836401 Purdue Agronomy Farm Sorghum Polarization

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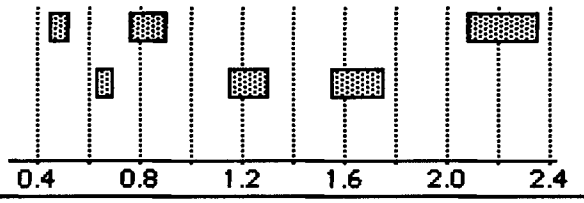
Purdue Agronomy Farm
Tippecanoe County
West Lafayette IN
0402813N Lat. 0865927W Long.

Illumination: Solar

Crops Experiment

Sorghum

Spectral Instruments	Dates	Wavelength Coverage (µm)	Data
Barnes 12-1000			
Barnes 12-1000			



Description Factors Parameters

Spectral date summary for 836401 Barnes 12-1000

15.00 degree FOV 5.90 meters above ground

Date	Time Period CUT		Illumination Angle-degrees Zenith		Illumination Angle-degrees Azimuth		View Angle-degrees Zenith		View Angle-degrees Azimuth		% Cloud Cover	
830927	17:39	20:15	42	55	180	230	0	60	0	360	?	65
830928	14:47	22:26	58	42	77	126	257	0	65	0	360	0	5

Show day of year

Detector Description

Barnes 12-1000 sn 105 setup for 1983 Polarization Experiment

WFS	Detector No.	Name	Wavelength Range Lower	Upper	Wavelength Resolution		Sampling Resolution	Number of Samples
			µm	µm	%	µm	µm	
1	1	Silicon	0.4500	0.5200	- 9	0.0700	0.0700	1
2	2	Silicon	0.4500	0.5200	- 9	0.0700	0.0700	1
3	3	Silicon	0.4500	0.5200	- 9	0.0700	0.0700	1
4	4	Silicon	0.7600	0.9000	- 9	0.1400	0.1400	1
5	5	Lead Sulfide	2.0800	2.3500	- 9	0.2700	0.2700	1
6	6	Lead Sulfide	2.0800	2.3500	- 9	0.2700	0.2700	1
7	7	Lead Sulfide	2.0800	2.3500	- 9	0.2700	0.2700	1
8	8	Pyroelectric	10.4000	12.5000	- 9	2.1000	2.1000	1

Detector Description

Barnes 12-1000 sn 108 setup for 1983 Polarization Experiment

WFS	Detector No.	Name	Wavelength Range Lower	Upper	Wavelength Resolution		Sampling Resolution	Number of Samples
			µm	µm	%	µm	µm	
1	1	Silicon	none	none	-9	-9	-9	0
2	2	Silicon	0.6300	0.6900	-9	0.0600	0.0600	1
3	3	Silicon	0.6300	0.6900	-9	0.0600	0.0600	1
4	4	Silicon	0.6300	0.6900	-9	0.0600	0.0600	1
5	5	Lead Sulfide	1.1500	1.3000	-9	0.1500	0.1500	1
6	6	Lead Sulfide	1.5500	1.7500	-9	0.2000	0.2000	1
7	7	Lead Sulfide	1.1500	1.3000	-9	0.1500	0.1500	1
8	8	Pyroelectric	10.4000	12.5000	-9	2.1000	2.1000	1

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Polarization

- Early in day as possible
- Zenith 0, 15, 30, 45, 60
- Azimuth 8
- If clear sky 0, 15, 30, 45, 60, 75 8 azimuth
- Once per hour. 2 reps.
- Pictures. everything one time ; take data first then pictures
- Note for when shadow is near F.O.V.

  Clear.

  Shadow

- Set up. pyranometer

- Overcast day, ~~[illegible]~~ layers of clouds with no build ups.
-

Need LiCor. (Larry · Craig) ~~Leafs~~ Leaves, [Grain Head.] (Front + back) (Yellow if significant amount

- Geometry (Lois + Vern will get this work)

Camera with cal placques. View placques at several zenith angles, look vertically. View canopy towards sun at 4 angles.

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L. Bibl

v Polarization Angles for Barnes

I first tried using a 1000 W lamps illuminating a 2×2' barium sulfate panel. However I could not obtain enough gain out of Barnes to determine satisfactory mins & maxs. I had ranges of ~~1~~ to ±10°.

Next I tried Barnes viewing the lamps directly. I tried checking the polarization of the light itself with channel #4 of unit 105 (i.e. ~~no pol~~ using just one polarizer. The min & maxs were from 3.5 to 3.8. I thought it was too much. I was concerned about shiny aluminum holder for ~~it~~ test polarization. I painted it black. This did reduce the variation to about half.

I then used visible test polarizer and measured units 105 then 108. I ~~then~~ ~~then~~ replaced visible polarizer with IR polarizer and measured units 108 and 105. I also used IR polarizer to measure min & max of one visible channel to get ~~for~~ relative

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angles between IR and visible channels.

So we need to get ~~about~~ absolute direction of polarizers.

Note. I was not able to get angle to ±.5°
The best that I could do was ±1°

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Polarization Angles for Barnes 10s

Chan #	Min			Max		
1	91.0°	94.25	98.5	14.5	5.25	6
2	174.0°	6.5	9.5°	92°	95°	98.0°
3	138°	141.5	145°	51°	52.5°	54°
4					40.0	
5	136	137.5	139	52	53	54
6	1	3	5	93	94	95
7	46	46.5	47	136	137	138
3		145			54	
				Barnes 10s		
1						
2	48	49	50	139	140	141
3	3	5	7	93	94	95
4	137	138	139	49	49.5	50
5	2	89	3		89	
6	0	48		137	138	139
7	92	93.5	95	2	3.5	5
2	50		52.5		147.5	49°

IR Polarizer

Changed Instruments for
Vanderbilt's Maryakon Study

9/26/83
L. Bold

Chan #	Band	From Instru.	Replaced 10-6-83
Instrument 105			
✓ 1	.45-.52	105	✓
✓ 2	.45-.52	Prototype	✓
✓ 3	.45-.52	111	✓
✓ 4	.76-.90	105	✓
✓ 5	2.08-2.35	108	✓
✓ 6	2.08-2.35	Prototype	✓
✓ 7	2.08-2.35	105	✓
✓ 8			✓
Instrument # 108			
✓ 1			✓
✓ 2	.63-.69	108	✓
✓ 3	.63-.69	Prototype	✓
✓ 4	.63-.69	105	✓
✓ 5	1.15-1.30	108	✓
✓ 6	1.15-1.30	Prototype	✓
✓ 7	1.15-1.30	105	✓
✓ 8	Thermal	108	✓
Prototype			
1	.52-.60	105	✓
2	.52-.60	prototype	✓
3	.52-.60	108	✓
4	.76-.90	prototype	✓
5	1.55-1.75	108	✓
6	1.55-1.75	prototype	✓
7	1.55-1.75	105	✓
8	thermal	Prototype	✓
Instrument 111			
# 1	.76-.90	108	✓