



Losses in Yield, Quality, and Profitability of Cotton From Improper Harvest Timing

**C.W. Bednarz
and**

W.D. Shurley

**University of
Georgia**

and

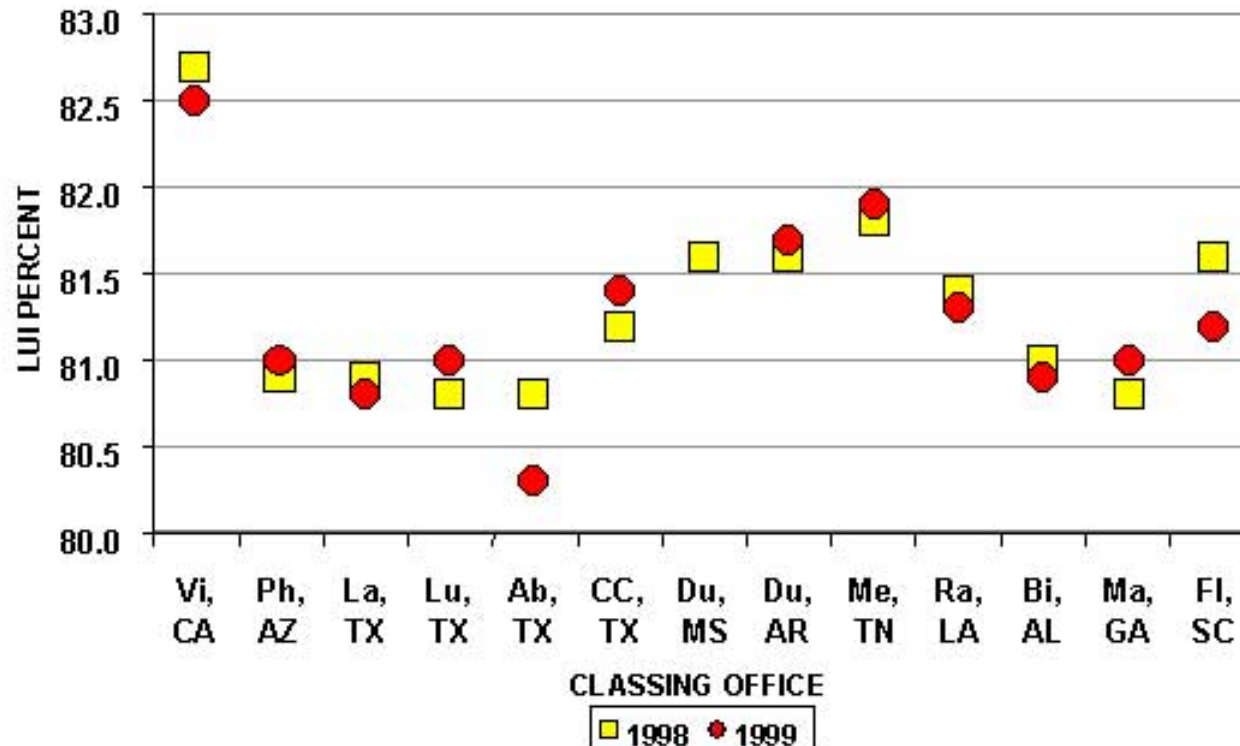
W.S. Anthony

USDA-ARS

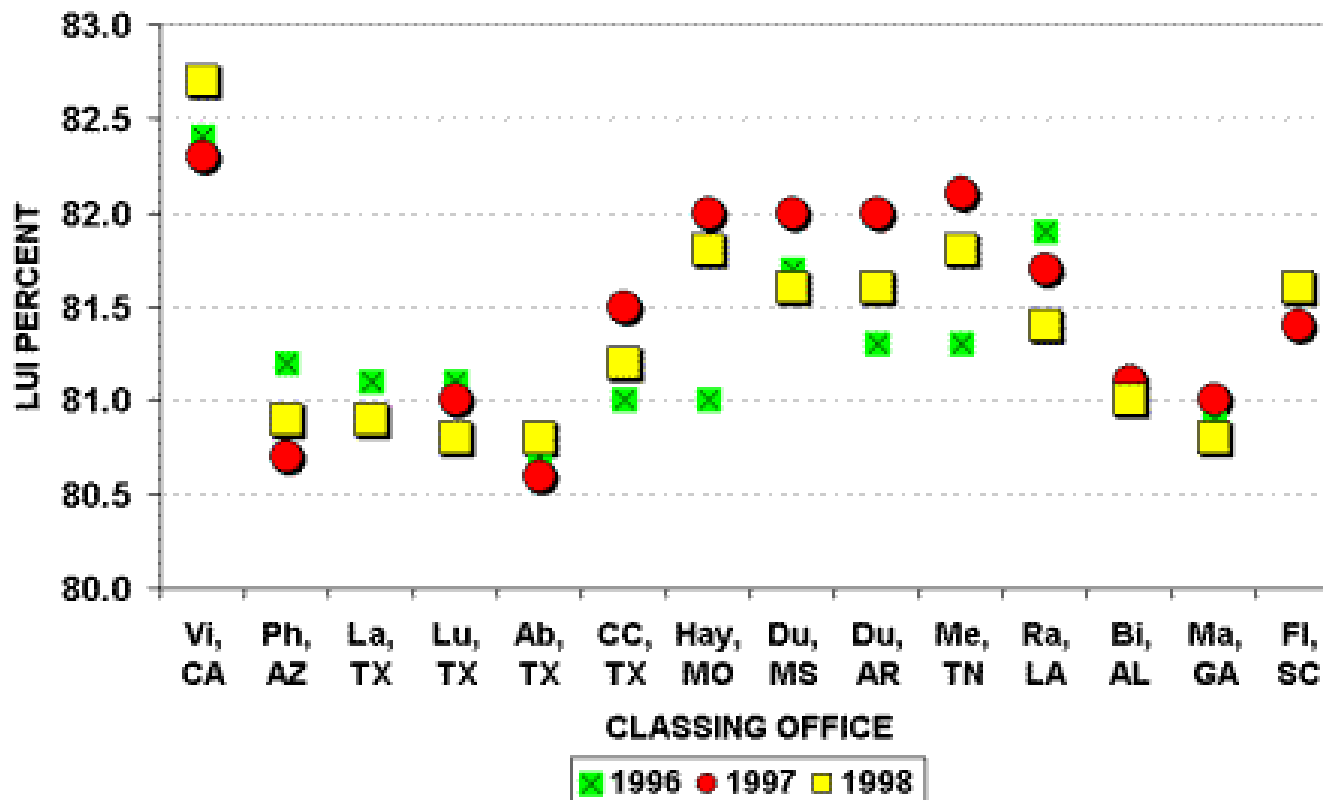


AVERAGE LENGTH UNIFORMITY

USA UPLAND - Final Report - 1999 Crop



AVERAGE LENGTH UNIFORMITY USA UPLAND - Final Report - 13011784 BALES



IS THIS PROBLEM DUE TO:

- ENVIRONMENT?

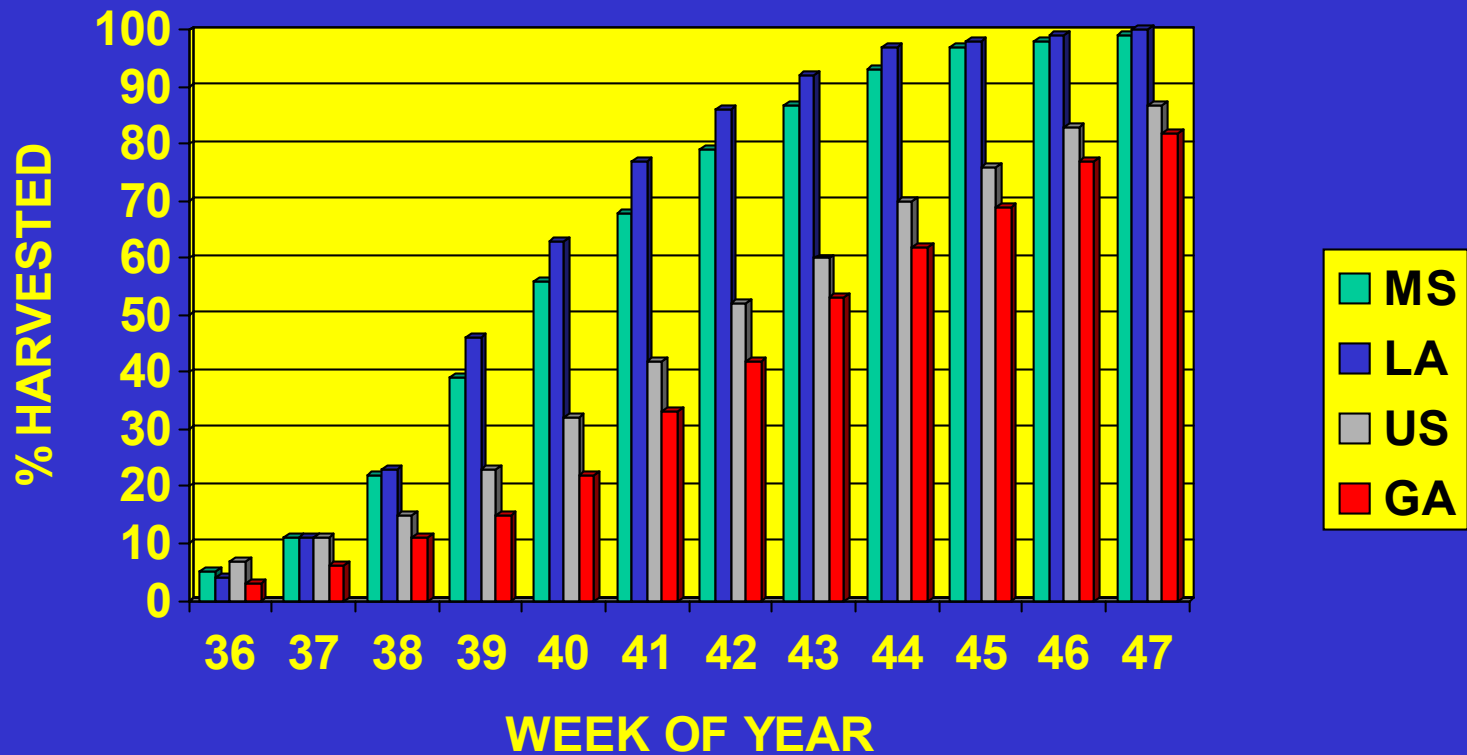
- Soil Type

- MANAGEMENT?

- Varieties
- Population Densities
- Insect Control
- Harvest Timing

PERCENT HARVESTED BY WEEK (5 year average)

<http://www.nass.usda.gov>



Cotton and Peanut “Most Active” Planting and Harvest Dates

<http://www.nass.usda.gov>



Commodity	Planted	Harvested
GA Cotton	4/25-5/25	10/5-11/15
GA Peanut	4/25-5/20	9/10- 10/15

What is This Harvest Delay Costing Us? (Objectives of Study)

- Investigate the effects of harvest timing on fiber properties in general and percent uniformity in particular.
- Investigate the effects of harvest timing on lint yield.
- Investigate the effects of harvest timing on profitability.

Cotton Defoliation Timing Study

CPES - Ponder Farm



- Established 13 treatments (weeks) in the study area.
- Applied harvest aids every week for 13 weeks (NACB and %OB)
- Machine picked each plot two weeks after applying harvest aids.

- Seed cotton ginned on mini gin and the USDA-ARS Lab.
- HVI and AFIS on lint samples (3 per plot).
- Data subject to ANOVA.



Harvest Dates

Week	1998		1999		2000	
	% OB	HvDAP	% OB	HvDAP	% OB	HvDAP
0	6	120	17	122	9	133
1	42	127	31	130	30	142
2	69	134	55	135	57	147
3	73	141	60	143	58	150
4	92	148	64	149	76	155
5	100	155	79	157	80	163
6	100	162	83	162	88	170
7	100	169	97	170	94	177
8	100	176	100	178	100	185
9	100	183	100	185	100	191
10	100	190	100	191	100	199
11	100	197	100	198	100	204
12	100	204	100	207	100	211

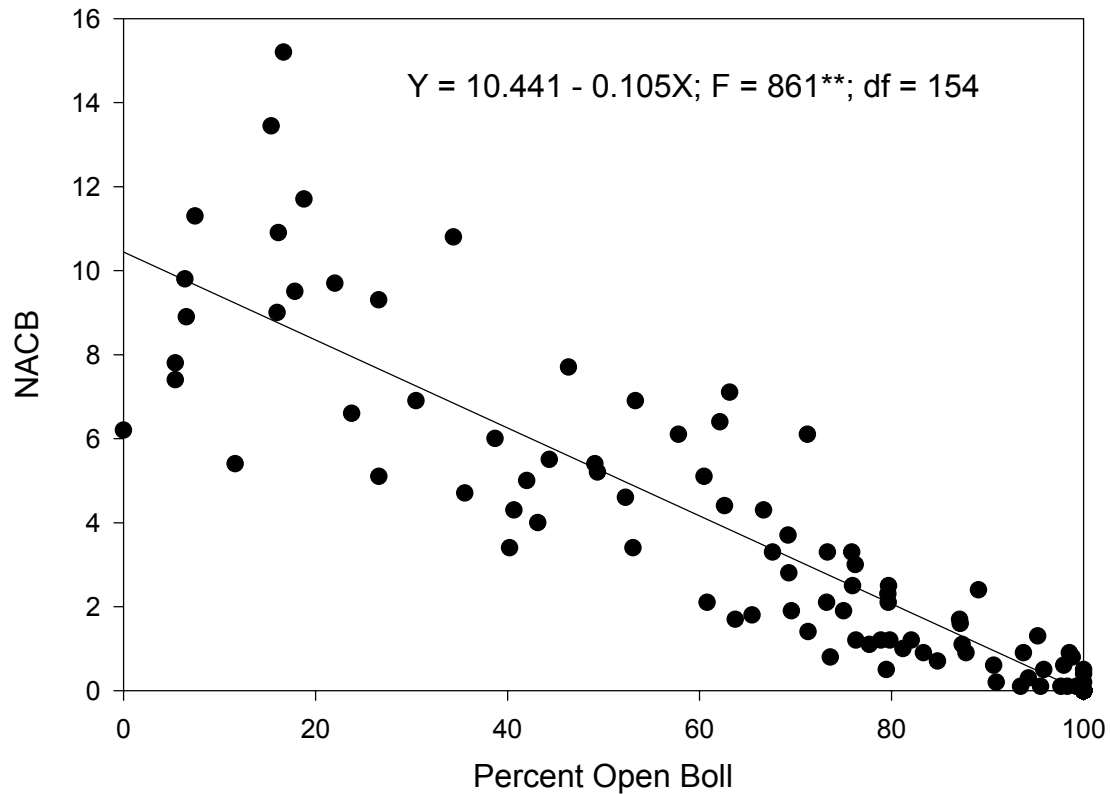
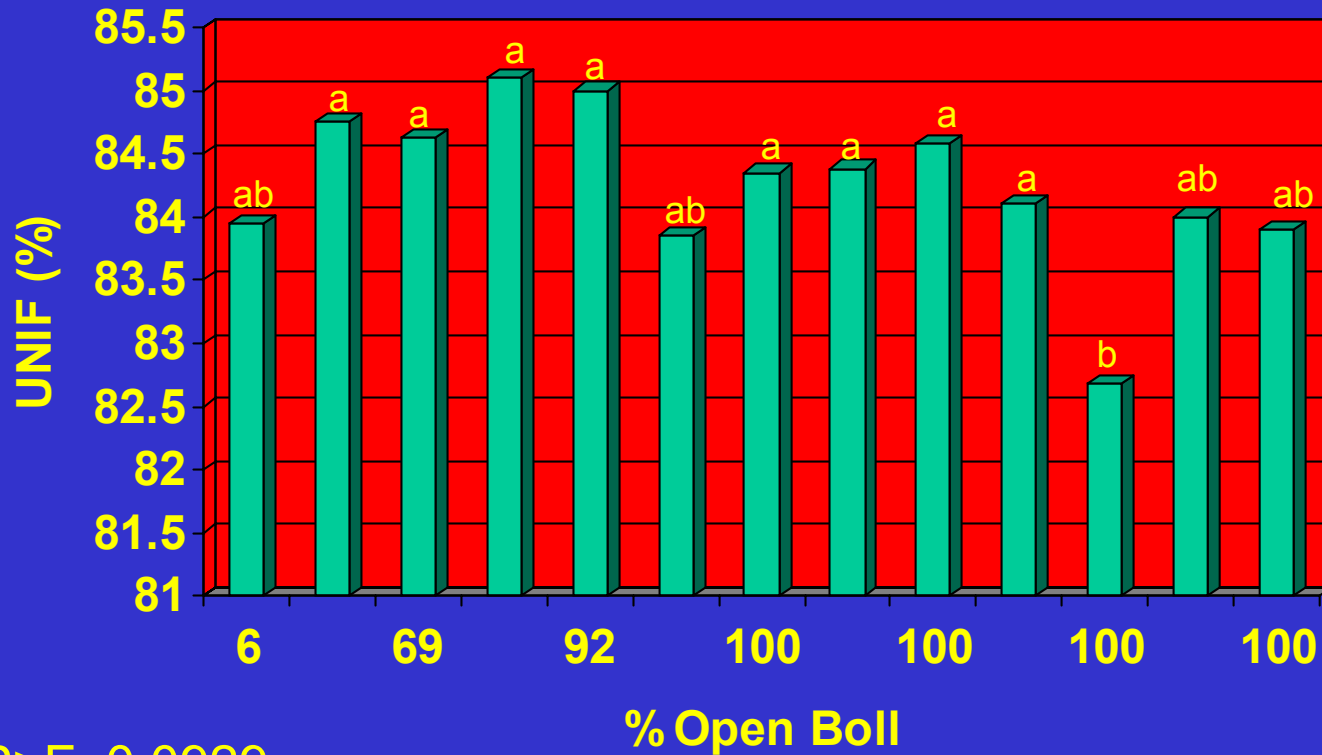


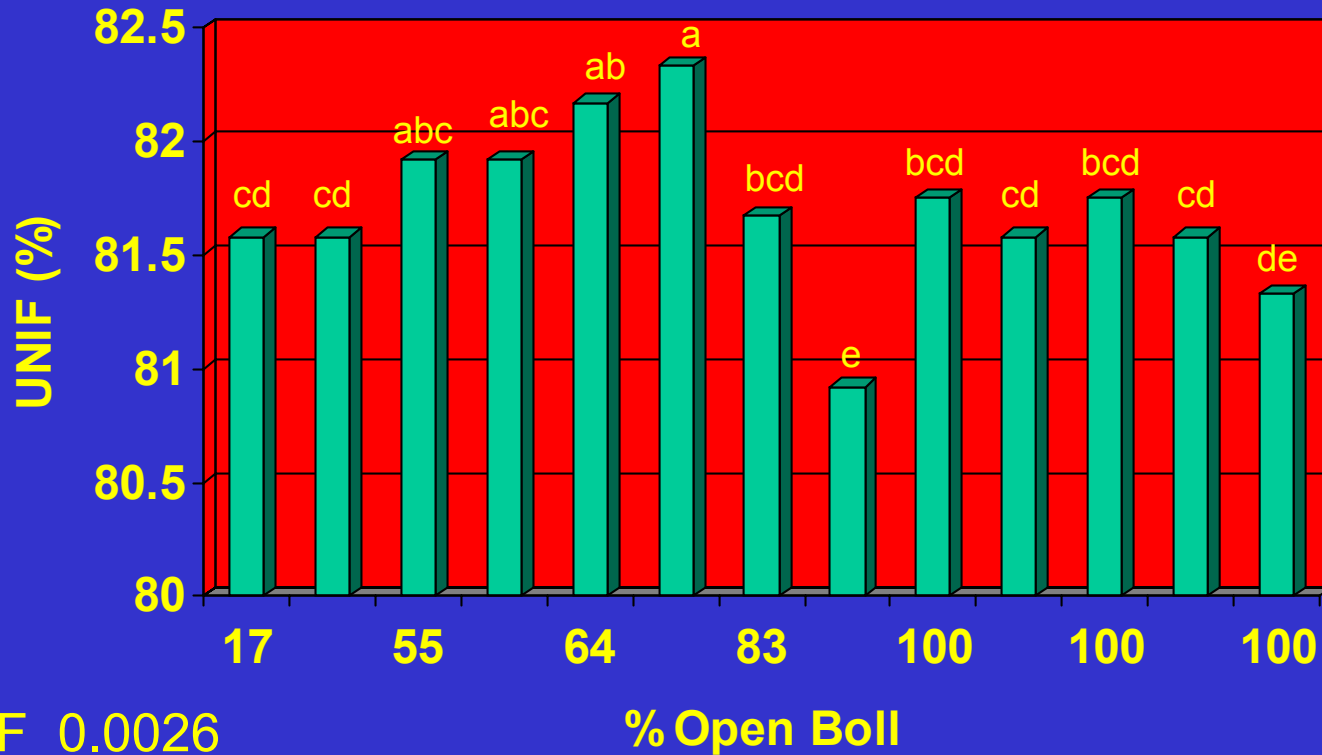
Figure 1. Nodes from the uppermost first sympodial position cracked boll to the uppermost harvestable boll (NACB) versus percent open boll in harvest timing studies conducted at the University of Georgia Coastal Plain Experiment Station in 1998, 1999 and 2000. ** denote significance at the $P = 0.01$ level.

Uniformity 1998

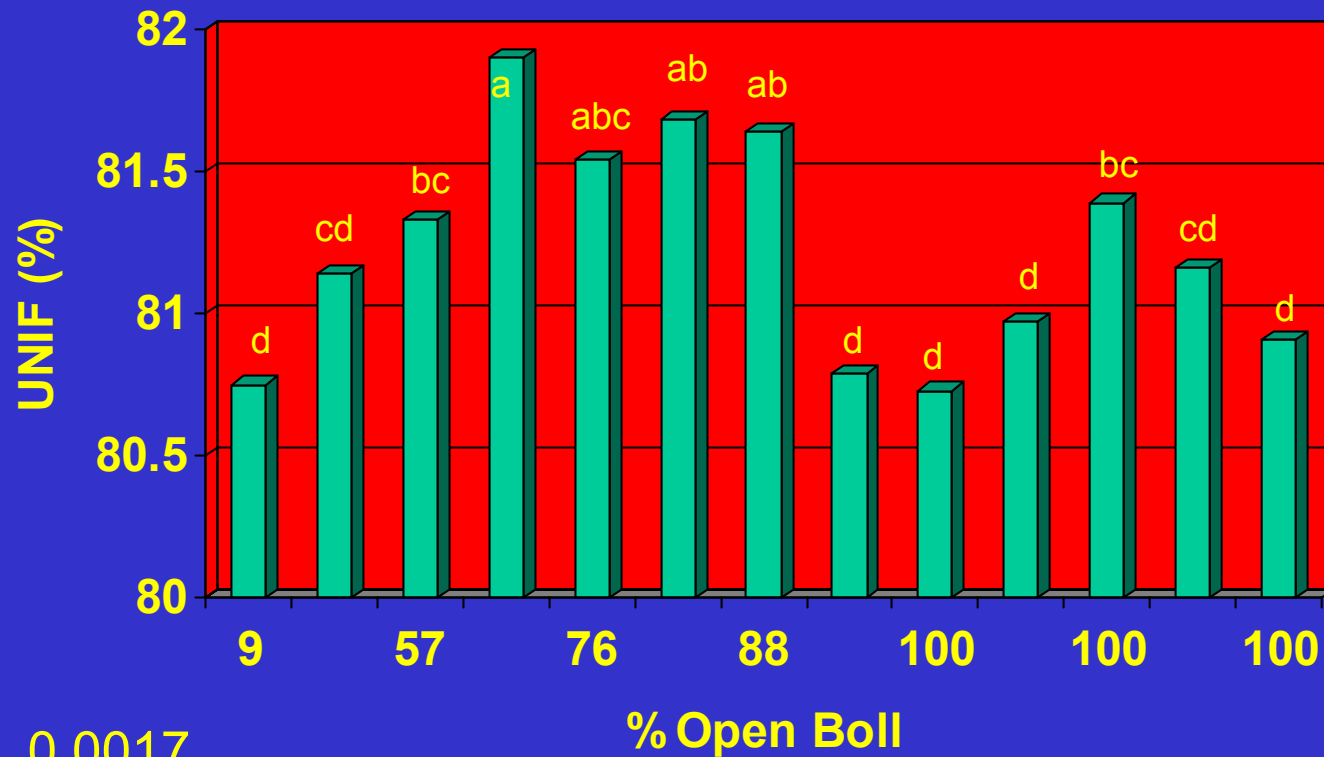


P>F 0.0929

Uniformity 1999

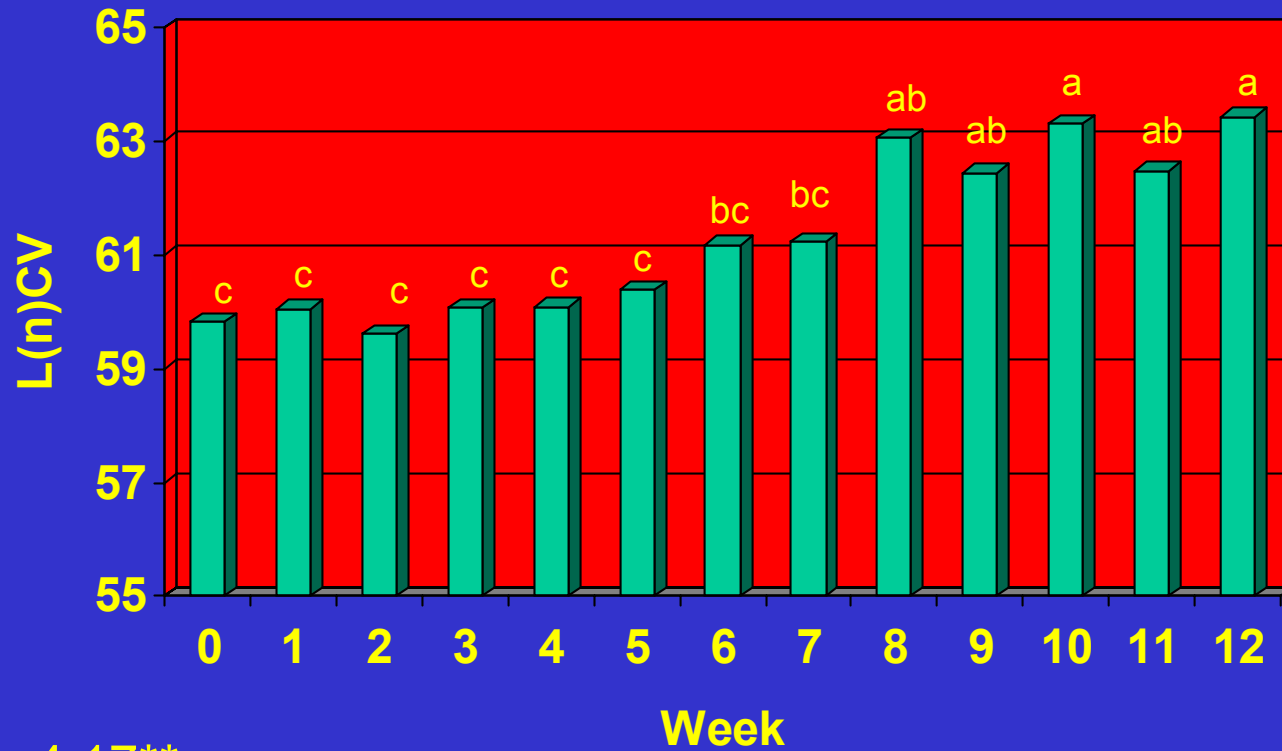


Uniformity 2000



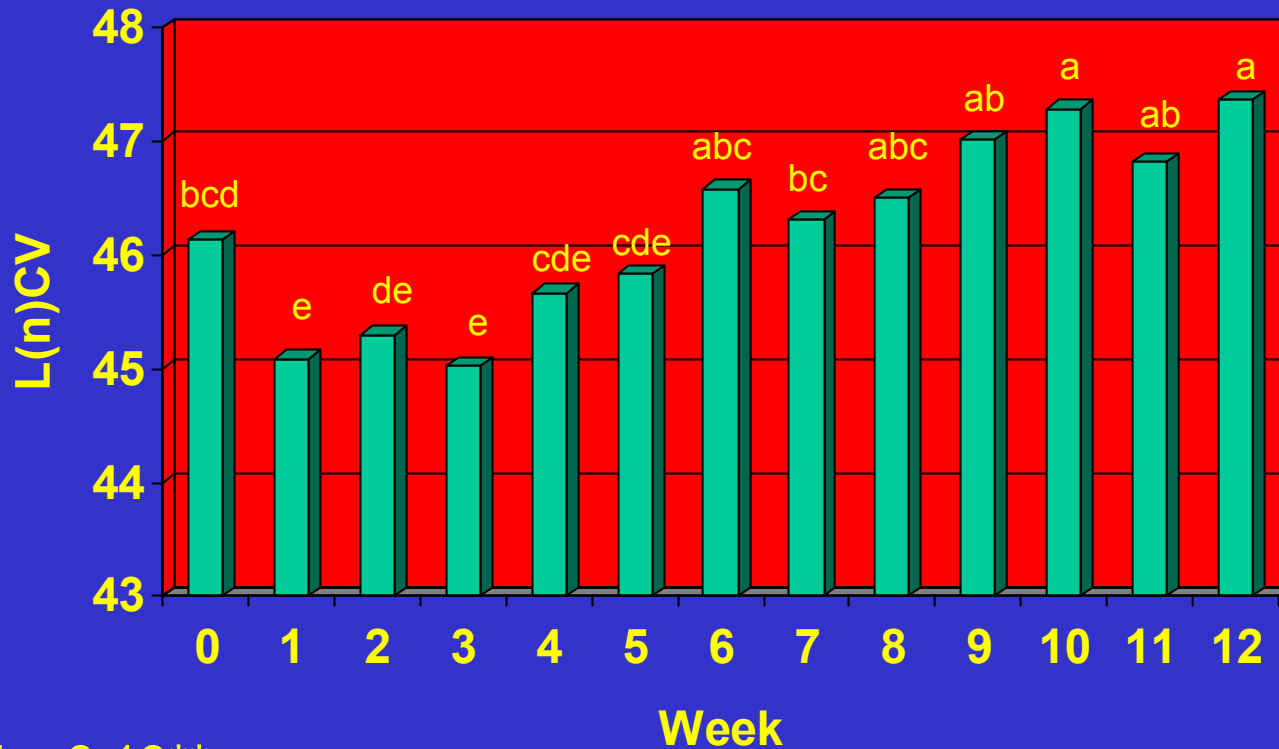
P>F 0.0017

L(n)CV 1999



F = 4.17**

L(n)CV 2000

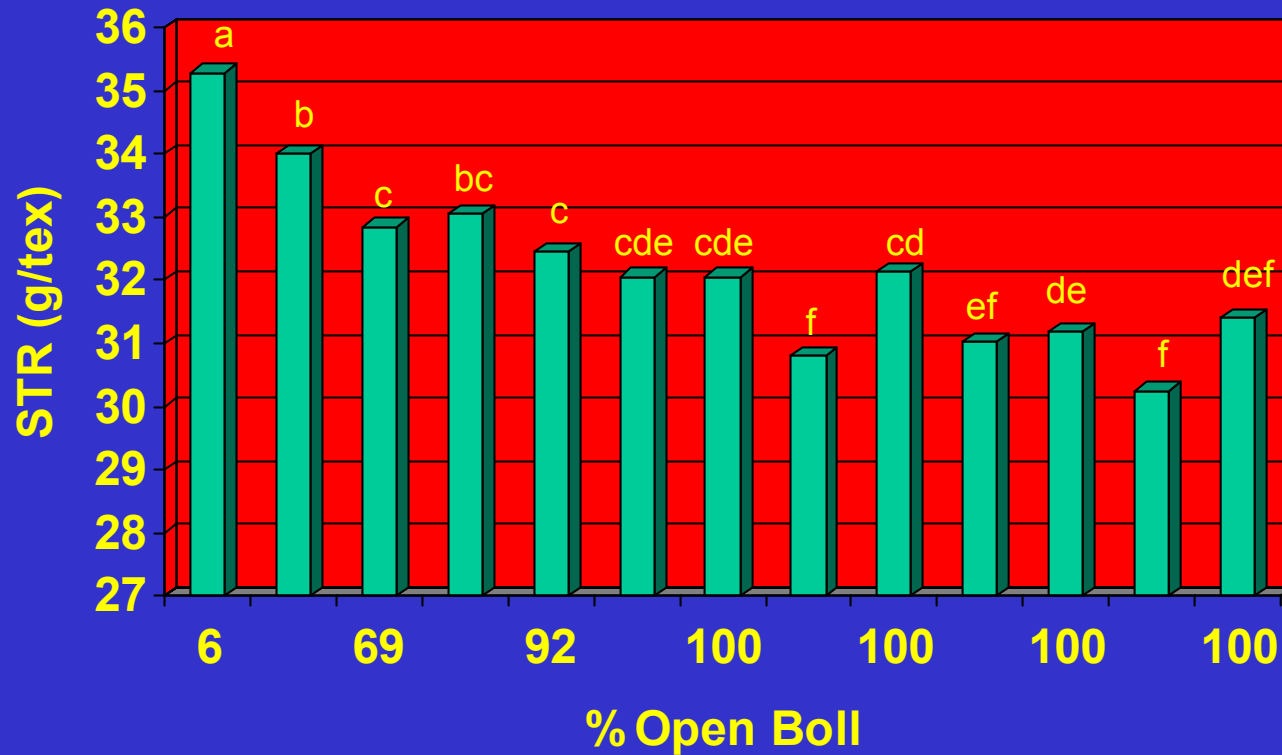


F = 6.19**

Why is Uniformity Changing?

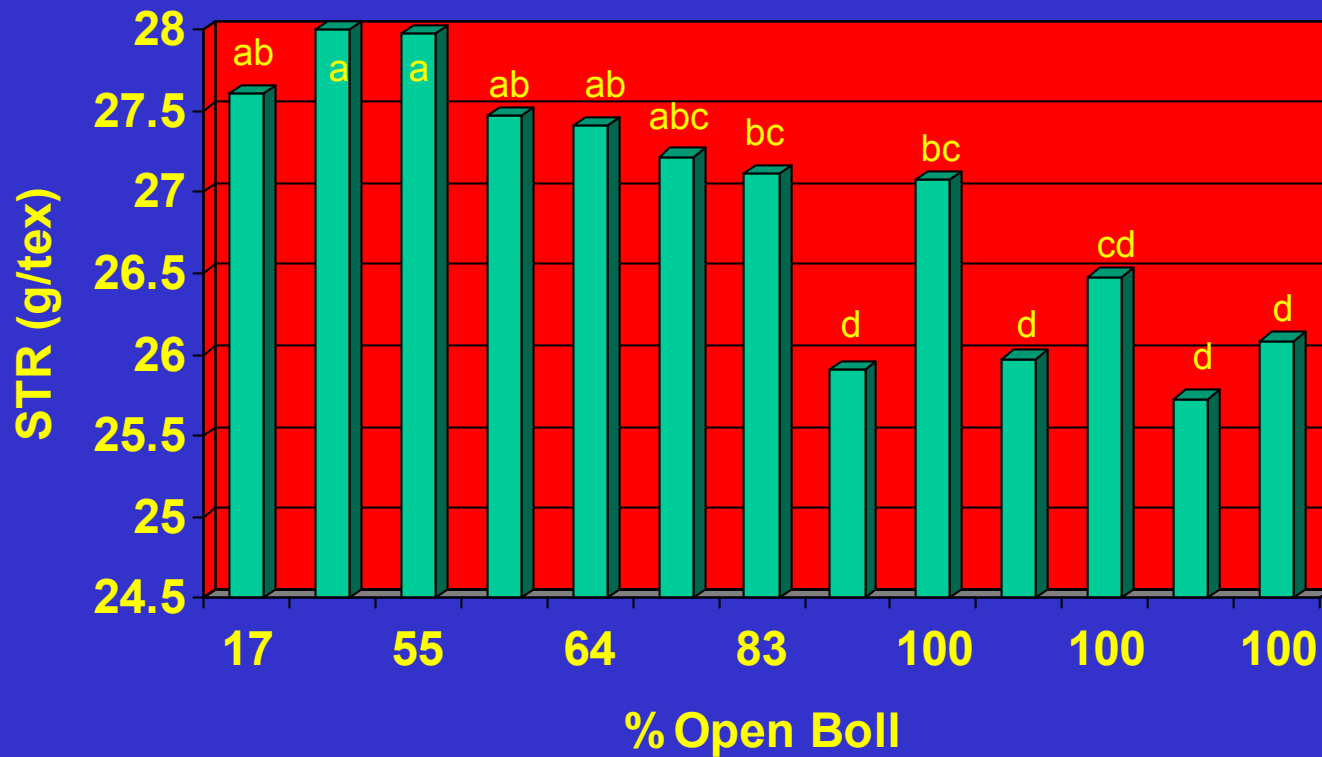
- Increasing up to 70% OB
 - Crop Maturity?
 - Non-determinate Crop
- Decreasing after 70% OB
 - Crop Weathering?

Strength 1998



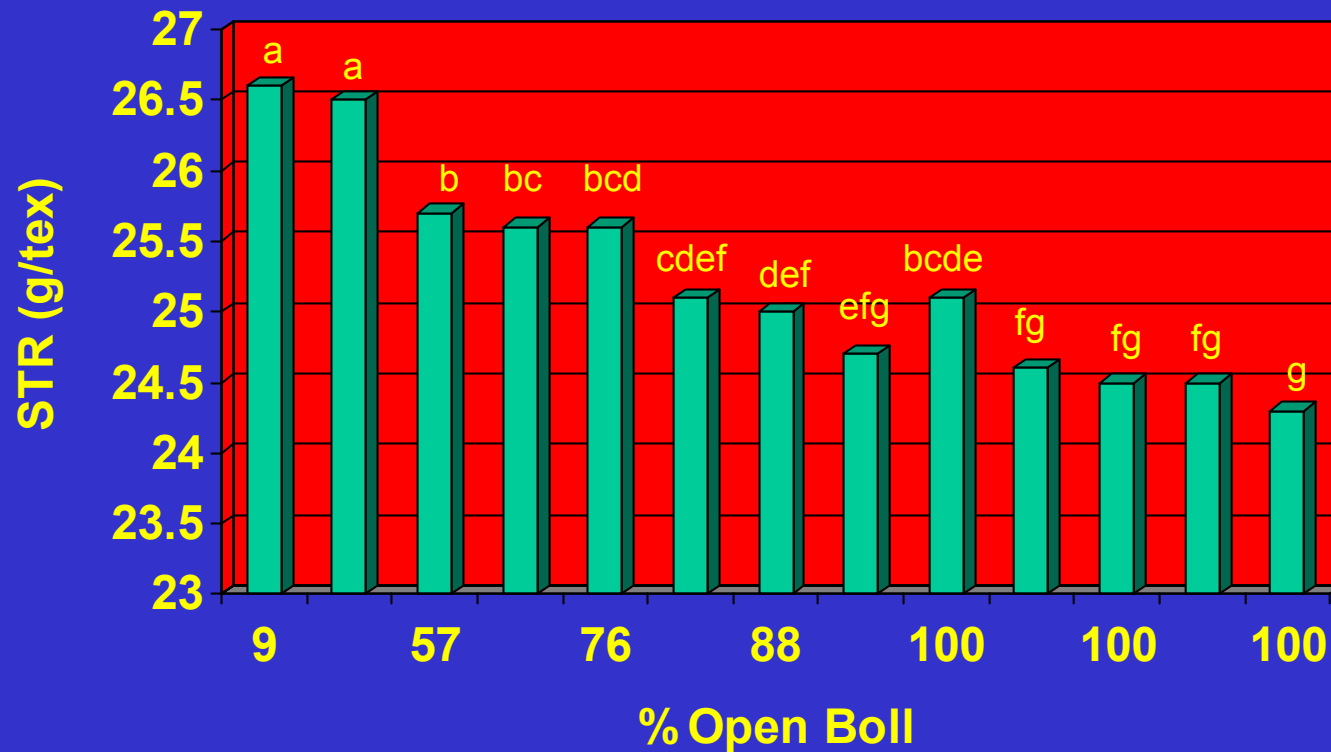
P>F 0.0001

Strength 1999



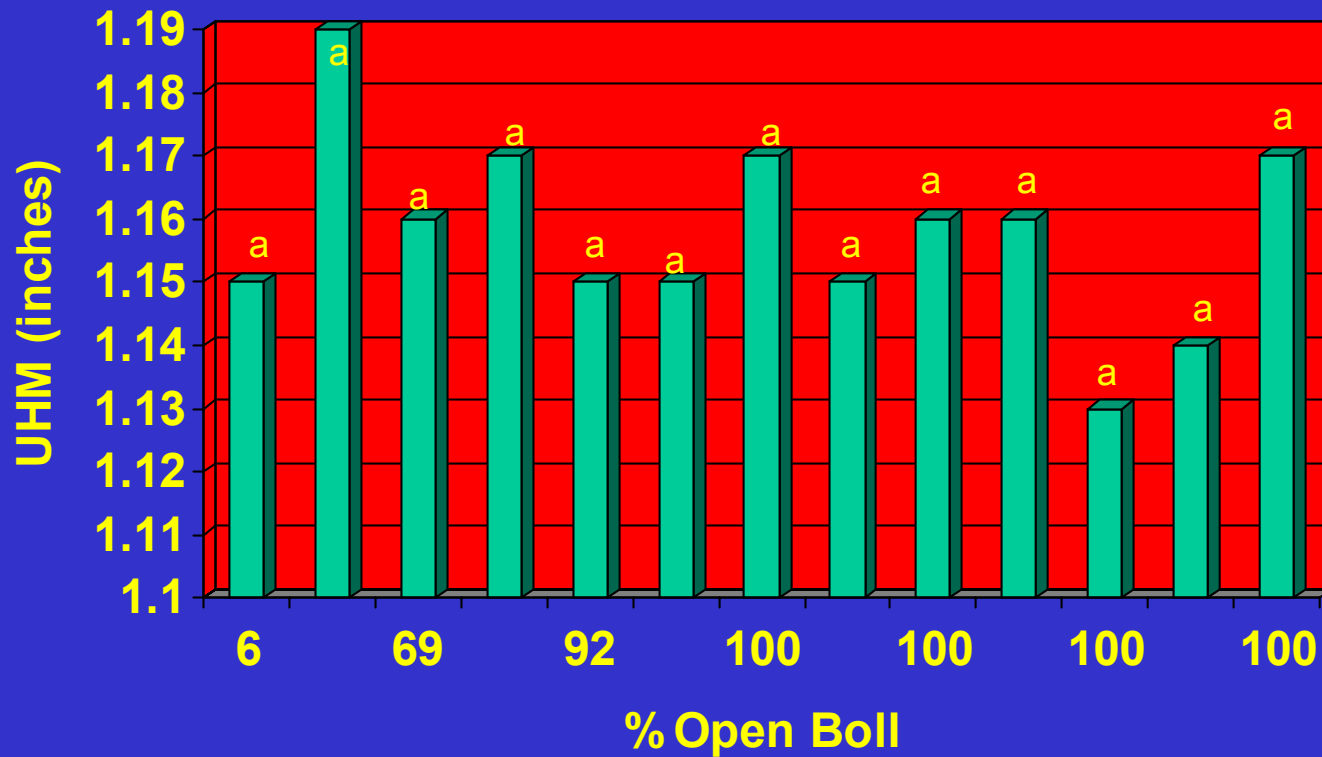
P>F 0.0001

Strength 2000



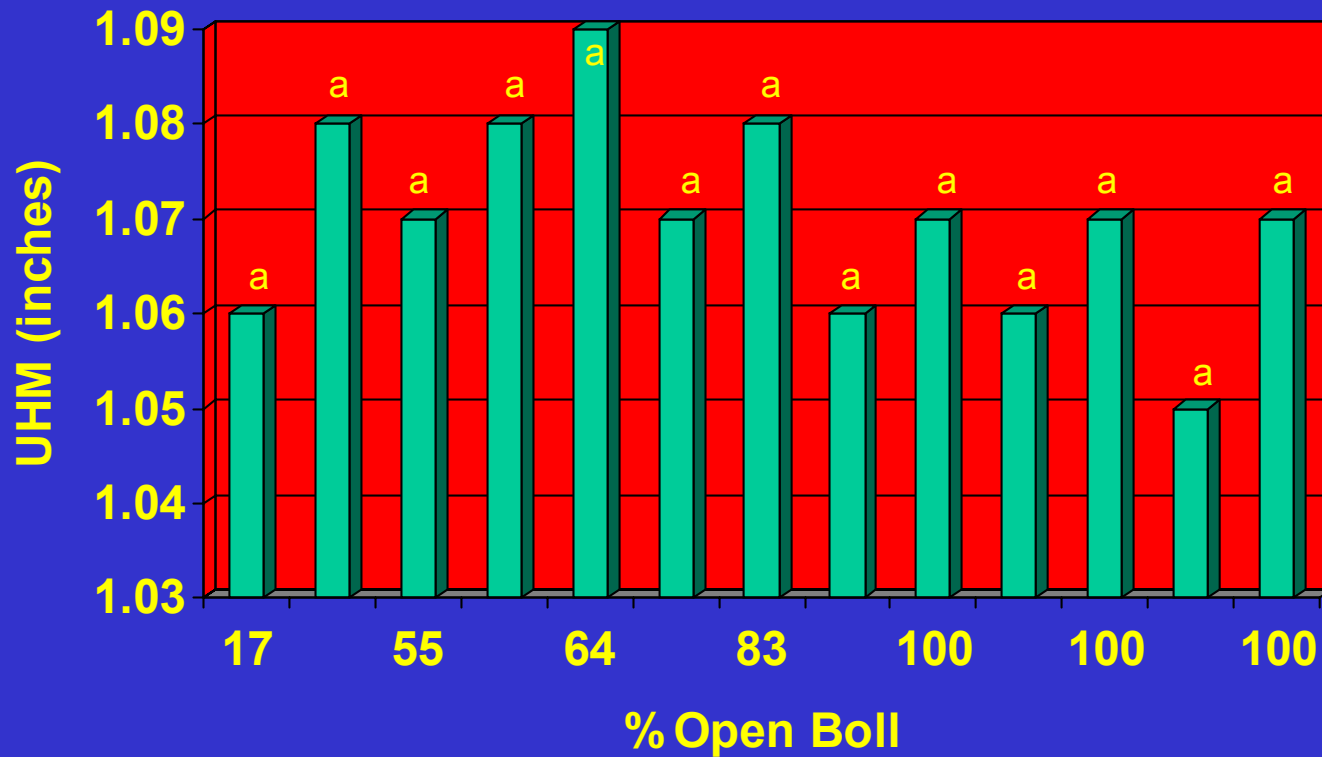
F = 13.91**

HVI-UHM 1998



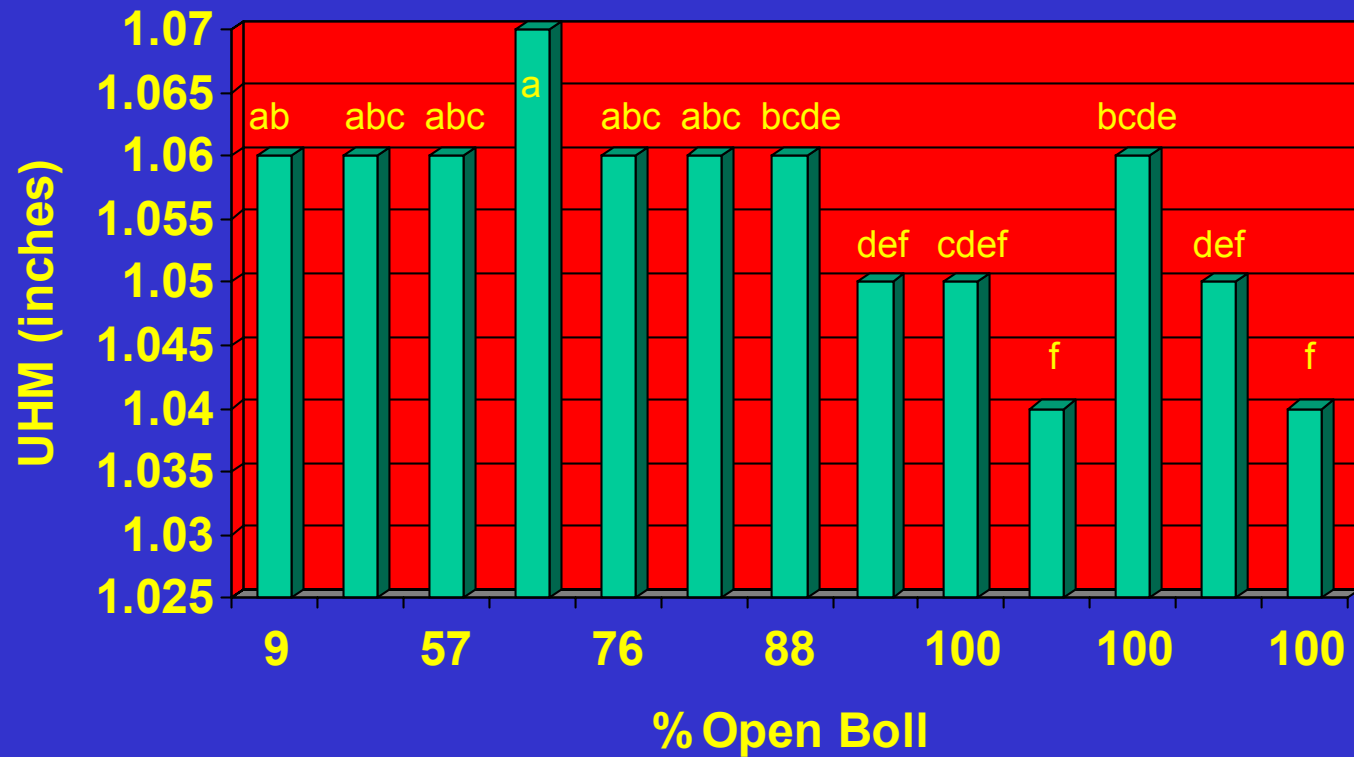
P>F 0.1699

HVI-UHM 1999



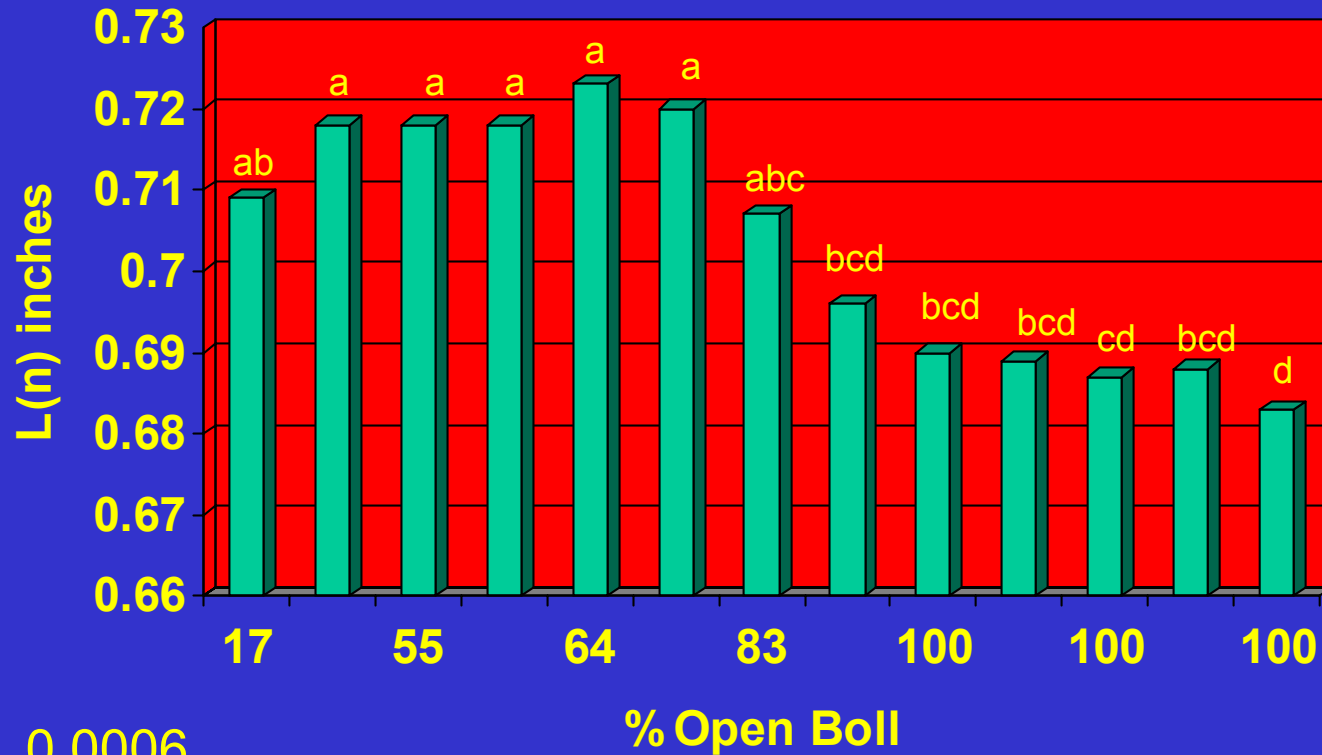
P>F 0.0833

HVI-UHM 2000



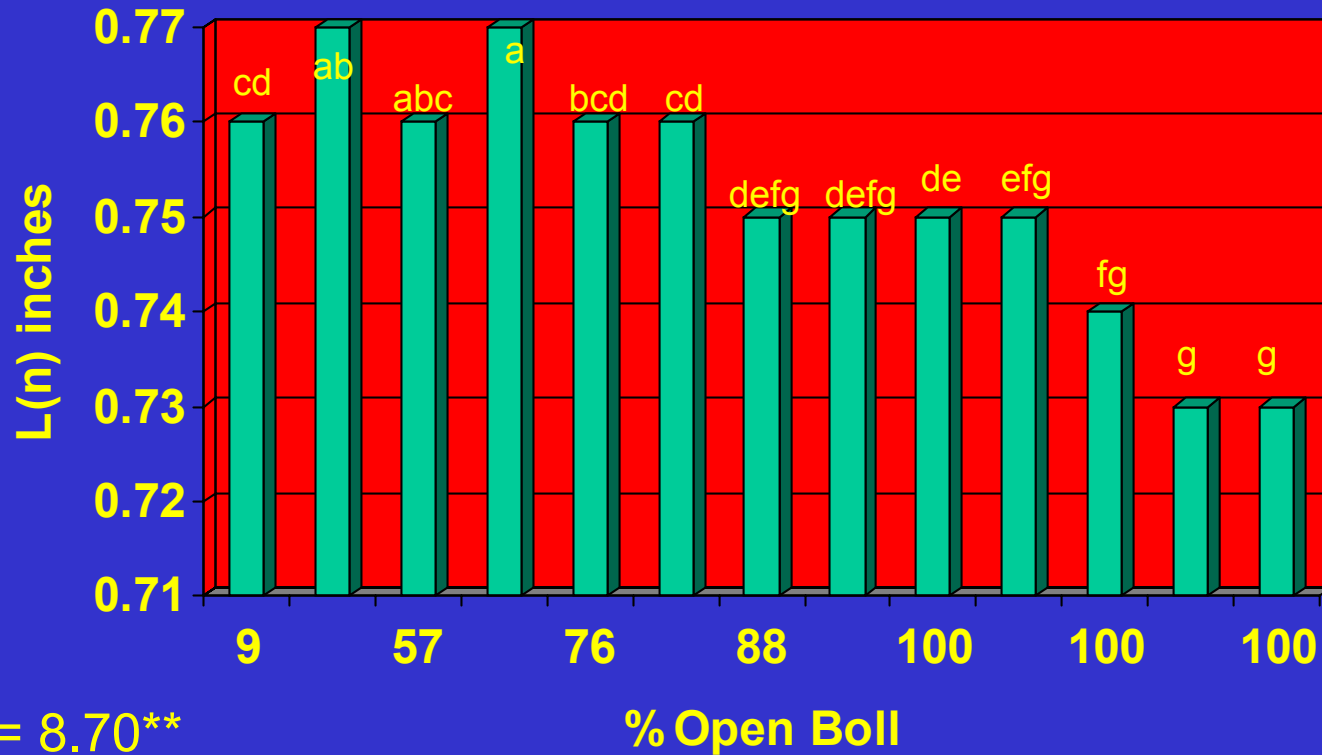
$F = 3.94^{**}$

AFIS-Length(n) 1999

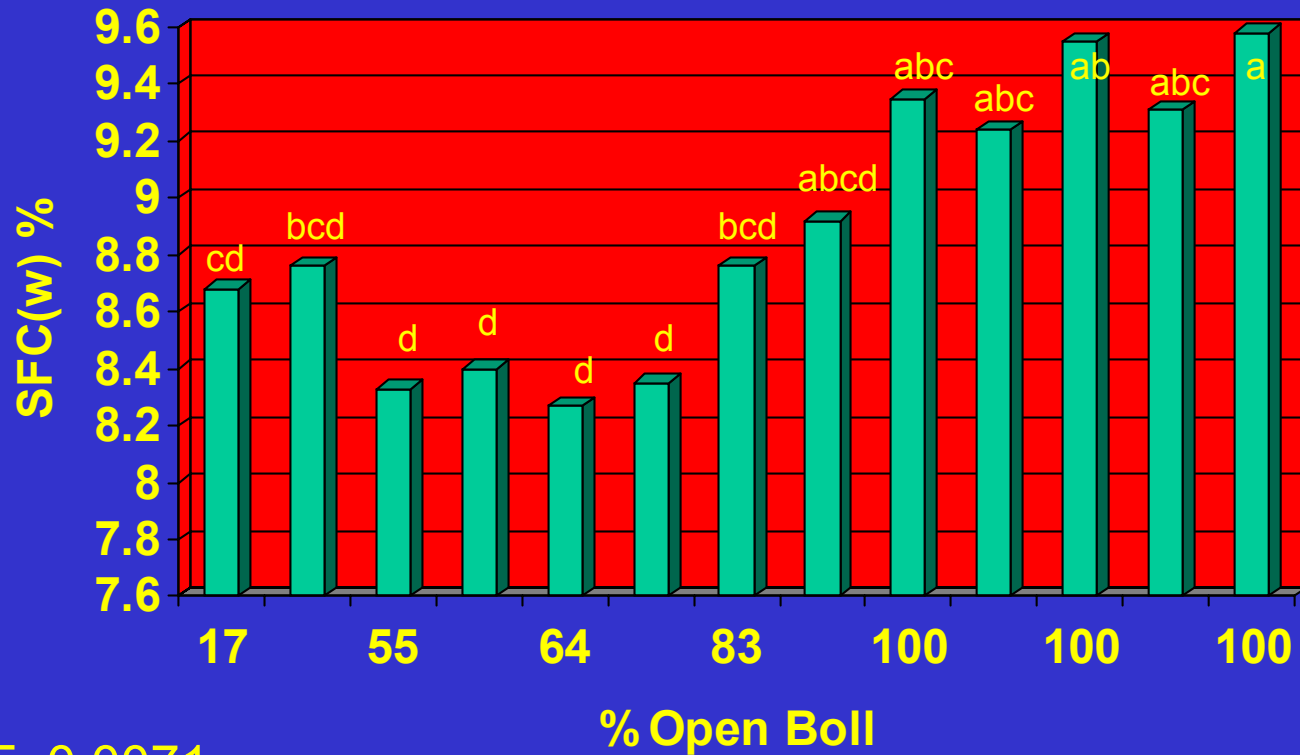


P>F 0.0006

AFIS-Length(n) 2000

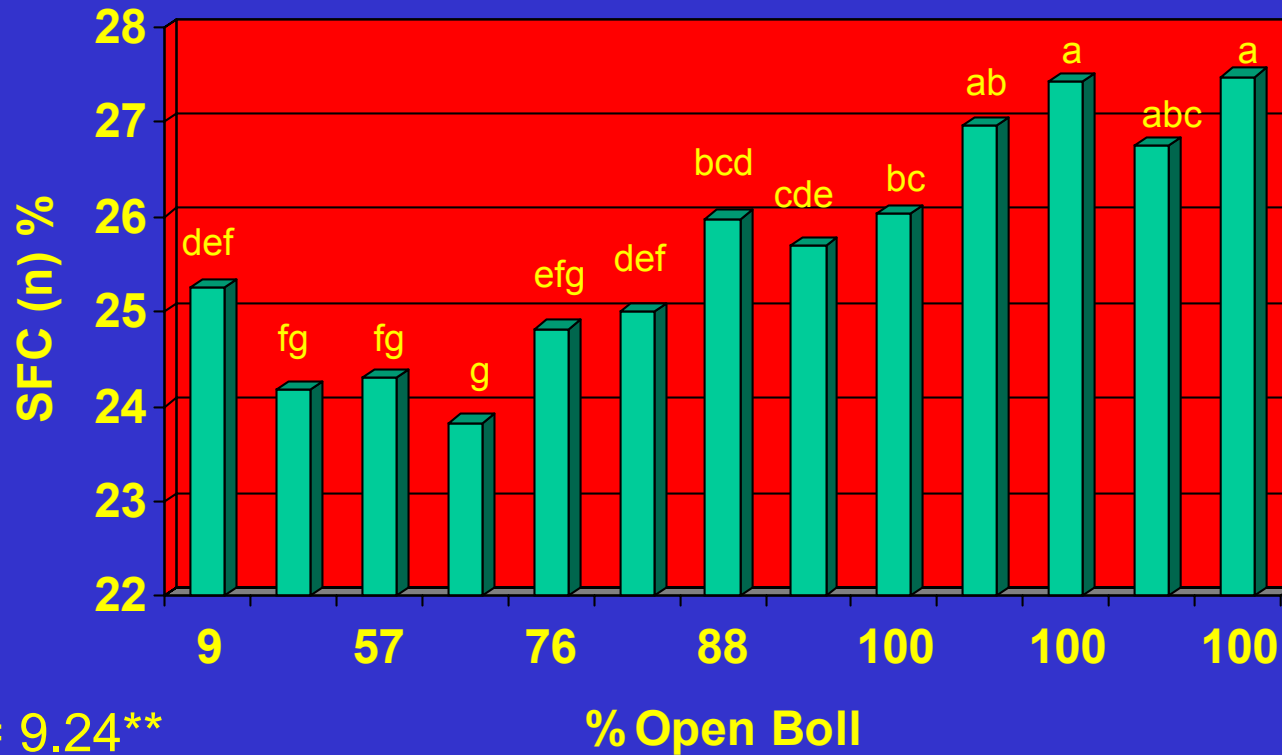


AFIS-SFC(w) 1999

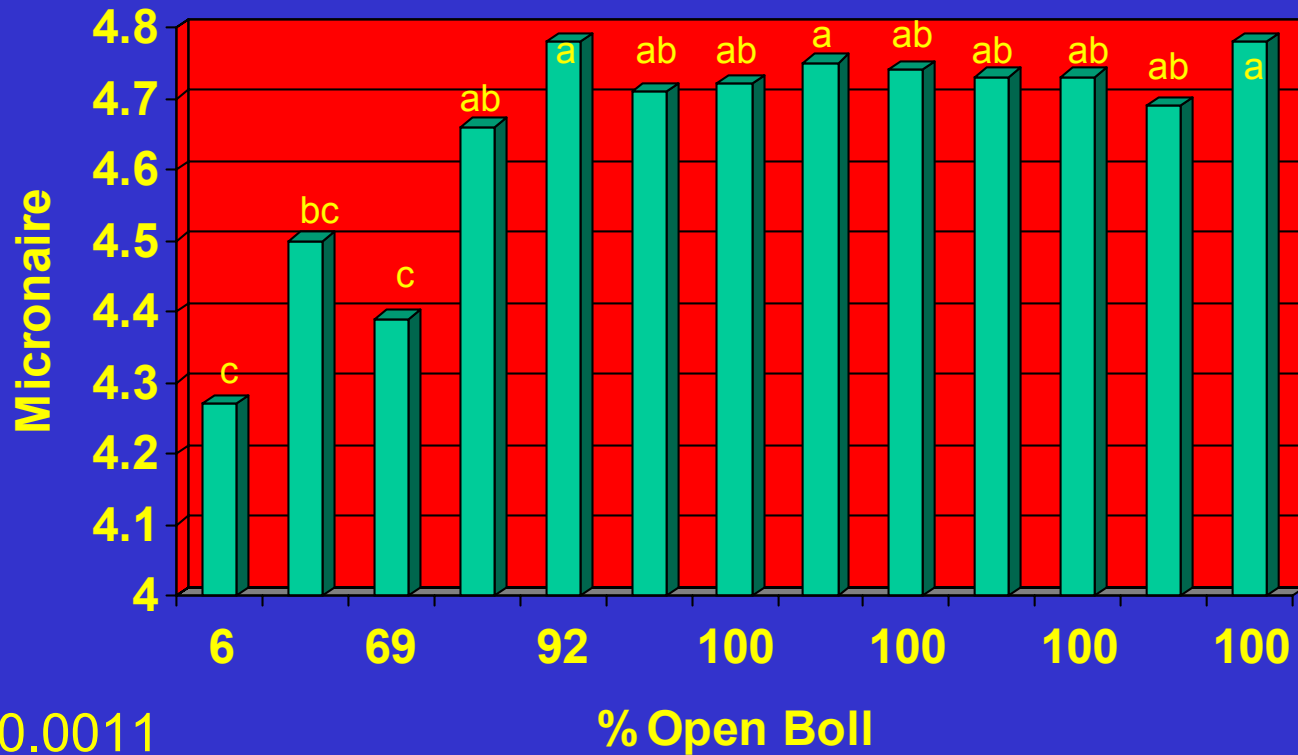


P>F 0.0071

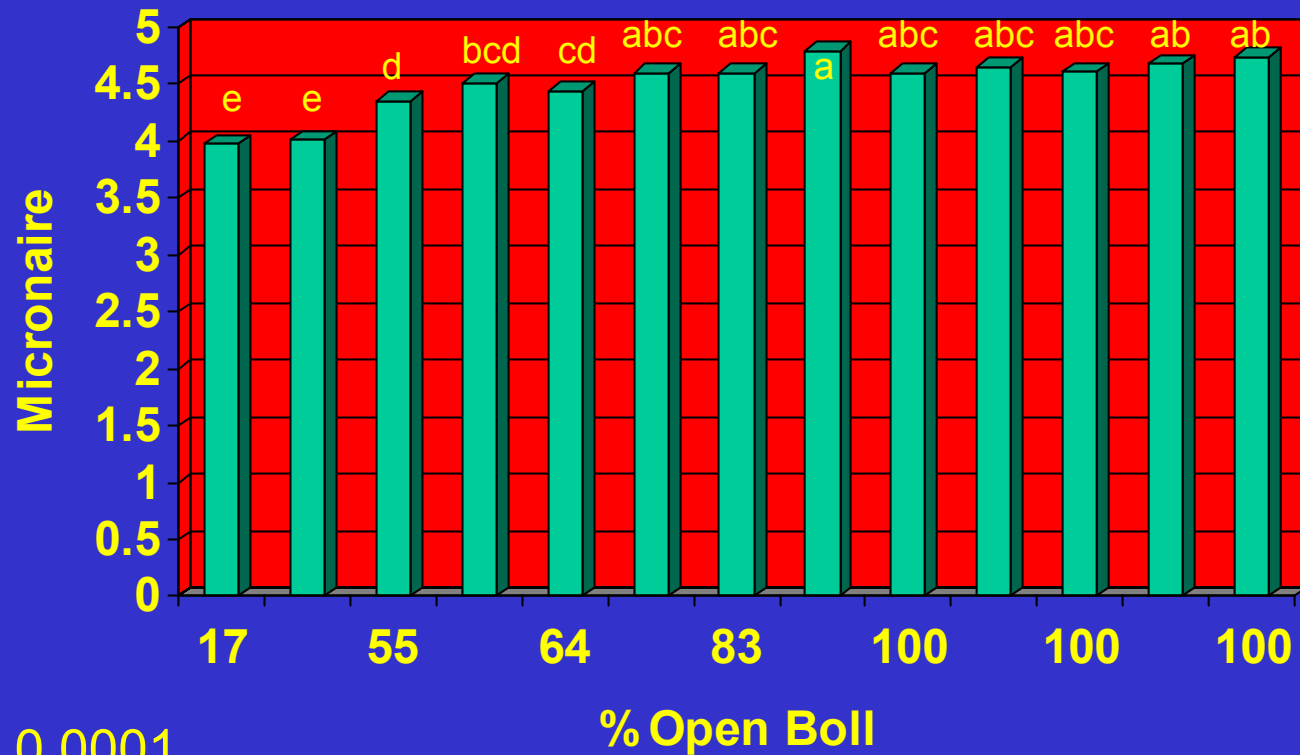
AFIS-SFC(n) 2000



HVI Micronaire 1998

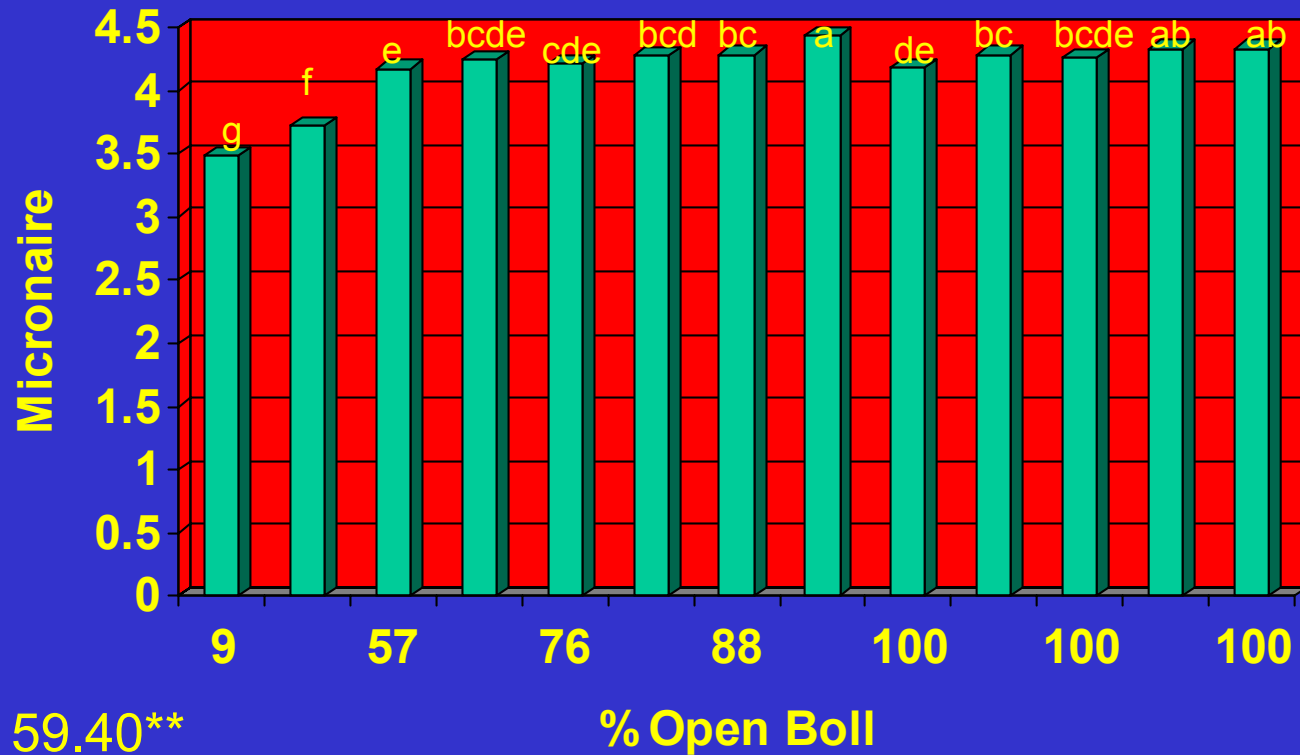


HVI Micronaire 1999



P>F 0.0001

HVI Micronaire 2000



Rainfall During Harvest

Week	1998		1999		2000	
	Events	Total	Events	Total	Events	Total
-----Inches-----						
0	5	3.5	2	0.2	0	0
1	1	0.3	2	0.3	4	4.2
2	1	0.2	2	0.8	3	2.6
3	2	8.7	2	0.3	3	2.2
4	0	0	3	1.3	5	2.1
5	3	4.2	1	0.9	0	0
6	3	0.7	4	1.3	1	1.5
7	3	3.8	0	0	0	0
8	0	0	0	0	0	0
9	0	0	1	1.0	0	0
10	0	0	0	0	0	0
11	0	0	0	0	4	1.1
12	2	0.2	3	0.7	4	3.0
TOTAL	20	21.5	20	6.7	24	16.7

Color Grades

Week	1998	1999	2000
0	41	31	42
1	41	31	41
2	41	31	42
3	51	31	41
4	51	31	41
5	52	41	41
6	52	31	41
7	51	41	41
8	51	41	41
9	51	41	51
10	51	41	51
11	61	41	51
12	61	41	51

Sum of Premiums/Discounts

Week	1998	1999	2000
	-----Cents per pound-----		
0	+0.5	+0.5	-2.0
1	+0.5	+1.5	+0.5
2	+0.5	+0.5	-2.0
3	-4.5	+1.5	+0.1
4	-4.5	+1.5	+0.1
5	-6.0	0	-1.5
6	-6.0	+1.5	-1.5
7	-4.5	0	-1.5
8	-4.5	0	-3.4
9	-4.5	0	-7.1
10	-4.5	0	-3.8
11	-9.0	0	-3.8
12	-9.0	0	-7.1

Lint Yields

Week	% OB	Lint	% OB	Lint	% OB	Lint
	1998		1999		2000	
	0	6	1154 c	17	795 f	9
1	42	1313 ab	31	881 ef	30	823 e
2	69	1305 ab	55	1054 de	57	896 de
3	73	1339 ab	60	1343 ab	58	1140 ab
4	92	1363 ab	64	1412 ab	76	1105 b
5	100	1409 a	80	1456 a	80	1117 ab
6	100	1361 ab	83	1297 bc	88	1153 ab
7	100	1313 ab	97	1237 cd	94	1049 bc
8	100	1355 ab	100	1275 bc	100	1219 a
9	100	1224 bc	100	1314 bc	100	1144 ab
10	100	1363 ab	100	1327 bc	100	1075 bc
11	100	1226 bc	100	-----	100	980 cd
12	100	1286 abc	100	1338 abc	100	974 cd

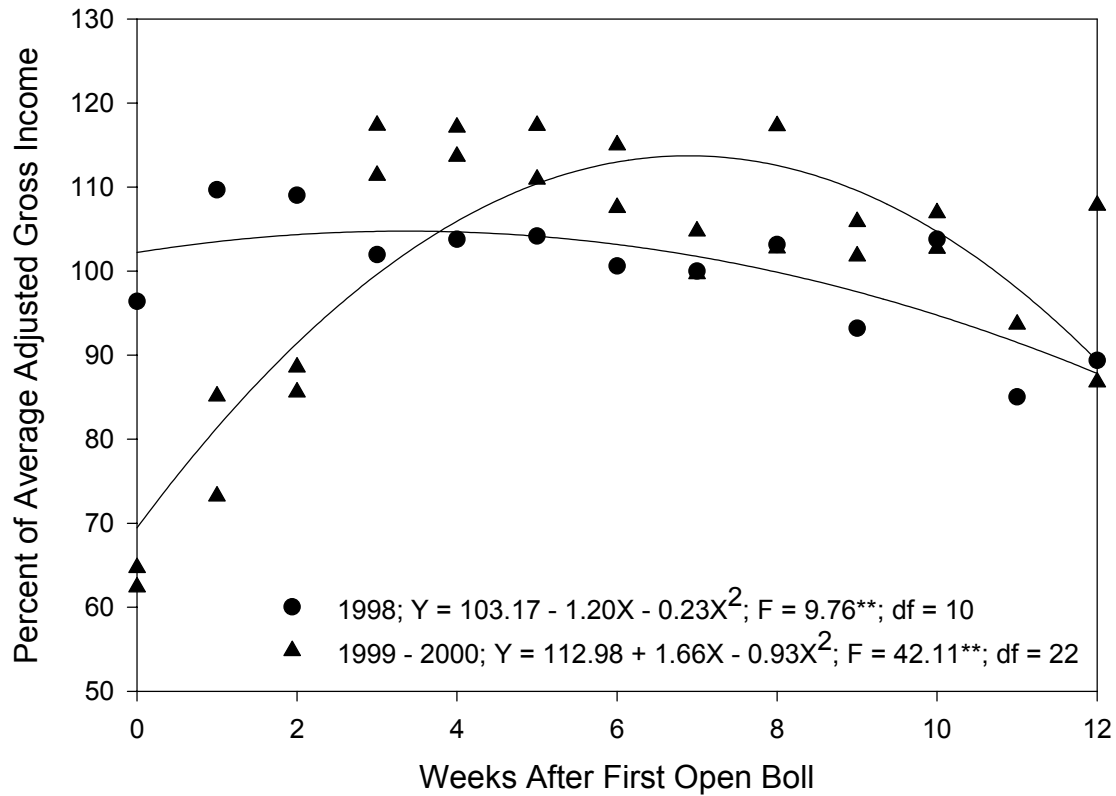


Figure 2. Percent of the yearly average adjusted gross income versus weeks after first open boll in harvest timing studies conducted at the University of Georgia Coastal Plain Experiment Station in 1998, 1999 and 2000. ** denote significance at the $P = 0.01$ level.

CONCLUSIONS

Application of Harvest-Aids at 60-80% Open Boll:

- Maximized
 - Length Uniformity
 - Fiber Length
 - Lint Yield (1999)
 - Profit (1999)
- Minimized
 - Short Fiber Content