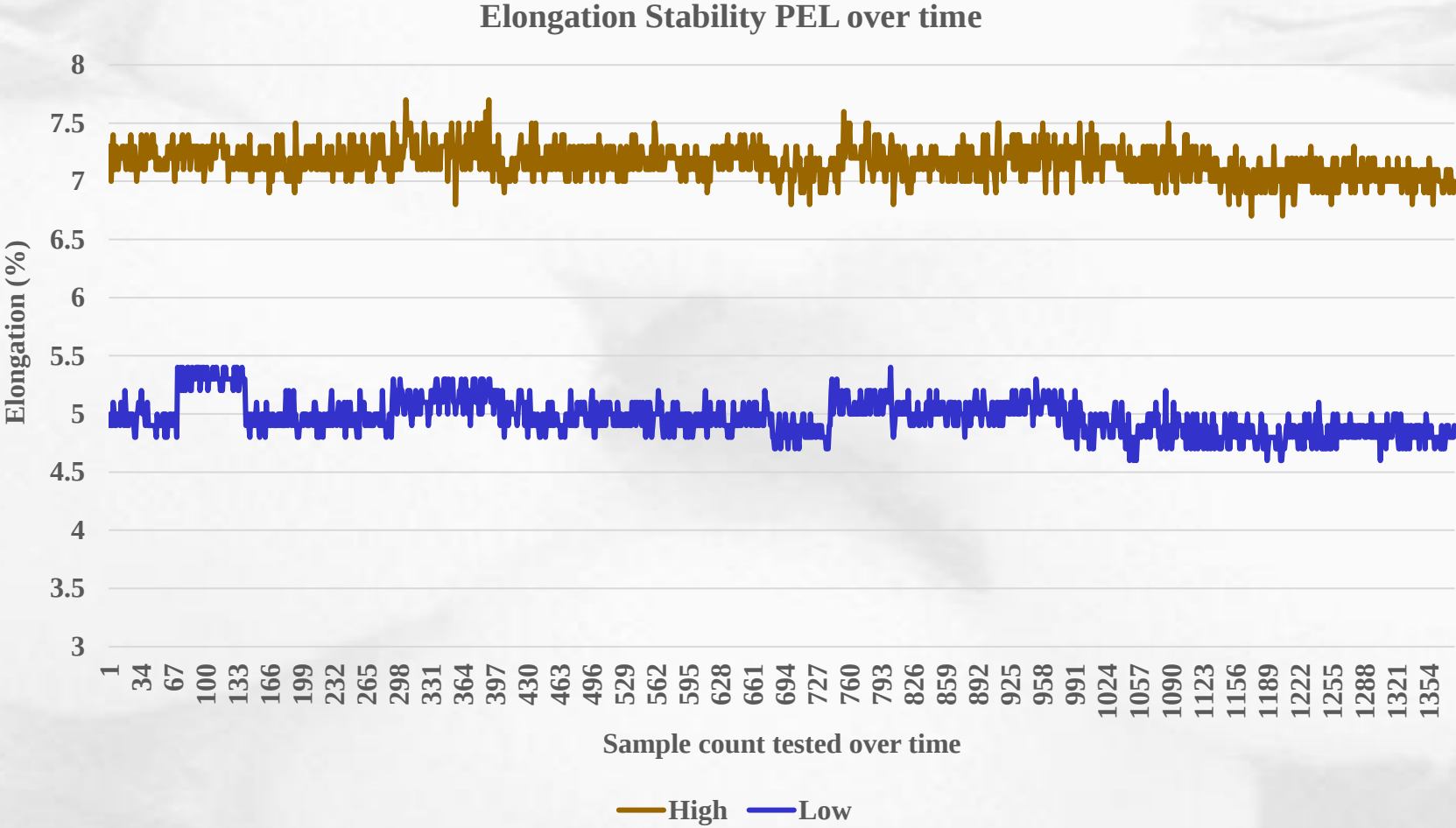


Yarn properties



Elongation

ELONGATION



Thank you

