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The Effects of Vegetation and
Soil Hydraulic Properties on
Passive Microwave Sensing of
Soil Moisture: Data Report for the
1982 Field Experiments

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September, 1983

National Aeronautics and
Space Administration

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PASSIVE MICROWAVE SENSING OF SOIL MOISTURE: DATA
REPORT FOR THE 1982 FIELD EXPERIMENTS

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ABSTRACT

During June - September, 1982 personnel from NASA/GSFC and USDA/BARC conducted field experiments to (1) study the biomass and geometrical structure properties of vegetation canopies to determine their impact on microwave emission data, and (2) to verify whether time series microwave data can be related to soil hydrologic properties for use in soil type classification. Truck-mounted radiometers at 1.4 GHz and 5 GHz were used to obtain microwave brightness temperatures of bare and vegetated test plots under different conditions of soil wetness, plant water content and canopy structure. Observations of soil moisture, soil temperature, vegetation biomass and other soil and canopy parameters were made concurrently with the microwave measurements. This report documents the experimental design and data collection procedures for both experiments, and presents the reduced data in tabular form.

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THE EFFECTS OF VEGETATION AND SOIL HYDRAULIC PROPERTIES ON PASSIVE MICROWAVE SENSING OF SOIL MOISTURE: DATA REPORT FOR THE 1982 FIELD EXPERIMENTS

1. INTRODUCTION

During June - September, 1982 personnel from NASA/Goddard Space Flight Center (GSFC) and USDA/Beltsville Agricultural Research Center (BARC) conducted two field experiments using truck-mounted microwave radiometers to examine the sensitivity of microwave emission data for soil moisture determination in the presence of vegetation and for soil classification purposes. The experiments took place at three local agricultural test sites managed by BARC which contained a variety of crop covers and soil types. This report documents the experimental design and data collection procedures for both experiments, and presents the reduced data in tabular form.

Previous research has indicated that while passive microwave radiometers can measure soil moisture remotely (Schmugge et al., 1980), the presence of a vegetation cover reduces microwave sensitivity to variations in the underlying soil moisture (Jackson et al., 1982; Theis et al., 1982; Wang et al., 1982a; Ulaby et al., 1982). This reduction in sensitivity may be due to both biomass and geometrical structure properties of the vegetation canopy which, individually or in combination, may impact the microwave response. In order for remotely sensed data to be used effectively in developing algorithms for extracting soil moisture information from observations of a vegetation-soil complex, the effects of vegetation on these data must be well understood. Since designing experiments to isolate the individual effects of vegetation biomass and structure is difficult under typical crop or plant conditions because both factors vary simultaneously, the 1982 field experiment utilized artificial arrangements of plant components to obtain information about these parameters.

The second part of the experiment was designed to examine the relationship between time series microwave emission data and the hydraulic properties of soils. Differences in microwave emission from different soils are particularly evident for wet soils. When the soils are wet, both the microwave response and the water holding capacity of the soils are influenced by the particle size distribution. Thus, there may be a relationship between microwave emissivity and some hydraulic characteristic of the soil such as ponded infiltration rate which would permit soils to be classified according to their hydrologic properties by remote sensing techniques. Field measurements over bare and vegetated plots were obtained to validate model simulations which tended to confirm this possibility (Blanchard and O'Neill, 1983).

In addition to descriptions of the equipment and the test sites used, data presented in this report include:

- Appendix A - field notes;
- Appendix B - weather data;
- Appendix C - soil moisture and bulk density measurements for the vegetation experiments;
- Appendix D - soil temperature measurements for the vegetation experiments;
- Appendix E - microwave data for the vegetation experiments;
- Appendix F - vegetation measurements;
- Appendix G - soil temperature measurements for the time series experiments;
- Appendix H - soil moisture and microwave data for the time series experiments.

2. MICROWAVE SENSOR SYSTEMS

Microwave data were acquired with C (5 GHz, 6 cm) and L (1.4 GHz, 21 cm) band radiometers mounted on a boom truck. Both sensors are dual-polarized Dicke radiometers which measure thermal microwave emission in both vertical and horizontal polarizations almost simultaneously. The radiometers have a comparable 3-dB beamwidth of - 13' and a calibration accuracy of ± 3 K. These sensors have been used in previous moisture experiments at

BARC test sites and are fully documented elsewhere (Wang et al., 1980 and 1982b).

Calibration of the microwave system was verified daily by measuring two targets of known brightness temperature (TB): the cold sky and a microwave absorbing material (Eccosorb) whose brightness temperature is nearly equivalent to its physical temperature (absorption coefficient of 0.99 at 1.4 GHz). At the beginning and end of the measurement season, the system was also calibrated over a pond of fresh water at a known temperature. Applying a linear regression to the entire set of calibration data gives the dependence of the target brightness temperature on normalized antenna voltage N for each of the radiometers as:

at 1.4 GHz frequency,

$$TBV = 334.16 = 349.46 NV$$

$$TBH = 330.30 - 319.40 NH$$

at 5 GHz frequency,

$$TBV = 320.08 - 246.09 NV$$

$$TBH = 331.69 - 272.56 \text{ NH}$$

(The subscripts V and H stand for vertical and horizontal polarization, respectively.) These equations were used for the derivation of calibrated brightness temperatures in all of the field measurement data sets.

3. EXPERIMENTAL DESIGN

The 1982 field experiments took place at three agricultural sites within the USDA research farm in Beltsville, MD. Figure I shows the test plot configuration for the Edmonston site, denoted by the letter "E" in plot identifications. Similarly, Figure 2 illustrates the layout of test plots at the South Farm site (designated "S"). The Gish site consisted of a bare plot and a corn field used only in one of the time series experiments and is not pictured here. Taken together, these sites contained a range of soil types and a variety of crop covers; specific information about each plot is given in Table 1.

The experimental design for the 1982 measurements directly reflects the objectives of the

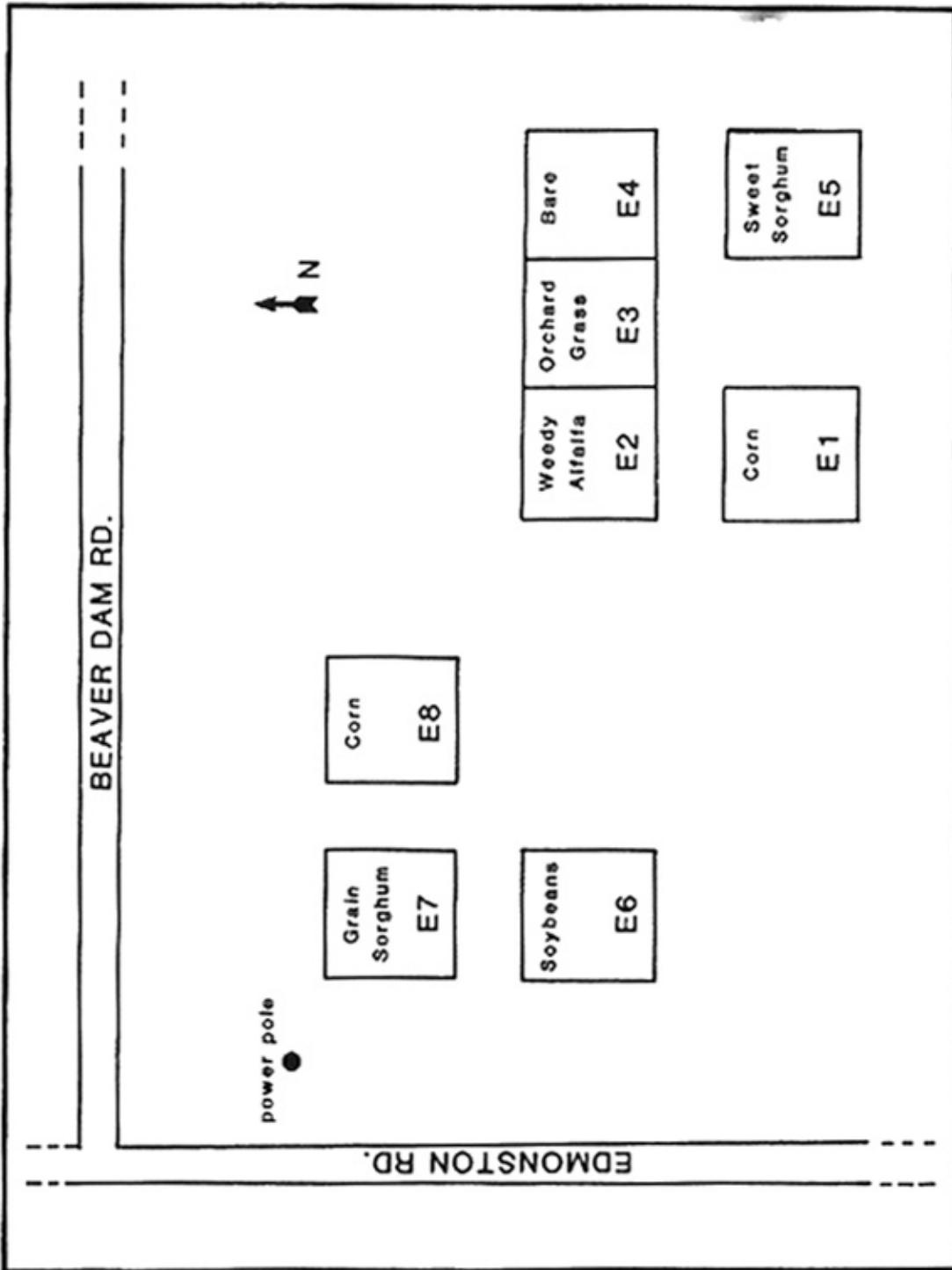


Figure 1. Test plot configuration for the Edmonston and Beaver Dam site (not to scale).

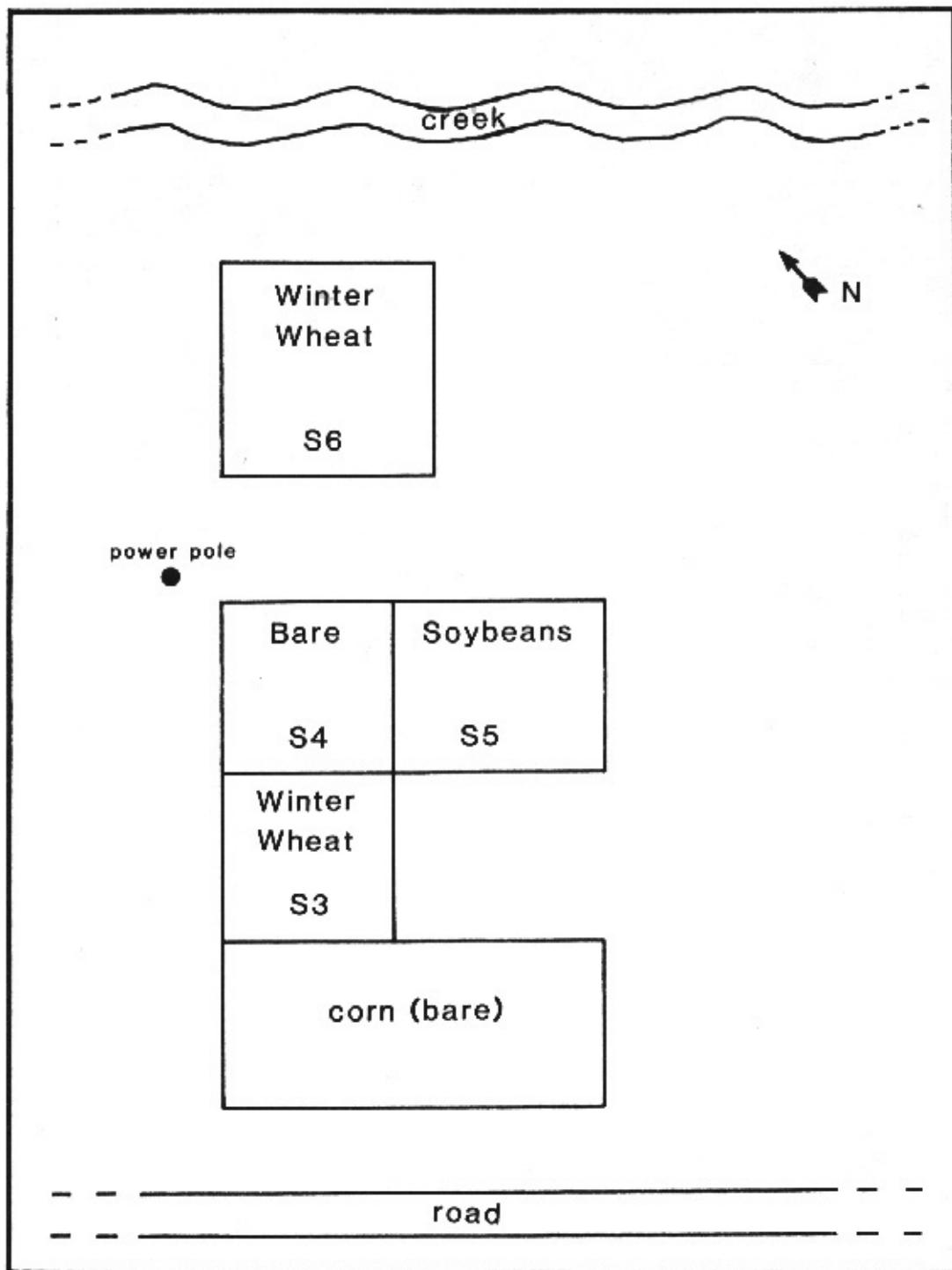


Figure 2. Test plot configuration for the South Farm site (not to scale).

Table 1. Test Site Description
Soil Texture

Plot	Location	Surface Cover	% Sand	% Silt	% Clay	USDA Classification
E1	Edmonston	Corn	69	22	10	Sandy loam
E2	Edmonston	Weedy Alfalfa	53	34	13	Sandy loam
E3	Edmonston	Orchard Grass	70	18	12	Sandy loam
E4	Edmonston	Bare	68	21	11	Sandy loam
E5	Edmonston	Sweet Sorghum	60	28	12	Sandy loam
E6	Edmonston	Soybeans				Sandy loam
E7	Edmonston	Grain Sorghum				Sandy loam
E8	Edmonston	Corn				Sandy loam
S3	South Farm	Winter Wheat	31	45	24	Loam
S4	South Farm	Bare	34	42	24	Loam
S5	South Farm	Soybeans	27	47	26	Loam
S6	South Farm	Winter Wheat	28	46	26	Loam
	Gish	Bare	24	47	29	Loam/clay loam
	Gish	Corn	24	47	29	Loam/clay loam

*Based on four samples per plot from the 0-5 cm depth; hydrometer analysis was used to determine the textural percentages.

two different studies being conducted. A summary of the measurement approach is found in Table 2. In the vegetation experiment, "crop destruction" measurements were obtained in order to:

- 1) examine the effects of vegetation structure and orientation on the microwave response by disturbing the natural order of the vegetation canopy while maintaining the same amount of biomass in the radiometer field of view, and
- 2) examine the effects of plant water content by retaining a given stage of structure/ orientation while varying the amount of biomass in the radiometer field of view.

To achieve these goals, test plots consisting of winter wheat, grass, corn, soybeans, grain sorghum and sweet sorghum were systematically modified to isolate either biomass or structure properties. These "modifications" included cutting crop canopies into vertical layers, stripping plants of leaves and grain heads, and orienting cut stalks on the surface in different azimuthal directions relative to the radiometer line of sight. In most of the crop destruction series, water was applied to the fields prior to measurement, both to reduce the chance that differences in the observed microwave response were caused by differences in the underlying soil moisture, and to better enable the effects of vegetation to be observed against a cold background. Metal screens at various heights within the crop canopy were also used in some measurements as a very cold microwave target, effectively blocking the soil emission from below and providing more direct information about emission and attenuation of microwave energy by the vegetation itself.

Unlike the vegetation experiments which usually involved independent series of measurements on different days, the experiment on hydraulic properties examined the changes in microwave emission over time as a soil dried down after

saturation. The experiment was conducted over both bare and vegetated plots at three sites comprised of different soils (two of these three sites were also used in the vegetation experiments). At least 5 to 8 cm of water were applied to each plot immediately prior to initiation of the measurements. Temperature,

Table 2. Measurement Approach

- | |
|---|
| <ul style="list-style-type: none">• Crop Destruction by Stages<ul style="list-style-type: none">- Wheat, Corn, Grain Sorghum, Sweet Sorghum• Crop Destruction by Layering<ul style="list-style-type: none">- Grass, Corn, Grain Sorghum, Sweet Sorghum• Crop Destruction by Plant Removal<ul style="list-style-type: none">- Soybeans, Corn• Canopy Emission via Metal Screens at Various Heights in the Canopy<ul style="list-style-type: none">- Corn, Sweet Sorghum• Stalk Investigations<ul style="list-style-type: none">- Sweet Sorghum, Dry Corn, Freshly-cut Corn• Support Data<ul style="list-style-type: none">- Mixed Field of View, Screen Baseline Measurements, Stubble Comparisons• Time-Series Data for Hydraulic Properties Investigation<ul style="list-style-type: none">- Bare and Vegetated Plots at Three Sites |
|---|

humidity, rainfall and pan evaporation data collected by BARC personnel were used to verify that the soil drying at the three sites was not influenced by local meteorological differences during the first few days of the measurement periods, thus permitting a valid comparison of whether volumetric soil moisture as measured by microwave radiometers at any one point within an initial period after saturation could be a detectable indicator of soil type.

4. GROUND TRUTH ACQUISITION AND PROCESSING

4.1 Soil Moisture

Observations of soil moisture, soil temperature and vegetation parameters were made concurrent with microwave measurements from the truck radiometers. For the vegetation experiments, soil moisture was determined by gravimetric sampling at four locations within each plot at depths of 0-2.5 and 2.5-5 cm and at two locations at depths of 0-1 and 0-15 cm. Approximately 100 grams in size, the samples were carved from the

face of a shallow hole with a special sampling tool, except for the 0-15 cm sample which was obtained with a coring device. Each sample was placed in a prelabeled plastic jar and sealed with a moisture tight lid.

The soil samples were taken into the lab and weighed (wet weight) that same day. The samples were then dried for 80 minutes in a microwave oven and weighed again (dry weight). All of the sample containers weighed within ± 0.01 g of each other, which was considered to be constant. Volumetric soil moisture was calculated by the following:

$$\theta V = \frac{\text{wet weight} - \text{dry weight}}{\text{dry weight} - \text{container weight}} \quad (\text{Db})$$

where Db is the soil bulk density. Mean values of volumetric soil moisture were computed for each depth from the samples collected within each plot; the typical standard deviation of the plot averaged values was about 1-2 percent.

4.2 Bulk Density

Precise bulk density measurements were made in each test plot several times during the experimental season (approximately every two weeks). Bulk density was sampled at four points in each plot for the 0-2.5 and 2.5-5 cm layers. Values for the other soil layers were estimated using these measurements and data collected in previous years under similar conditions.

Determination of soil bulk density in 1982 was based on a volumetric displacement procedure that utilizes a specially designed bulk density ring with a hook gage and three one-footlong bolts. The bulk density ring is placed on the ground and secured by driving in the three bolts. A sheet of plastic film is used to line the inside of the cylinder. Using a water-filled 500 ml graduated cylinder, the bulk density cylinder is filled to the hook gage and the quantity of water is recorded. This is returned to the graduated cylinder. The soil from the inside of the bulk density ring is then dug out to the desired depth of measurement and placed in a sealed container. The plastic liner is replaced and the ring is filled again. This amount of water is recorded. The soil wet and then dry weights are measured. The volume of soil removed is equal to the difference between the two water volumes used to fill the bulk density ring. The bulk density is computed by dividing the dry weight by this volume.

All of the data collected over the experimental period were plotted and a value of the bulk density was estimated for each period when conditions were the same. In some cases values had to be extrapolated or interpolated. Bulk density samples were also collected before and after all experiments in which a large number of people were in the field between truck measurements, i.e., the crop destruction experiments. Soil moisture and bulk density values for all of the vegetation experiments are summarized in Appendix C.

4.3 Soil Temperature and Meteorological Data

Near surface soil temperatures were monitored by inserting temperature probes into the soil at depths of 1, 3 and 7.5 cm at one or two locations within each plot. At the same time surface temperatures were collected using a small, hand-held infrared thermometer which measures thermal emissions at wavelengths between 8 and 14 microns with an accuracy of ± 0.5 K. Appendix D presents all of the temperature data for the various vegetation experiments.

Local meteorological data consisting of rainfall, temperature, humidity, total wind movement and pan evaporation were measured at the Edmonston test site on a daily basis. Although separated by more than one mile, these data were also considered representative of the South Farm sites and are listed in Appendix B. Complementing this information, a day-to-day documentation of surface cover characteristics and general weather observations during the experiments is found in Appendix A, Field Notes.

4.4 Vegetation Parameters

The basic parameters used to describe the condition of the vegetation canopy are the plant height, canopy cover, wet biomass, dry biomass and water content. During 1982 wet biomass was determined by periodic sampling of the vegetation in the test plots, generally at least once during the week microwave observations were made. Corn, sweet sorghum and grain sorghum were sampled by cutting individual plants. Soybeans, grass and winter wheat were sampled by cutting all plants in a measured area. At least ten samples were used.

After the vegetation wet weight was determined, the samples were dried and reweighed to obtain the dry weight. Vegetation water content was determined by subtracting the dry weight from the wet weight.

In addition to the whole plant samples, various plant components corresponding to measurements made with the radiometers during crop destructions were also obtained. All of the vegetation data are presented in Appendix F.

Corn plant parameters at maturity included a nodal length of 16 cm and stalk diameters of 1.5-2 cm (elliptical). The number of leaves averaged about 12 per plant. Sweet sorghum at maturity had a nodal length of 23 cm and averaged 9 leaves per plant.

For the time series experiments gravimetric soil moisture was sampled for the 0-2 cm and 2-4 cm soil depths at four corners of the plots on an hourly basis during the time periods when microwave radiometric data were being collected. Bulk density samples of the soil layers were collected once during and once after completion of the time series. Table 3 lists the bulk density values for the 0-4 cm layer in these plots. Soil temperatures were recorded at

Table 3. Bulk Density Values for Time Series Experiments

Plot	Bulk Density (g/cm3)
E4	1.39
E5	1.35
S4	1.45
S5	1.33
Gish bare	1.15
Gish corn	1.15

thirty-minute intervals coincident with the microwave measurements. Particle size analyses of these soils were available from previous experiments on these plots. Appendices G and H contain the measured soil temperature, soil moisture and microwave data for the three time series experiments.

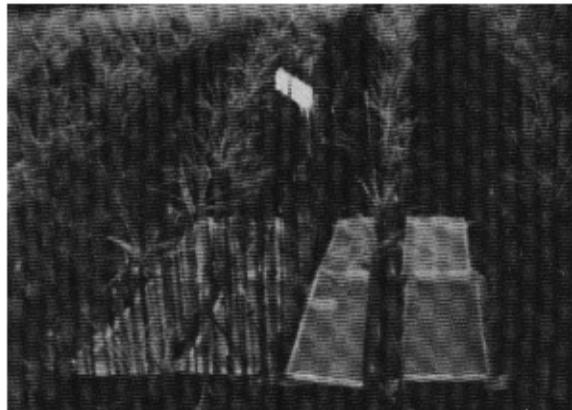
SUMMARY

The objectives of the 1982 field experiments were two-fold: (1) to study the biomass and geometrical structure

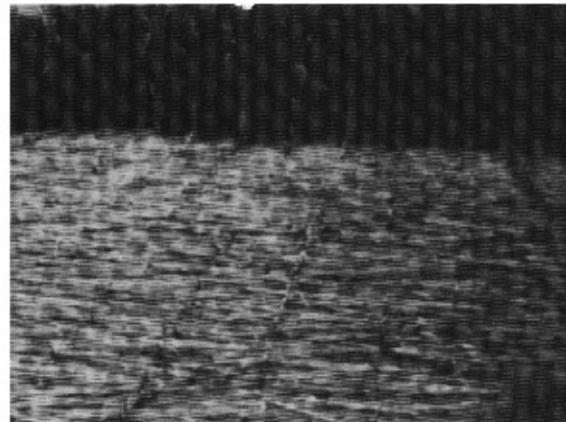
properties of vegetation canopies to determine their impact on microwave emission data, and (2) to verify whether time series microwave data can be related to soil hydrologic properties for use in soil type classification. To achieve these goals, two truck mounted radiometers at 1.4 GHz and 5 GHz were used to obtain microwave brightness temperatures of bare and vegetated test plots under different conditions of soil wetness, plant water content and canopy structure. Observations of soil surface/canopy temperature, soil profile temperature, soil moisture, soil texture, bulk density, vegetation biomass and canopy characteristics were made either concurrently with the microwave measurements or periodically throughout the experiments as necessary. These data are summarized in Appendices A-H. In addition to visual descriptions, field conditions were documented photographically during each measurement series; although not reproduced here, this photographic record is maintained at GSFC.

Preliminary analysis of the crop destruction data indicate that detailed measurements using artificial arrangements of plant components are helpful in advancing fundamental understanding of the interactions of microwave energy with a vegetation canopy. Although vegetation biomass has a major influence on measured microwave emission, the orientation of stalks and the presence of vertical structure in a crop canopy also affect the microwave response at different frequencies from a vegetation/soil scene. Figure 3 illustrates several stages in a corn destruction measurement series, while Figure 4 gives the results of a four-stage sequence of measurements using the same set of corn stalks in different orientations relative to the radiometer

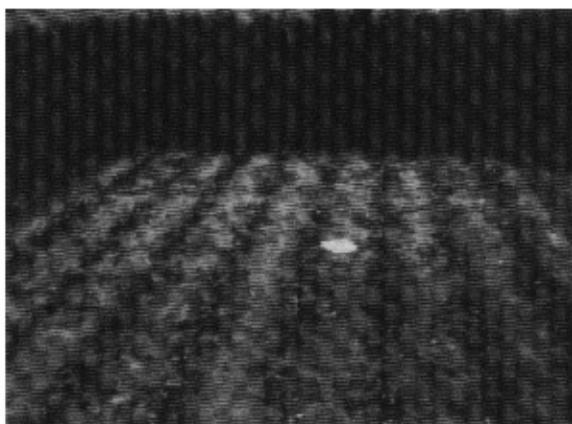
CROP DESTRUCTION -- CORN



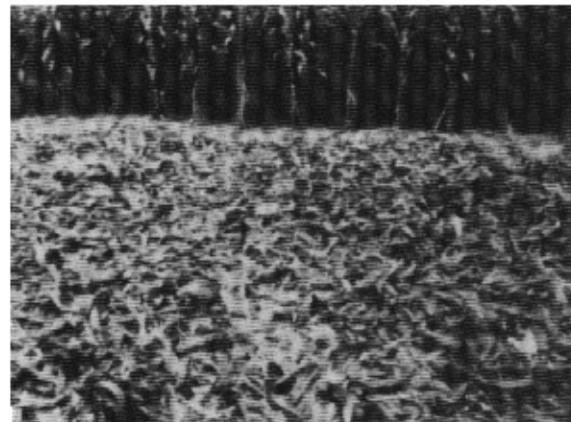
STANDING STALKS



CUT STALKS PERPENDICULAR



STUBBLE



EVERYRTHING RANDOM

Figure 3. Photographic illustration of a crop destruction sequence for corn. A complete series of measurements would include full canopy; standing stalks (from which leaves and ears have been stripped); stubble (for the bare soil background); cut stalks parallel, perpendicular and random; and all portions of the canopy random.

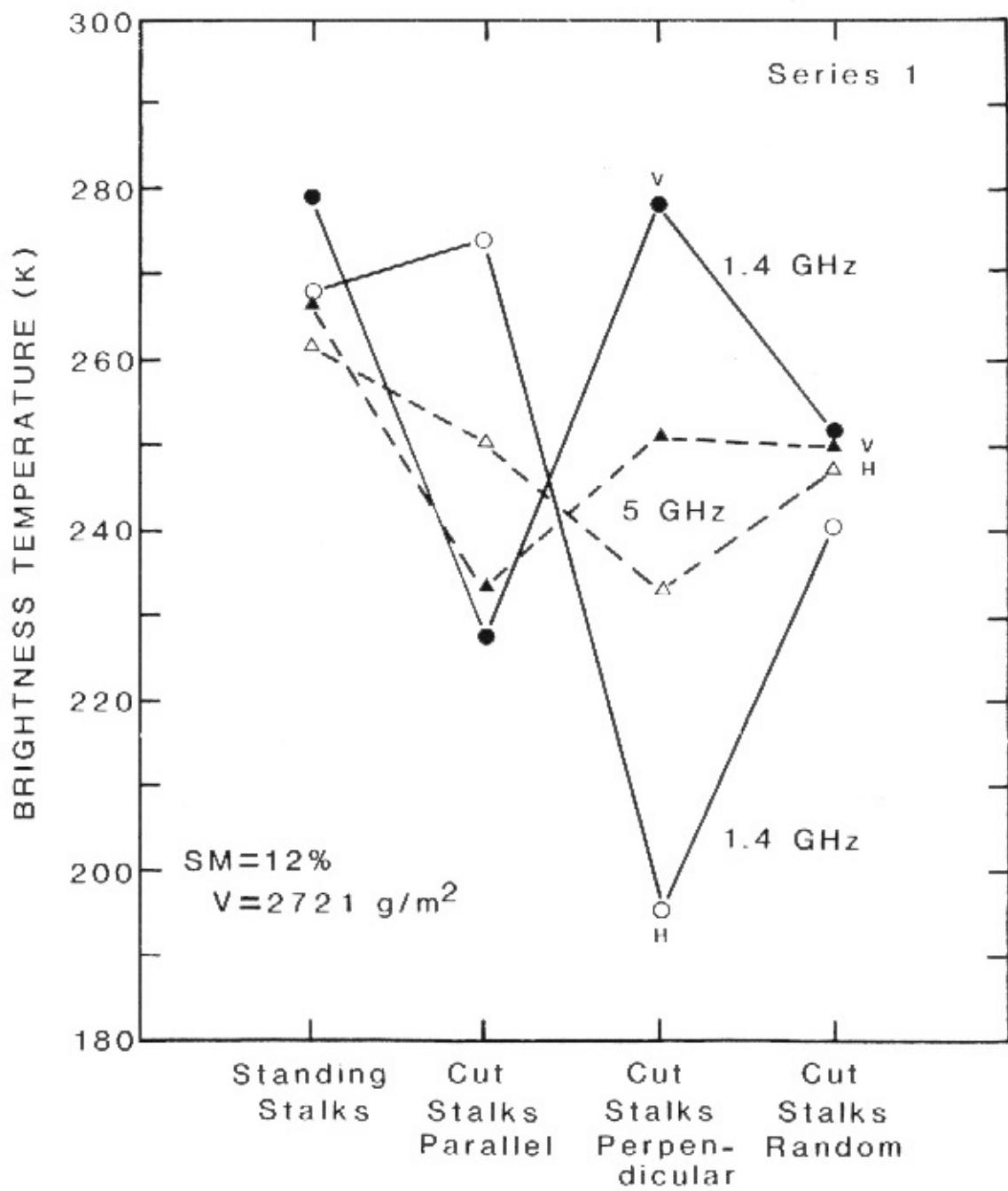


Figure 4. Effect of corn stalk orientation on measured brightness temperature with vegetation biomass held constant. SM is volumetric soil moisture in the 0-5 cm layer; V is vegetation water content. The small H's and V's refer to horizontal and vertical polarization, respectively, for each frequency.

antenna beam (i.e., biomass was held constant). The large variation in observed brightness temperature is polarization- and frequency-dependent; the magnitude of the effect varies with the amount of water in the crops, disappearing at low levels of vegetation water content. Delineation of the extent of the effect of canopy structure and plant water content on microwave data through experiments of this type should be very useful to the development of appropriate physically-based vegetation models and to more accurate Interpretation of microwave measurements for a variety of applications. Analysis of model simulations and microwave data from the time series experiments suggest that a relative classification of the hydrologic soil type can be accomplished with a one time microwave measurement if it is known that the surface soils were subjected to significant rainfall from 1/2 to 2 days prior to measurement. A more quantitative classification can be made if a long term time series of microwave data can be collected over large areas where some ground verification of soil properties is available.

6. ACKNOWLEDGEMENTS

The authors wish to express their sincere appreciation to the personnel of the Hydrology Lab and the Field Crops Lab, USDA/ARS/BARC and the Hydrological Sciences Branch, NASA/GSFC for their assistance in data collection and plot preparation.

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Weather Data
Edmonston and Beaver Dam Site, 1982

Date	Time	Rainfal l (cm)	Evapo ration (cm/day)	Air Temperature			Water Temperature					
				Max	Min	Dry	Wet	Max	Min	Total	Relativ e Wind	Humidity (%)
6/5	(850)	1.286	-	-	-	-	-	-	-	-	-	-
6/6	(850)	0.254	-	21.8	11.1	-	-	-	-	-	-	-
6/7	850	0.00	-	19.7	10.0	16.7	15.9	-	-	4214.1	85.0	
6/8	(850)	0.00	0.338	20.4	13.3	17.3	15.9	-	-	4248.1	89.6	
6/9	846	0.00	0.460	28.8	14.5	20.4	18.1	-	-	4262.9	80.8	
6/10	847	0.00	0.00	17.9	16.0	17.3	14.4	-	-	4281.2	84.3	
6/11	857	0.137	0.130	20.3	12.8	18.2	17.4	-	-	4293.8	98.2	
6/12	(850)	0.00	0.130	20.0	12.8	-	-	-	-	-	-	-
6/13	(850)	4.160	0.130	16.9	12.5	-	-	-	-	-	-	-
6/14	(850)	0.00	0.447	25.8	11.6	16.8	14.7	-	-	4384.5	82.6	
6/15	918	0.00	0.681	28.4	21.0	21.9	19.3	-	-	4404.3	78.0	
6/16	(850)	0.00	0.559	30.7	19.8	23.0	20.7	-	-	4504.0	96.0	
6/17	(850)	0.066	0.439	27.4	18.0	25.0	21.1	-	-	4560.9	-	
6/18	907	0.00	0.744	26.4	16.1	19.8	16.8	-	-	4577.6	73.7	
6/19	(850)	0.00	0.744	28.9	14.4	-	-	-	-	-	-	-
6/20	(850)	0.00	0.744	25.4	14.4	-	-	33.3	19.2	-	-	-
6/21	851	0.00	0.726	29.3	14.3	21.8	20.4	32.8	20.1	4668.1	86.8	
6/22	851	0.00	0.536	27.3	16.2	23.8	18.5	29.1	19.3	4692.1	56.2	
6/23	(850)	0.259	0.721	25.4	10.4	19.6	16.4	30.9	16.8	4725.6	65.8	
6/24	854	0.00	0.711	26.6	12.3	19.6	15.6	31.0	18.3	4757.8	60.7	
6/25	904	0.00	0.198	28.1	10.6	21.8	18.9	-	-	4784.0	78.2	
6/26	(850)	0.00	0.198	31.1	16.9	-	-	-	-	-	-	-
6/27	(850)	0.00	0.198	31.1	14.9	-	-	35.8	19.2	-	-	-
6/28	903	0.00	0.198	32.7	22.7	25.2	22.4	35.3	23.9	4878.0	84.8	
6/29	923	0.00	0.485	31.5	17.8	23.9	22.2	33.3	22.1	4937.3	94.1	
6/30	859	0.004	0.556	31.3	13.7	24.5	20.8	31.5	18.2	4974.3	74.2	

Weather Data
Edmonston and Beaver Dam Site, 1982

Date	Time	Rainfal l (cm)	Evapo ration (cm/day)	Air Temperature			Water Temperature					
				Max	Min	Dry	Wet	Max	Min	Total	Relativ e Wind	Humidity (%)
7/1	(850)	0.142	0.744	26.8	10.7	19.9	14.3	18.8	17.9	5012.4	53.4	
7/2	903	0.00	0.528	27.8	8.9	20.2	17.1	-	-	5042.8	64.3	
7/3	(850)	0.140	0.528	26.7	15.2	-	-	-	-	-	-	-
7/4	(850)	0.00	0.528	25.8	13.7	-	-	-	-	-	-	-
7/5	(850)	0.00	0.528	26.1	10.6	-	-	32.9	17.9	-	-	-
7/6	(850)	0.00	0.693	28.1	16.7	21.5	18.0	34.2	20.9	5170.4	80.8	
7/7	(858)	0.00	0.866	31.8	20.8	23.8	20.9	35.2	22.7	5209.3	84.4	
7/8	904	0.00	0.673	34.8	19.7	27.8	24.3	37.7	23.8	5258.6	79.5	
7/9	906	0.00	0.404	32.2	18.3	24.8	22.3	-	-	5283.3	92.7	
7/10	(850)	0.00	0.404	28.9	19.6	-	-	-	-	-	-	-
7/11	(850)	0.00	0.404	29.2	18.9	-	-	34.4	23.9	-	-	-
7/12	916	0.00	0.732	31.6	20.4	24.9	22.7	35.9	24.8	5357.8	94.7	
7/13	856	0.00	0.744	32.0	18.9	26.1	20.7	35.1	23.6	5381.8	62.4	
7/14	854	0.533	0.190	31.1	18.2	-	-	29.0	23.1	5402.2	97.3	
7/15	(850)	0.00	0.630	31.2	19.2	-	-	29.8	23.9	5417.3	97.8	
7/16	(850)	0.00	0.582	31.4	18.3	-	-	-	-	5436.5	97.8	
7/17	(850)	0.00	0.582	33.6	18.4	-	-	-	-	-	-	-
7/18	(850)	0.00	0.582	34.4	20.3	-	-	37.3	24.3	-	-	-
7/19	858	0.00	0.686	35.1	20.0	-	-	37.7	24.1	5508.8	74.6	
7/20	904	0.178	0.490	30.8	17.7	-	-	31.6	20.1	5532.0	97.4	
7/21	909	0.013	0.909	33.3	18.8	-	-	33.3	18.8	5580.1	61.5	

7/22	854	0.00	0.841	31.9	21.8	-	-	34.3	20.4	5611.4	72.4
7/23	(850)	0.213	0.417	28.3	19.4	-	-	-	-	5642.1	98.2
7/24	(850)	0.00	0.417	30.0	16.1	-	-	-	-	-	-
7/25	(850)	0.00	0.417	33.1	14.4	-	-	36.2	21.7	-	-
7/26	(850)	0.013	0.803	34.5	21.4	-	-	37.0	25.2	5709.9	68.2
7/27	906	0.00	0.457	32.9	21.5	-	-	35.6	24.3	5733.4	66.4
7/28	(850)	1.194	0.444	30.4	16.6	-	-	31.7	20.1	5760.0	97.8
7/29	901	0.00	0.277	28.9	15.7	-	-	34.0	20.9	5792.8	75.5
7/30	(850)	0.813	0.312	23.3	14.4	-	-	-	-	5813.8	97.8
7/31	(850)	0.00	0.312	28.1	15.6	-	-	-	-	-	-

Weather Data
Edmonston and Beaver Dam Site, 1982

Date	Time	Air Temperature			Water Temperature							
		Rainfall (cm)	Evaporation (cm/day)	Max	Min	Dry	Wet	Max	Min	Total	Relative Humidity (%)	Wind
8/1	(850)	0.00	0.312	28.1	15.6	-	-	-	-	-	-	-
8/2	(850)	0.00	0.490	29.9	16.6	-	-	33.7	21.2	5885.8	98.2	-
8/3	902	0.00	0.561	30.0	16.3	-	-	29.9	21.8	5907.0	83.8	-
8/4	847	0.00	0.505	32.0	21.8	-	-	34.7	22.5	5930.6	97.9	-
8/5	852	0.00	0.477	32.3	21.6	-	-	29.1	23.9	5955.7	98.0	-
8/6	840	0.899	0.193	32.2	19.4	-	-	-	-	5983.7	97.8	-
8/7	(850)	0.818	0.193	25.6	17.8	-	-	-	-	-	-	-
8/8	(850)	0.00	0.193	27.5	20.0	-	-	-	-	-	-	-
8/9	(850)	0.097	0.291	29.8	21.2	-	-	32.7	23.5	6067.8	92.2	-
8/10	(850)	0.00	0.711	31.0	17.4	24.4	22.8	35.1	22.9	6095.4	91.4	-
8/11	859	0.00	0.536	26.2	15.2	21.1	18.8	31.2	18.2	6118.8	69.3	-
8/12	(850)	1.07	0.460	25.9	11.2	18.1	16.7	30.4	17.7	6174.8	89.5	-
8/13	909	0.00	0.470	32.2	9.9	17.9	16.1	-	-	6196.7	87.2	-
8/14	(850)	0.00	0.470	27.2	12.8	-	-	-	-	-	-	-
8/15	(850)	0.00	0.470	28.9	13.2	-	-	-	-	-	-	-
8/16	859	0.00	0.490	30.0	17.9	20.9	19.4	32.8	20.0	6232.5	98.2	-
8/17	904	0.386	0.597	31.6	13.7	23.2	21.6	34.1	19.3	6251.6	90.0	-
8/18	(850)	0.00	0.988	27.7	11.9	20.5	17.9	32.7	18.4	6279.9	78.0	-
8/19	854	0.00	0.605	30.3	15.4	20.1	12.3	32.8	19.4	6305.7	94.0	-
8/20	906	0.00	0.505	28.6	14.2	23.2	21.1	-	-	6331.7	87.2	-
8/21	(850)	0.160	0.505	25.7	14.4	-	-	-	-	-	-	-
8/22	(850)	0.00	0.505	23.9	10.4	-	-	-	-	-	-	-
8/23	(850)	0.013	0.267	26.8	17.5	20.9	20.1	26.4	19.3	6442.2	97.0	-
8/24	(850)	0.00	0.495	30.4	20.9	21.6	20.8	33.3	21.9	6479.3	90.8	-
8/25	(850)	0.427	0.742	31.5	11.0	22.9	20.8	31.7	16.3	6517.7	98.2	-
8/26	909	0.00	0.625	28.9	11.2	18.4	22.7	32.0	16.3	6570.0	68.4	-
8/27	852	0.00	0.513	25.6	9.4	18.2	17.1	-	-	6597.6	91.4	-
8/28	(850)	0.00	0.513	25.8	11.7	-	-	-	-	-	-	-
8/29	(850)	0.00	0.513	22.5	1.7	-	-	-	-	-	-	-
8/30	858	0.00	0.427	23.3	13.0	14.4	12.8	24.2	14.6	6709.7	70.2	-
8/31	931	0.00	0.681	30.4	21.2	21.1	19.4	31.1	18.3	6756.0	88.2	-

Weather Data
Edmonston and Beaver Dam Site, 1982

Date	Time	Air Temperature			Water Temperature							
		Rainfall (cm)	Evaporation (cm/day)	Max	Min	Dry	Wet	Max	Min	Total	Relative Humidity (%)	Wind
9/1	924	0.00	0.323	27.4	22.2	21.7	20.7	27.0	20.7	6845.7	96.4	-
9/2	(850)	0.008	0.640	31.9	18.4	23.1	22.2	32.9	21.5	6921.1	98.2	-
9/3	(850)	1.15	0.579	27.8	8.3	19.9	18.9	-	-	6964.6	98.2	-
9/4	(850)	0.00	0.579	27.8	8.3	-	-	-	-	-	-	-
9/5	(850)	0.00	0.579	25.6	6.1	-	-	-	-	-	-	-
9/6	(850)	0.00	0.579	25.6	6.7	-	-	-	-	-	-	-
9/7	855	0.00	0.554	26.5	17.1	19.6	17.3	29.7	17.7	7074.5	83.2	-
9/8	900	0.00	0.140	20.9	14.2	17.7	17.1	22.1	17.4	7132.5	97.7	-
9/9	(850)	0.01	0.284	24.9	11.1	17.9	16.7	25.4	16.3	7155.0	97.3	-
9/10	906	0.00	0.457	27.8	9.7	18.4	17.8	-	-	7176.8	97.8	-
9/11	(850)	0.00	0.457	30.0	10.8	-	-	-	-	-	-	-
9/12	(850)	0.00	0.457	30.3	12.1	-	-	-	-	-	-	-
9/13	920	0.00	0.620	29.8	15.1	19.9	19.2	30.7	19.3	7253.0	98.0	-

9/14	(850)	0.005	0.290	28.2	15.1	22.6	21.4	28.6	18.8	7282.4	96.0
9/15	908	0.00	0.259	29.3	18.1	19.8	19.0	29.2	19.7	7300.9	98.0
9/16	920	0.00	0.648	30.3	12.2	23.2	21.5	31.8	16.9	7320.4	84.7
9/17	930	0.00	0.676	22.2	8.3	18.2	15.1	-	-	7364.8	66.7
9/18	(850)	0.00	0.676	29.2	6.6	-	-	-	-	-	-
9/19	(850)	0.00	0.676	25.0	7.2	-	-	-	-	-	-
9/20	913	0.658	0.028	18.2	13.2	17.4	17.2	19.9	16.1	7461.6	98.2
9/21	(850)	0.043	0.020	19.8	13.8	16.7	16.2	21.2	15.8	7484.4	96.4
9/22	939	2.271	0.00	15.1	8.8	14.8	14.4	17.1	11.8	-	96.7
9/23	(850)	0.185	0.00	20.4	5.6	12.3	11.2	23.2	11.4	7582.5	72.8
9/24	910	0.00	0.198	22.2	3.6	13.3	12.8	-	-	7613.1	97.4
9/25	(850)	0.00	0.198	22.5	13.6	-	-	-	-	-	-
9/26	(850)	1.52	0.198	18.9	8.3	-	-	-	-	-	-
9/27	(850)	0.597	0.328	25.2	10.1	16.9	16.0	26.7	15.6	7742.8	87.8
9/28	927	0.00	0.020	22.2	10.4	16.5	15.1	23.1	14.4	7762.3	92.8
9/29	908	0.00	0.356	23.7	14.6	16.8	16.1	25.2	15.1	7785.5	97.0
9/30	1005	0.00	0.157	19.0	8.4	17.7	16.8	-	-	7846.4	97.9

Volumetric Soil Moisture and Bulk Density for BARC Plots, 1982

Date	Plot	Volumetric soil moisture				Bulk density		Comments	
		Depth layer (cm)		Depth layer (cm)					
		0-1%	0-2.5%	2.5-5%	0-15%	0-2.5%	2.5-5%		
6/18/82	S3	23.19	21.27	24.29	23.01	1.10	1.26		
6/18/82	S4	14.23	17.84	21.73	25.06	1.41	1.41		
6/21/82	S3	16.72	15.02	19.45	17.70	1.10	1.26		
6/21/82	S4	6.71	14.28	17.29	15.86	1.41	1.41		
6/23/82	S3	21.62	21.04	23.99	20.25	1.10	1.26	Full.	
6/23/82	S3	32.73	28.51	23.10	-	1.44	1.26	Heads removed, stalks cut.	
6/23/82	S3	32.56	29.28	23.54	-	1.44	1.26	Cleared.	
6/23/82	S4	17.26	19.35	21.11	21.76	1.41	1.41		
6/23/82	S5	19.91	21.18	23.41	21.62	1.41	1.41		
6/25/82	S6	19.43	18.67	21.66	22.73	1.10	1.26	Full.	
6/25/81	S6	19.27	18.79	17.34	-	1.44	1.26	Stalks cut.	
6/25/82	S6	16.42	17.37	17.11	-	1.44	1.26	Cleared.	
6/29/82	E1	2.17	4.50	8.30	6.95	1.22	1.22		
6/29/82	E1	1.33	4.48	9.99	-	1.22	1.22	End of day.	
6/29/82	E2	4.19	4.53	6.94	9.02	1.19	1.42		
6/29/82	E3	2.25	4.34	6.08	4.49	1.16	1.40		
6/29/82	E4	2.24	4.80	8.20	8.76	1.20	1.16		
6/29/82	E5	2.24	7.56	10.80	10.71	1.22	1.22		
6/29/82	E5	2.73	7.09	10.52	-	1.22	1.22	End of day.	
7/26/82	E1	1.29	2.93	4.97	5.60	1.22	1.23		
7/26/82	E2	5.06	5.11	7.20	8.74	1.19	1.42		
7/26/82	E3	2.80	4.01	5.33	3.80	1.19	1.42		
7/26/82	E4	1.23	5.63	8.27	9.24	1.18	1.15		
7/26/82	E5	1.40	2.78	4.99	5.14	1.21	1.22		
7/27/82	E1	1.96	3.66	4.62	6.28	1.22	1.23		
7/27/82	E3	2.03	2.12	3.79	4.36	1.19	1.42		
17/27/82	E3	1.31	1.77	3.54	-	1.19	1.42	End of day.	

2

Date	Plot	Volumetric soil moisture				Bulk density		Comments	
		Depth layer (cm)		Depth layer (cm)					
		0-1%	0-2.5%	2.5-5%	0-15%	0-2.5%	2.5-5%		
####	E4	0.85	3.62	8.34	8.27	1.18	1.15		
7/27/82	E5	2.24	2.96	5.77	4.96	1.21	1.22		
8/09/82	E8	10.33	13.32	12.34	-	1.28	1.28	Cleared.	
8/09/82	E8	12.41	12.22	11.63	11.97	1.21	1.18	Full.	
8/09/82	E8	12.86	12.98	11.62	-	1.28	1.28	Stripped. stalks, tassels removed.	
8/09/82	E8	11.66	12.58	12.86	12.94	1.28	1.28	Stalks cut, layers cut.	
8/10/82	E7	8.18	9.02	10.51	-	1.28	1.25	Cleared.	
8/10/82	E7	8.68	9.62	9.58	10.79	1.20	1.20	Full - North side.	

8/10/82	E7	10.34	11.17	11.51	-	1.28	1.25	Full - South side.
8/10/82	E7	8.60	9.79	10.94	11.76	1.28	1.25	Stripped stalks, layers cut.
8/11/82	E1	2.51	5.92	7.24	12.07	1.22	1.23	Full - North side (dry).
8/11/82	E1	13.18	14.79	14.26	11.26	1.22	1.23	Full - South side (wet).
8/11/82	E1	12.28	13.65	14.46	-	1.29	1.33	Cleared - South side (wet).
8/11/82	E6	3.80	6.47	8.32	14.67	1.20	1.16	Full - North side.
8/11/82	E6	12.62	12.08	11.53	12.13	1.20	1.16	Full - South side.
8/11/82	E6	12.76	13.65	12.98	-	1.26	1.20	Cleared - South side.
8/25/82	E5	13.16	13.78	13.56	-	1.29	1.29	Cleare d.
8/25/82	E5	21.78	18.27	16.67	9.93	1.21	1.22	Full.
8/25/82	E5	17.69	17.07	15.63	-	1.29	1.29	Stalks cut, stripped stalks.
8/26/82	E5	17.57	15.75	14.41	-	1.29	1.29	Cleare d.
8/26/82	E5	18.62	18.33	17.13	11.08	1.21	1.22	Full.
8/26/82	E8	8.59	12.02	12.70	12.08	1.28	1.28	Cleared - South side.
8/26/82	E8	2.46	3.08	7.59	-	1.28	1.28	Cleared - North side.
9/15/82	E8	0.54	1.06	2.11	2.55	1.28	1.28	North side.
9/15/82	E8	14.43	13.80	-	-	1.28	1.28	South side, p.m.
#####	E8	15.42	14.75	14.18	12.84	1.28	1.28	South side, a.m.

APPENDIX D
Soil Temperature Measurements for Vegetation Experiments

Notation:

Canopy/Air Difference

+ indicates that the surface/canopy is warmer than the air

- indicates that the surface/canopy is cooler than the air

Soil Temperature Data for BARC Plots, 1982 (In Degrees C)

Date	Plot	(EDT) Time	Canop y/Air Dif.	Sfc	1 cm	3 cm	7.5 cm	Comments
6/18/82	S3 (Winter wheat)	10:55	+1.6	25.5	23.3	23.5	22.6	
		11:20			24.5	24.7	23.4	
		11:42			24.8	25.1	23.8	
		12:15		26.3	25.0	25.4	24.8	
6/18/82	S4 A (Bare)	10:55	+1.5	25.5	27.0	26.5	-	Site A in near corner
		11:00			-	28.5	22.0	Site B in far corner
		B						
		A			24.5	25.0	-	Thermometers exposed to direct sun
		B			28.5	29.0	23.5	
		A			28.0	27.5	-	
6/21/82	S3 A (winter wheat)	11:44			27.9	29.0	24.1	
		B			25.6	27.0	27.5	-
		A			27.0	27.5	-	
		B			28.1	28.5	24.5	
		12:17						
		B			28.1	28.5	24.5	
		12:19						
		A			28.1	28.5	24.5	
		B			28.1	28.5	24.5	
		10:15			32.2	28.9	24.4	Site A thermometers affected by direct sun
6/21/82	S4A (Bare)	A			31.1	30.0	25.0	
		A			28.9	27.8	23.3	
		B			31.1	29.4	25.6	
		A			29.4	28.9	25.6	
		B			28.9	28.3	23.3	
		09:45		25.0	28.9	28.9	24.4	Thermometers in direct sun
		B			29.4	28.3	24.4	
		A			30.0	30.0	25.6	In shadow of radiometers
		B			31.7	30.0	25.6	
		10:25			31.7	31.7	26.1	
		A			31.7	31.7	26.1	
		B			32.2	31.1	26.7	
		10:55		31.1	28.9	29.4	26.7	
		A			31.1	30.6	27.2	
		B						

Date	Plot	(EDT) Time	Canop y/Air Dif.	Sfc	1 cm	3 cm	7.5 cm	Comments
6/23/82	S3 A (winter wheat)	09:45	+1.30	23.5*	23.9	22.8	21.7	*1degree drop when wind blows
		09:50			22.8	23.3	21.1	Full canopy
		11:05	+1.30	26.0	27.8	25.6	23.3	Heads removed
		A			26.7	25.6	22.2	
		B			26.7	26.7	24.4	Stalks cut
		11:20			27.2	25.6	22.8	
		A	+4.60	29.0	26.7	26.7	24.4	
		B		(25.5)	27.2	25.6	22.8	
		11:35			uncut wheat			
		A	+4.00	27.5	26.7	26.1	24.4	Stalks removed
		B		(22)	29.4	26.7	23.3	
				(in radiometer)				
				shadow of				
6/23/82	S5	10:05		-	25.0	24.4	22.8	Bare, soybeans just planted in N-S rows
	S4	10:10		-	23.9	23.9	23.3	
	S5	11:20		-	25.6	23.9	21.1	
	S4	11:20		-	25.6	23.3	22.2	
6/25/82	S6 A B	09:15	+0.80	25.5	23.3	21.7	21.1	
		9:15			24.4	22.2	20.0	
		A	09:40		24.4	22.2	21.7	Radiometers parallel to row direction
		B	09:40		24.4	22.8	20.0	
		A	09:55		24.4	22.2	21.7	Radiometers perpendicular to row direction
		B	09:55		28.0	25.0	23.3	
		A	10:30	+2.40	28.6	28.9	25.6	Cut wheat perpendicular
		B	10:30	+2.80	29.3	29.4	25.6	
		A	11:10	+4.30	32.0	30.6	26.7	
		B	11:10		31.1	26.7	22.2	Cut wheat parallel
		A	11:35	+2.20	31.0	28.9	25.6	Stubble
		B	11:35		30.0	26.7	22.2	
		A	12:00	+3.00	32.5	29.4	25.6	Stalks random, 1 layer
		B	12:00		33.3	27.2	23.3	
		A	12:35	+2.70	32.9	29.4	26.7	Stalks random, 2 layers
		B	12:35		33.9	27.8	24.4	

Date	Plot	(EDT) Time	Canop y/Air Dif.	Sfc	1 cm	3 cm	7.5 cm	Comments
6/29/82	E2 (Alfalfa) E3 (Grass) E4 A (Bare) Sorghum)	10:15	-1.3	25.7	25.6	25.0	24.7	
		10:45	-0.2	26.4	26.1	26.1	25.0	
		10:45	-0.1	26.2	26.7	26.1	25.6	
		11:00	-0.4	28.0	27.2	26.1	25.6	
		10:50	+2.6	30.3	28.3	27.2	27.2	Site A near, Site B far
		10:50			28.3	27.8	27.5	
		B						
		A	11:05	+2.5	31.2	28.9	28.3	28.1
		B	11:05		28.9	28.9	27.8	
		E5 (S.	11:20	+0.7	29.4	31.1	30.9	30.0
		11:45	+0.8	32.5	31.1	30.6	30.0	
7/26/82	E2 (Alfalfa) E3 (Grass) E4 A (Bare) Sorghum)	13:10	+1.1	32.8	32.2	31.7	30.6	
		11:20	+0.4	26.7	31.1	30.0	28.3	
		11:45	+0.1	28.4	32.2	30.0	28.9	
		13:25	+0.0	29.2	33.3	31.7	30.0	
		E1 (Corn)	09:20	+2.1	31.6	28.9	26.7	24.4
		10:00	+1.5	32.0	28.9	26.7	25.0	
		E1 (Corn)	09:20	+2.8	32.3	30.0	28.9	25.6
		10:00	+3.1	32.2	30.0	29.4	26.1	
		E4 A (Bare)	09:20	+6.3	37.3	35.0	35.0	30.6
		B			35.0	34.4	31.1	
		A	10:00	+6.0	36.9	33.9	32.8	32.2
		B	10:00		33.9	32.2	31.7	
		E1 (Corn)	10:40	-0.4	31.3	35.6	35.0	31.1
		11:15	+0.1	33.0	35.6	35.0	31.7	

		12:45	+1.6	34.6	36.7	35.6	33.9
		13:15	+1.5	34.7	37.8	36.7	35.0
E5		10:40	-2.0	30.2	32.2	31.1	27.8
(S.		11:15	-1.6	31.8	32.8	31.7	28.9
Sorghu m)		12:45	-2.4	32.5	36.1	34.4	31.7
		13:15	-2.8	32.9	37.2	35.6	32.2

Date	Plot	(EDT) Time	Canop y/Air Dif.	Sfc	1 cm	3 cm	7.5 cm	Comments
7/27/82	E3	09:15	+1.8	31.9	31.1	28.3	26.1	Full canopy
		09:45	+2.2	33.0	32.2	29.4	26.7	
		11:15	+9.5	39.5	38.9	37.8	30.6	First cut
	E1	14:50	+10.1	43.1	38.9	36.1	32.8	Second cut
		10:40	+0.2	30.6	33.9	32.8	28.9	Screens at 4"
		10:50	-2.5	30.3	35.0	32.2	27.8	
		A 14:16	-1.1	30.7	33.9	32.8	30.0	Screens at 4"
		B 14:16			33.9	32.8	31.1	
	A 14:30				36.1	34.4	32.2	
		B 14:30	-0.9	33.1	36.1	35.0	30.6	Screens at 20"
8/9/82	E8	8:53	-0.8	24.6	25.6	24.2	24.2	Full canopy, south side
		09:28	-0.7	24.6				Standing stalks, south side
		09:45	-0.3	26.0				Top 'A' cut, north side
		10:00	0.0	26.4				Tassels cut, south side
		10:20	+2.1	27.0				Second 1/3 cut, north side
		10:35	+3.2	29.2				Stubble, north side
		10:50	+0.4	28.1				Stubble, south side
		11:10	+1.2	29.6				Cut stalks parallel, south s.
		12:10	+6.3	35.5				Everything random, south s.
		09:15	+0.3	26.5				Full canopy, south side
8/10/82	E7	09:20	+0.7	28.2				Standing stalks, south side
		09:40	+0.5	27.5				Grain heads removed, north s.
		10:05	+2.4	29.4				Cut stalks parallel, south s.
		10:20	+3.9	30.6				Cut stalks perpendicular, south
		10:45	+4.0	31.0				Everything random, south side
		11:00	+3.1	29.6				50% cut, north side
		11:30	+2.8	29.8				Stubble, north side

Date	Plot	(EDT) Time	Canop y/Air Dif.	Sfc	1 cm	3 cm	7.5 cm	Comments
8/11/82	E6	09:05	-1.6	21.2	23.9	23.3	23.3	Full canopy, wet side (south)
		09:20	-1.7	21.9	25.6	25.6	25.0	Full canopy, dry side (north)
		09:40	-1.1	21.6	22.6			50% of plants removed, wet
		10:00	-0.4	24.6	23.7			Stubble, wet side
		12:30	-1.2	28.0				dry side
#####	E1	10:30	-1.7	24.1	25.2			Full canopy, wet side (south)
		10:45	-0.6	24.2	25.4			Full canopy, dry side (north)
		11:00	-2.6	23.7	24.5			25% of plants removed
		11:20	-0.7	24.3	25.1			50% of plants removed
		11:45	+1.3	25.5	26.2			75% of plants removed
		12:10	0.0	28.1	29.0			Stubble
8/25/82	E5	09:15	+0.6	24.8				Full canopy
		11:00	+1.2	29.3				Full canopy
		11:15	+1.0	28.9				
		11:45	-1.2	26.6				Standing stalks
		13:00	0.0	31.3	29.4	25.6	24.4	Standing stalks
		13:15	-2.4	28.5	30.0	25.6	24.4	Stubble
		13:30	-0.5	29.3	30.3	26.1	24.4	Cut stalks, parallel
		13:45	+0.1	31.6	30.6	26.1	24.4	Cut stalks, perpendicular
		14:00	-7.1	24.1	30.9	26.1	24.4	Screens (baseline)
		14:22	-0.8	31.6	31.7	26.7	251.0	Screens w/ 280 stalks perpen.
		15:00	-0.3	31.4	32.8	27.2	25.3	Screens w/280 stalks parallel
		15:15	-1.2	30.4	32.8	31.7	25.3	Cut stalks random
		15:30	+2.4	33.9	33.3	32.0	25.6	Everything random

Date	Plot	(EDT) Time	Canopy/Air Dif.	Sfc	1 Cm	3 cm	7.5 cm	Comments
8/26/82	E5	09:30	0.0	23.3	21.1	20.0	19.4	Full canopy
		9:55	-1.2	23.6	22.2	20.6	20.0	
		10:10	-0.9	21.6	22.2	20.6	20.0	
		10:15	-0.8	20.1	22.8	20.9	20.0	Second 1/3 cut with screens
		10:25	0.2	24.5	22.8	20.9	20.0	Second 1/3 cut no screens
		10:40	1.6	25.1	23.9	21.4	20.6	Stubbl e
		10:55	-0.2	24.2	23.9	21.4	20.9	Stubbl e
		11:10	-0.6	25.8	24.4	21.7	21.1	Stubble with wood blocks
		12:53	+8.7	35.9				Dry stalks perpendicular
		13:15	+8.3	34.7	32.8	30.0	28.3	Dry stalks parallel
8/26/82	E8	13:30	+3.1	33.7	33.9	30.6	28.6	Stubbl e
		13:45	+5.6	23.1				Screens at 60" high over stub.
		14:05	-4.2	22.4				Screens at 30"
		14:15	-2.1	24.5				Screens at 4"
		14:30	-1.4	26.2				Screens at 4", no posts
		14:40	+8.2	36.2				Stubble baseline
		09:47	22.5 (soil)	24.4	25.9	22.2	20.9	Standing stalks, wet side (s.)
		10:00		23.2	25.9	22.5	21.1	Stubble, wet side
		10:11		25.1	27.5	23.1	21.4	100 stalks parallel, wet side
		10:15		26.0	28.1	23.3	21.4	200 stalks
9/15/82	E8	10:18		26.9	26.7	23.3	21.7	300 stalks
		10:25		26.6	26.7	23.3	21.7	400 stalks
		10:30		26.1	26.4	23.3	21.7	500 stalks
		10:37		28.1	28.9	23.6	22.0	600 stalks
		13:00		31.9	31.4	27.8	25.6	1200 stalks
		13:00			30.6	25.6	23.9	(measured under stalks)
Date	Plot	(EDT) Time	Canopy/Air Dif.	Sfc	1 cm	3 cm	7.5 cm	Comments
9/15/82	E8	10:41		29.6	30.6	31.1	23.3	Standing stalks, dry side (n.)
		10:55		31.1	31.1	31.7	23.6	Stubble, dry side
		11:05		32.8	32.5	31.1	23.9	100 stalks parallel, dry side
		11:08		32.0	32.8	31.1	24.2	200 "
		11:16		31.6	33.3	31.1	24.4	300"
		11:22		32.6	33.3	31.4	24.4	400"
		11:29		32.9	32.2	31.1	24.4	500"
		11:34		32.0	31.7	31.1	25.0	600"
		13:09		34.5	33.1	33.3	27.2	100 dry stalks parallel, dry side
		13:15		33.9	32.8	33.6	27.5	200"
9/15/82	E8	13:22		36.6	32.8	33.9	27.5	300"
		13:31		39.0	35.0	35.6	27.8	500"
		14:13		36.6	34.4	35.3	28.3	Stubbl (34.4 degrees inside dry stalks) e, dry side
		13:40	A = inside plot	34.2	31.1	27.2		500 dry stalks parallel, wet side
			B = outside plot	32.2	28.3	26.4		
		13:50	A	29.0	29.4	26.7		Stubble, wet side
			B		25.3	28.3	26.7	
		13:55	A	30.0	30.0	26.7		100 dry stalks parallel, wet side
			B		25.3	28.1	26.7	
		14:06	A	33.1	31.4	27.2		300 dry stalks parallel, wet side (33.3 degrees inside stalk at top of pile,dry) (31.1 degrees inside stalk at bottom of pile wet)

APPENDIX E
Microwave Data for Vegetation Experiments

Notation:

CV - 5 GHz vertical polarization
 CH = 5 GHz horizontal polarization
 LV = 1.4 GHz vertical polarization
 LH = 1.4 GHz horizontal polarization

SD = standard deviation of 20-30 samples averaged to give one TB value

Microwave Data for BARC Plots, 1982 (In Degrees K)

Date	Time (EDT)	Plot	Angle	CV TB	SD	CH TB	SD	LV TB	SD	LH TB	SD	Comments
6/18/82	10:32	S3	70	280.25	0.30	268.94	0.29	257.55	1.70	202.61	0.95	
	10:40	S3	60	287.94	1.07	267.56	0.34	263.39	1.28	192.04	0.71	
	10:43	S3	50	290.98	0.41	265.46	0.44	260.02	1.10	200.33	0.71	
	10:45	S3	40	289.22	0.54	264.45	0.44	252.40	1.17	208.80	0.94	
	10:47	S3	30	284.49	0.25	265.17	0.35	243.50	0.67	217.04	1.15	
	10:50	S3	20	278.13	0.54	266.12	0.43	236.2	1.00	221.65	0.99	
	10:53	S3	10	272.87	0.27	267.62	0.39	232.90	1.41	226.6	1.09	
	10:57	S4	10	236.94	0.41	232.17	0.51	235.87	1.36	231.81	0.86	
	10:59	S4	20	240.6	0.85	226.1	0.43	238.44	1.13	224.35	1.14	
	11:01	S4	30	249.01	0.24	217.83	0.32	244.06	1.26	216.52	0.96	
	11:04	S4	40	259.54	0.62	206.07	0.50	249.89	1.19	205.13	0.76	
	11:08	S4	50	274.89	0.30	186.41	0.52	259.23	1.52	183.09	0.94	
	11:10	S4	60	283.93	1.04	162.59	0.44	263.20	1.15	158.21	0.92	
	11:13	S4	70	280.24	0.35	135.37	0.64	254.72	1.68	128.46	0.87	
	11:17	S4	70	280.70	0.49	136.17	0.71	255.59	1.60	129.32	0.92	
	11:20	S4	40	265.48	0.87	209.56	0.33	250.63	1.33	201.40	0.68	Mixed Field of View all S4
	11:28	S4	40	266.47	0.34	216.63	0.41	250.66	1.46	206.41	0.97	Mainly S4
	11:30	S4	40	263.99	0.24	218.54	0.42	252.88	1.06	208.97	0.75	More S4 than S3
	11:34	S4	40	273.32	0.34	233	0.27	239.98	1.06	199.71	0.91	1/2 S4, 1/2S3; C-band band
	11:37	S3	40	280.38	0.62	243	0.35	239.60	1.47	200.74	0.62	1/2 S4, 1/2S3; L-band band
	11:39	S3	40	288.72	0.64	266.31	0.34	254.39	1.64	211.29	0.70	More S3 than 94
	11:43	S3	40	290.93	0.37	265.92	0.32	252.78	1.03	212.11	0.90	Mainly S3
	11:46	S3	40	290.15	0.63	265.18	0.30	241.67	1.01	233.00	0.93	All S3
	12:07	S3	10	274.35	0.38	270.1	0.43	241.00	1.12	232.65	0.88	AH S3
	12:11	S3	10	274.35	0.36	270.84	0.49	231.74	1.05	230.09	1.06	Mainly S3
	12:13	S3	10	264.42	0.43	259.53	0.36	227.18	1.06	225.45	0.80	1/2 S3, 1/2 S4; L-band centered
	12:15	S4	10	254.68	0.30	249.22	0.42	240.89	1.40	236.54	1.06	1/2S3, 1/2 S4; C-band centered
	12:17	S4	10	250.81	0.41	247.01	0.30	241.1	0.86	236.56	1.16	more S4
	12:20	S4	10	252.30	0.33	247.71	0.46	237.48	1.48	232.79	1.17	Mainly S4
	12:23	S4	10	250.54	0.20	242.31	0.31	297.78	1.01	297.72	0.89	All S4

Date	Time (EDT)	Plot	Angle	CV TB	SD	CH TB	SD	LV TB	SD	LH TB	SD	Comments
6/21/82	09:40	S3	70	287.64	0.35	267.88	0.39	265.82	1.32	199	0.98	mixed Field of View; all S3 Mainly S3 1/2 S3, 1/2 S4; L-band band 1/2 S3,1/2 S4; C-band centered
	09:43	S3	60	293.61	0.52	272.26	0.33	270.17	1.26	210.72	0.85	
	09:48	S3	50	294.64	0.35	271.28	0.32	267.47	0.83	218.73	0.84	
	09:50	S3	40	292.29	0.90	271.6	0.29	262.15	1.41	226.9	0.97	
	09:52	S3	30	287.87	1.37	272.65	0.36	257.34	0.92	234.77	1.19	
	09:55	S3	20	281.98	0.37	272.44	0.34	251.75	1.31	238.84	1.15	
	09:57	S3	10	278.78	0.42	275.12	0.46	250.37	1.27	246.04	0.88	
	10:01	S4	10	271.2	0.34	267.68	0.39	255.57	1.00	251.26	0.71	
	10:04	S4	20	273.91	0.37	264.01	0.30	258.35	1.19	246.49	0.86	
	10:07	S4	30	278.48	0.69	257.06	0.29	261.96	0.95	237.48	0.69	
	10:09	S4	40	285.49	0.48	245.74	0.33	265.42	1.43	224.21	1.10	
	10:12	S4	50	291.42	0.24	230.49	0.48	269.32	1.44	208.45	1.09	
	10:25	S4	60	293.04	0.64	207.28	0.35	270.27	1.18	182.87	0.87	
	10:28	S4	70	277.7	0.50	174.30	0.38	255.86	1.79	147.87	0.97	
	10:36	S3	10	278.97	0.53	275.62	0.26	252.05	1.50	247.20	0.80	
6/23/82	10:38	S3	10	277.74	0.41	275.28	0.32	252.47	0.95	249.22	0.87	Mainly S4 All S4 All S4 mainly S4 1/2S4, 1/2 S3; C band centered 1/2 S4,1/2 S3; L-band centered mainly S3 AH S3 Full canopy
	10:41	S3	10	275.73	0.60	272.80	0.42	247.45	1.16	247.75	1.12	
	10:44	S3	10	268.82	0.64	267.03	0.32	246.39	1.13	244.45	0.96	
	10:46	S4	10	274.19	1.09	273.1	0.31	256.42	1.38	253.4	0.81	
	10:49	S4	10	277.72	1.25	274.91	0.29	258.18	1.22	255.66	0.95	
	10:51	S4	40	289.80	0.38	252.80	0.34	266.45	1.34	226.55	0.89	
	10:54	S4	40	286	0.69	255.26	0.38	264.78	1.61	228.68	0.97	
	10:58	S4	40	283.67	0.92	253.5	0.31	255.64	1.31	219.70	0.72	
	10:59	S4	40	286.93	0.62	259.02	0.41	255.35	1.35	220.16	0.87	
	11:01	S3	40	291.18	0.84	270.47	0.28	260.93	1.28	226.59	1.21	
6/23/82	11:04	S3	40	291.64	0.57	269.82	0.35	261.36	0.99	226.73	0.90	mainly S3 AH S3 Full canopy
	09:36	S3	10	276.3	0.25	272.5	0.36	238.06	1.28	234.27	0.83	
	09:38	S3	20	279.6	0.32	270.95	0.35	240.73	1.51	228.34	1.13	
	09:40	S3	30	284.20	1.11	271	0.25	245.54	1.27	221.70	0.90	
	11:00	S3	10	274.74	0.49	273.8	0.36	238.70	1.07	236.5	0.79	
Date	Time (EDT)	Plot	Angle	CV TB	SD	CH TB	SD	LV TB	SD	LH TB	SD	Comments
6/23/82	09:43	S3	40	288.28	0.91	270.28	0.30	253.72	1.02	214.22	0.95	Full canopy Soybeans just Heads removed
	09:45	S3	50	291.07	0.51	270.79	0.26	259.88	1.47	206.65	0.80	
	09:54	S4	25	254.87	0.21	243.26	0.41	243.30	1.11	226	0.82	
	09:58	S4	40	262.49	0.87	230.84	0.26	249.09	0.98	209.3	0.90	
	10:00	S5	40	282.72	0.37	270.94	0.34	271.63	1.41	251.6	0.93	
	10:05	S5	25	283	1.18	276.84	0.33	273.86	0.88	264.1	1.06	
	11:00	S3	10	274.74	0.49	273.8	0.36	238.70	1.07	236.5	0.79	Heads removed

11:04	S3	20	277.40	0.77	271.6	0.36	238.69	0.80	231	0.75		
11:05	S3	30	282.21	0.28	270.63	0.33	244.94	1.28	224.5	0.95		
11:07	S3	40	288.56	0.72	271.72	0.29	253.5	0.98	219.2	0.91		
11:09	S3	50	293.53	0.60	273	0.32	261.20	1.19	212.7	1.00		
11:17	S5	40	288.63	1.27	280.17	0.32	272.13	1.26	251.96	0.84	Bare - no no	
11:19	S5	25	288.81	1.11	284.6	0.25	275.4	1.31	265.84	0.93		
11:22	S4	25	264.66	0.69	253.9	0.37	245	1.12	228.71	1.04		
11:26	S4	40	272.59	0.24	242.43	0.37	252.1	1.16	211.7	1.08		
11:31	S3	50	280.09	0.63	270.08	0.26	251.4	1.18	249.5	0.94	Cut stalks	
11:34	S3	40	276.80	1.13	270.6	0.37	247.12	1.20	252.8	1.06		
11:39	S3	30	271.30	0.87	269.9	0.38	242.9	1.20	247.75	1.07		
11:43	S3	20	267.32	0.78	270	0.40	239.77	1.52	247.37	1.15		
11:46	S3	10	266.31	0.64	269.79	0.33	243.8	1.10	253.2	0.69		
12:00	S3	10	251.9	0.69	251.90	0.33	229.80	1.06	220.7	0.93	Stubble	
12:01	S3	20	254	0.52	250.1	0.38	225.71	1.25	213.04	0.88		
12:03	S3	30	258.9	0.30	249.2	0.32	229.00	1.09	208.5	2.17		
12:06	S3	40	265.1	0.71	247.27	0.41	233.75	1.03	194.61	0.59		
12:09	S3	50	272.43	0.56	248.97	0.32	240.98	1.20	182.19	1.13		
6/25/82	09:08	S6	70	286.7	0.50	273.83	0.23	264.22	1.37	210.48	1.07	Full canopy
											,	
	09:13	S6	60	290.59	0.25	275	0.44	270.92	1.04	221.14	0.88	
	09:16	S6	50	291.57	0.20	276	0.19	271.54	1.08	233.1	0.87	
	09:18	S6	40	290.76	0.38	277.68	0.43	268.16	1.17	240.52	0.72	

Date	Time	Plot	Angle	CV		CH		LV		LH		Comments
				TB	SD	TB	SD	TB	SD	TB	SD	
6/25/82	09:21	S6	30	288.41	0.42	279.98	0.26	265.08	1.41	246.44	0.84	Full canopy parallel
	09:23	S6	20	285.59	0.24	281.67	0.30	260.42	1.31	252.30	0.81	"
	09:29	S6	10	282.67	0.42	282.87	0.34	258.54	0.92	256.31	0.97	"
	09:39	S6	10	284.00	0.32	281.81	0.39	258.69	1.05	252.59	0.86	Full canopy perpendicular
	09:45	S6	20	286.39	0.34	281.09	0.37	261.28	1.62	249.5	1.02	"
	09:49	S6	30	289.04	0.84	279.66	0.25	263	1.28	243.92	0.97	"
	09:51	S6	40	291.44	0.33	277.9	0.31	265.69	1.11	238.16	0.80	"
	09:53	S6	50	293.3	0.35	275.9	0.37	269.84	1.27	231	0.84	"
	09:55	S6	60	293.20	0.48	272.84	0.31	269.26	1.16	222.40	0.86	"
	10:00	S6	70	288.6	0.55	267.06	0.33	262.28	1.32	213.3	0.75	"
	10:19	S6	70	286.6	0.88	268.60	0.33	254.7	1.26	248.48	1.08	Cut stalks perpendicular
	10:22	S6	60	289.45	1.10	274.86	0.30	265.77	1.14	258.82	1.16	"
	10:24	S6	50	288.35	0.61	277.6	0.26	267.00	1.63	262.03	1.05	"
	10:27	S6	40	287.20	0.19	279.4	0.22	266.73	0.97	263.26	0.76	"
	10:30	S6	30	285.05	0.39	280.3	0.31	264.94	0.94	264.55	0.99	"
	10:32	S6	20	282.89	0.28	280.86	0.29	265.69	1.17	267.6	1.31	"
	10:36	S6	10	281.62	0.56	282.14	0.28	264.2	0.87	269.73	0.82	"
	10:47	S6	10	282.36	0.43	281.04	0.37	276.1	2.05	267.05	0.95	"
	10:50	S6	10	282.19	1.34	280.83	0.29	276.6	1.29	267.37	0.88	Cut stalks parallel
	10:52	S6	20	284.75	0.40	280.9	0.34	274.10	1.23	261.8	1.03	"
	10:57	S6	30	286.94	0.43	279.80	0.35	274.00	1.53	255.50	0.92	"
	11:03	S6	40	288.7	0.47	277.72	0.41	273.4	1.86	250.4	0.89	"
	11:05	S6	50	291.2	1.11	277.06	0.28	274.58	1.42	247.76	1.14	"
	11:08	S6	60	291.34	0.50	275.40	0.31	271.93	1.03	237.76	0.98	"
	11:12	S6	70	288.39	1.07	273.5	0.27	261.8	1.64	231.79	0.89	"
	11:27	S6	70	285.6	0.73	264.99	0.32	252.21	1.63	170.82	0.87	Stubble
	11:29	S6	60	290.15	1.28	264.18	0.36	262.8	0.87	197.94	0.75	"
	11:32	S6	50	289.61	0.41	265.70	0.29	264.8	1.18	220.26	0.81	"
	11:34	S6	40	285.55	0.33	268.6	0.29	263.19	1.07	234.72	0.81	"
	11:37	S6	30	281.86	0.60	271.90	0.37	261.22	1.09	245.08	0.79	"

Date	Time	Plot	Angle	CV		CH		LV		LH	Comments	
	(EDT)			TB	SD	TB	SD	TB	SD	TB	SD	
6/25/82	11:39	S6	20	279.66	0.87	275.60	0.45	260.62	0.97	252.88	0.82	Stubble
	11:43	S6	10	277.67	0.23	276.84	0.40	258.89	1.40	258	0.91	"
	11:53	S6	10	284	0.41	284.1	0.27	270.15	1.38	269.80	0.70	Cut stalks at Random
	11:54	S6	20	286	0.26	284.25	0.33	270.94	1.19	265.4	0.82	" 1 layer
	11:58	S6	30	286.65	0.30	281.97	0.32	270.5	1.17	258.80	0.96	"
	12:00	S6	40	288.91	1.29	282.03	0.41	271.41	1.56	256	0.88	"
	12:02	S6	50	291.88	0.62	280.95	0.33	272.36	1.11	251	1.00	"
	12:07	S6	60	293.83	0.24	280.17	0.24	272.25	1.43	251.6	0.76	"
	12:10	S6	70	288.93	0.60	275.2	0.25	261.64	1.57	247.38	0.72	"
	12:28	S6	70	292.42	0.57	280.76	0.30	265.29	1.33	258.5	0.90	Cut stalks at Random
6/29/82	12:30	S6	60	294.69	0.49	285.1	0.38	274.25	1.24	261.1	1.07	" 2 layers
	12:33	S6	50	294.21	0.64	286.71	0.34	275.85	1.30	262.70	0.83	"
	12:35	S6	40	292.22	1.18	287.15	0.35	274.59	1.17	264.98	0.96	"
	12:38	S6	30	290.68	0.42	288.10	0.42	274.28	1.52	268.57	1.28	"
	12:40	S6	20	290.02	0.36	289	0.31	274.24	0.97	271.35	1.15	"
	12:42	S6	10	288.69	0.41	288.91	0.31	274.22	1.35	271.54	1.02	"
	09:09	-	10	80.69	0.45	48.49	1.07	75.64	1.35	56.97	0.95	Metal plates over grass; L. antenna 41.5" high
	09:14	-	10	68.27	0.20	38.21	0.94	152	1.32	124.45	1.11	Metal Plates over grass; C. antenna 44.5" high
	09:17	-	20	31.41	0.32	18.97	1.09	52.96	0.85	28.94	0.97	Metal plates over grass; C. antenna 52.5" high
	09:20	-	20	41.80	0.30	34.06	1.07	44.17	1.20	21.69	0.87	Metal plates over grass; L. antenna 48" high
09:24	-	20	293.75	0.63	291.20	0.31	294.6	1.61	289	0.97	Grass only	
	-	10	295.41	0.64	293.48	0.28	297.68	1.21	296.39	1.07	Grass only	
	-	10	269.66	1.17	266.71	0.22	174.21	1.18	160.41	0.67	Chain link over grass, L	
	-	10	267.97	0.45	266.21	0.32	177.35	0.66	175.2	0.70	Chain link	

09:33	-	20	253.61	0.23	248.6	0.35	78.09	0.98	105.1	0.79	over grass, C		
09:35	-	20	256.18	0.59	256.20	0.35	93.79	0.89	94.75	0.96	Chain link over grass, C		
09:37	-	20	251.21	0.51	250.68	0.34	101.93	1.88	109.4	5.3	Chain link over grass, L		
09:40	-	20	264.60	0.86	275.9	0.34	187.4	1.02	242.7	1.05	Chain link elevated; rippling as held		
											Chickens wire over grass; L-centered		

Date	Time	Plot	Angle	CV		CH		LV		LH		Comments
	(EDT)			TB	SD	TB	SD	TB	SD	TB	SD	
6/29/82	09:58	E2	10	287.71	0.54	288	0.40	287.04	1.13	284.3	0.84	Baseline measurements
	10:04	E2	20	287.96	0.37	287.66	0.36	288.3	1.41	283.1	0.81	
	10:05	E2	30	288.08	0.48	286.6	0.37	288.50	1.02	279.30	0.96	
	10:07	E2	40	288.2	0.34	285.60	0.31	286.2	1.33	276.16	1.23	
	10:09	E2	50	288.19	1.17	284.71	0.33	285.70	1.34	273.55	1.27	
	10:13	E3	50	297	0.56	292.90	0.31	284.94	1.25	266.68	1.00	Baseline measurements
	10:15	E3	40	297.78	0.23	293.74	0.33	286.6	1.42	274.93	0.96	
	10:18	E3	30	297.50	0.62	295.2	0.42	288.25	1.20	280.9	0.93	
	10:20	E3	20	297.04	0.50	295.52	0.32	288.73	1.29	283.92	1.00	
	10:22	E3	10	296.9	0.33	295.9	0.31	288.08	1.21	286.39	0.96	
	10:24	E4	10	289.43	0.51	287.8	0.41	280.7	1.62	276.55	1.12	Baseline measurements
	10:26	E4	20	290.8	0.64	285.2	0.28	281.2	1.16	272.10	1.04	
	10:28	E4	30	293.6	0.29	281.36	0.26	280.59	1.23	264.64	0.94	
	10:30	E4	40	296.48	0.84	274.3	0.28	281.8	1.26	254.08	0.90	
	10:32	E4	50	298.46	1.20	263.2	0.39	281.28	1.36	238.9	1.07	
	10:40	E2	60	288.28	0.59	283.79	0.34	282.07	0.78	271.28	0.96	
	10:42	E2	70	286.6	0.24	281.41	0.38	273	1.70	268.70	1.02	
	10:45	E3	70	291.5	0.59	286.7	0.37	272.13	1.37	248.78	1.12	
	10:47	E3	60	296.71	0.42	292	0.41	283.3	1.35	266.04	0.97	
	10:50	E4	60	296.35	0.37	245.78	0.32	279.11	1.44	216.2	0.69	
	10:51	E4	70	278.5	0.71	214.33	0.40	258.99	1.21	178.7	0.68	
	11:09	E5	10	287.54	0.38	285.48	0.51	277.45	1.18	273.1	1.18	Parallel to rows
	11:13	E5	20	288.8	0.65	284.14	0.33	277.71	1.18	270.74	0.68	"
	11:15	E5	30	290.11	0.84	279.50	0.27	276.50	1.01	264.20	0.82	"
	11:17	E5	40	293.06	0.25	273	0.24	277.49	1.49	249.13	1.34	"
	11:20	E5	50	294.87	0.35	263.14	0.31	278.2	1.10	234.75	0.99	"
	11:22	E5	60	293.19	1.40	249.1	0.35	275.38	1.10	213.98	1.10	"
	11:25	E5	70	283.2	0.33	230.6	0.36	258.28	1.17	184.48	0.81	"
	11:31	E1	70	281.21	0.41	264.6	0.35	275.24	1.28	250.2	0.79	"
	11:33	E1	60	287.76	0.55	272.6	0.54	284.3	1.21	257.48	0.92	"

Date	Time	Plot	Angle	CV	CH	LV	LH	Comm
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	(EDT)	Time	Plot	Angle	ents									
					TB	SD	TB	SD	TB	SD	TB	SD	TB	SD
6/29/82	11:35	E1	50	289.45	0.47	276.03	0.37	286.60	1.64	267.34	1.18	Parallel to rows		
	11:38	E1	40	290.21	0.44	280.44	0.40	286.6	1.34	273.45	0.93		"	
	11:41	E1	30	289.3	0.21	283.35	0.36	289	1.32	278.56	0.87		"	
	11:42	E1	20	288.07	0.40	286.32	0.39	288.6	1.13	283.55	0.87		"	
	11:44	E1	10	287.40	0.25	286.93	0.35	289.5	1.21	287.6	0.92		"	
	12:45	E5	70	287.88	0.45	245.86	0.31	253.1	1.01	184.46	1.06		Perpendicular to rows	
	12:48	E5	60	296.68	0.41	261.75	0.34	271.8	1.29	214.20	0.83		"	
	12:50	E5	50	298.6	0.82	273.6	0.21	277	1.24	238.68	1.01		"	
	12:54	E5	40	297.9	0.49	280.32	0.27	275.6	1.08	250.43	0.93		"	
	12:56	E5	30	296.19	0.37	285.80	0.31	278.2	1.13	260.59	1.09		"	
	12:58	E5	20	294.47	0.44	289.23	0.33	278.6	1.64	268.33	0.83		"	
	13:00	E5	10	292.66	1.28	291.34	0.32	295.9	1.50	289.53	1.09		"	
	13:09	E1	10	288.72	0.48	288.47	0.32	291.40	1.22	288.67	1.27		"	
	13:12	E1	20	289.79	0.31	287.35	0.28	289.8	1.20	282.81	0.89		"	
	13:14	E1	30	291.00	0.34	286.66	0.46	289.2	1.19	278.74	1.01		"	
	13:16	E1	40	292	0.20	284.92	0.34	287.4	1.16	272.94	0.98		"	
	13:18	E1	50	291.40	0.49	282.1	0.36	285.3	1.07	265.82	0.84		"	
	13:21	E1	60	288.50	0.26	277.41	0.37	282	1.13	257.20	1.09		"	
	13:24	E1	70	281.11	0.28	269.35	0.41	270.4	1.46	247.68	0.64		"	
7/26/82	09:28	E2	10	289.13	0.28	289.35	0.44	278.42	0.79	290.05	1.16	Baseline #2		
	09:36	E2	20	288.3	1.03	287.81	0.30	278.94	1.07	287.6	1.29			
	09:39	E2	30	288.5	0.62	286.13	0.39	279.01	1.04	283.85	1.16			
	09:41	E2	40	287.60	0.36	283.5	0.30	278.32	1.05	280.79	1.50			
	09:44	E2	50	287.51	1.03	283.3	0.41	277.35	1.04	277.04	1.20			
	09:46	E3	50	301.57	1.15	296.18	0.25	277.31	0.72	269.76	0.99			
	09:48	E3	40	301.34	0.37	297.12	0.38	280.50	0.89	281.62	1.31			
	09:52	E3	30	300.43	0.32	298.79	0.33	281.01	1.13	285.39	1.18			
	09:54	E3	20	299.58	0.37	299.4	0.28	280.14	1.07	288.54	1.87			
	9:54	E3	10	298.82	1.36	299.53	0.34	280.75	0.90	291.49	1.93			

Date	Time	Plot	Angle	CV	CH				LV				LH				Comments
(EDT)					TB	SD	TB	SD	TB	SD	TB	SD	TB	SD	TB	SD	
7/26/82	09:59	E4	10	292.28	1.07	291.13	0.31	279.64	0.81	287.01	0.84	Parallel to rows					
	10:01	E4	20	294.10	0.90	289.36	0.30	278.97	0.77	282.75	1.48						
	10:03	E4	30	297.05	0.72	285.73	0.34	278.67	1.01	275.10	0.96						
	10:06	E4	40	300.42	0.52	279.07	0.45	278.63	1.07	266.16	1.28						
	11:10	E4	50	302.65	0.34	268.21	0.23	278.26	1.21	250.17	1.60						
	10:15	E2	60	287.14	0.66	282.98	0.36	274.07	0.93	268.66	1.12						
	10:20	E2	70	286.70	0.21	281.2	0.36	266.8	1.07	266.6	1.09						
	10:23	E3	70	299.50	0.86	291.00	0.40	267.41	1.36	249.72	1.25						
	10:24	E3	60	303.78	0.38	295.76	0.26	275.64	1.06	254.86	1.36						
	10:27	E4	60	300.61	0.53	251.44	0.34	273.40	0.86	226.33	0.92						
	10:30	E4	70	281.44	0.24	218.6	0.47	252.3	0.89	184.96	1.00						
	10:43	E1	10	294.01	0.58	294	0.21	299.43	1.52	299.08	0.78						
	10:46	E1	20	294.15	0.45	293.33	0.42	301.79	3.00	297.30	2.41						
	10:49	E1	30	294.12	0.65	292.61	0.41	296.79	1.37	292.33	0.90						
	10:51	E1	40	294.30	0.44	291.41	0.18	295.16	1.08	291.17	0.93						
	10:53	E1	50	294.09	0.22	288.99	0.37	292.84	1.15	288.13	0.91						
	10:55	E1	60	292.8	0.54	285.77	0.25	289.69	1.21	286.27	0.84						
	10:58	E1	70	289.78	0.40	281.49	0.38	283.8	1.06	283.05	0.93						
	11:00	E5	70	284.23	0.45	273.30	0.36	276.86	1.01	273.62	0.73						
	11:05	E5	60	290.9	0.70	281.96	0.38	286.1	1.05	277.06	1.02						
	11:07	E5	50	293.6	0.35	287.62	0.39	290	1.05	280.6	0.77						
	11:09	E5	40	293.69	0.53	289.55	0.25	291.18	1.29	283.34	0.91						
	11:12	E5	30	294.4	0.32	292.07	0.36	293.50	1.00	289.27	0.93						
	11:14	E5	20	294.79	0.63	293.9	0.36	293.88	1.34	290.75	0.98						
	11:17	E5	10	294.50	1.20	295.25	0.34	294.39	1.43	293.5	1.11						
	12:42	E5	10	297.5	0.45	296.26	0.29	296.32	1.70	292.47	0.96	Perpendicular to rows					
	12:45	E5	20	298.13	0.38	296.1	0.41	297.28	1.35	290.52	0.92						
	12:48	E5	30	298.45	0.69	295.6	0.31	295.23	1.15	283.76	0.92						
	12:52	E5	40	297.31	0.67	293.61	0.33	293.34	1.06	281.02	0.99						
	12:54	E5	50	296.02	1.12	290.9	0.25	289.67	1.36	275.6	0.77						

Date	Time	Plot	Angle	CV		CH		LV		LH		Comments
	(EDT)			TB	SD	TB	SD	TB	SD	TB	SD	
7/26/82	12:58	E5	60	293.70	0.50	287.58	0.30	284.49	1.73	269.30	0.99	Perpendicular to rows
	13:01	E5	70	286.38	0.40	278.31	0.34	273.02	1.68	259.56	0.93	"
	13:08	E1	70	288.30	0.48	279.88	0.40	276.51	1.21	277.16	0.87	"
	13:09	E1	60	294.11	0.66	287.92	0.28	285.89	1.42	281.14	0.93	"
	13:11	E1	50	296.83	0.42	292.63	0.35	291.42	1.19	285.90	0.94	"
	13:14	E1	40	297.68	0.61	294.97	0.36	294.71	1.00	289.04	0.97	"
	13:16	E1	30	297.78	0.49	296.35	0.38	297.87	1.45	292.02	0.83	"
	13:19	E1	20	297.52	0.24	296.26	0.35	300.02	1.33	294.66	1.04	"
	13:21	E1	10	296.68	1.38	296.27	0.39	300.87	0.82	297.20	0.62	"
	13:30	E5	20	297.53	0.49	296.46	0.33	291.09	1.44	286.01	1.22	45 degree angle to row
7/27/82	13:33	E5	20	297.51	0.82	296.02	0.43	291.91	1.30	286.62	1.22	" boom is 6 feet lower
	13:37	E4	20	295.89	0.42	288.92	0.27	289.56	1.05	282.60	0.71	Boom same as 13:33
	13:38	E4	20	295.51	0.29	288.48	0.30	289.98	1.32	284.18	0.85	Boom same as 13:30
	08:56	E3	10	299.05	0.25	298.41	0.24	292.06	1.53	288.22	0.99	Full Canopy
	09:00	E3	20	299.28	0.58	299.09	0.21	290.97	1.93	285.33	0.87	"
	09:03	E3	30	300.22	0.40	298.50	0.35	290.75	1.39	282.06	0.85	"
	09:05	E3	40	300.82	0.58	297.36	0.32	289.09	0.99	276.70	0.75	"
	09:07	E3	50	301.31	0.89	295.94	0.35	287.96	1.32	267.76	0.97	"
	09:09	E3	60	301.44	0.31	293.86	0.29	281.92	1.42	254.07	0.99	"
	09:14	E3	70	296.29	0.85	287.85	0.28	272.46	1.03	247.48	0.83	"
7/27/82	09:25	E4	70	281.65	0.31	215.09	0.37	259.02	1.31	190.11	0.79	
	09:27	E4	60	299.12	0.89	244.51	0.22	281.81	1.05	227.64	0.75	
	09:29	E4	50	302.18	0.99	265.28	0.25	288.07	1.25	253.02	0.87	
	09:32	E4	40	299.96	0.70	276.27	0.28	289.15	1.40	265.72	1.11	
	09:35	E4	30	296.79	1.01	284.36	0.35	289.80	1.33	274.43	0.72	
	09:36	E4	20	294.57	0.86	289.12	0.33	288.98	1.08	281.23	0.97	
	09:38	E4	10	293.96	0.92	292.12	0.30	291.89	1.31	287.46	1.08	
	10:38	E1	10	274.44	0.84	273.88	0.42	253.73	1.59	256.12	0.95	Screens in corn at 4"
	10:41	E1	20	274.14	0.53	274.14	0.33	256.18	1.26	252.78	0.94	Parallel to rows
7/27/82	10:43	E1	30	275.17	0.56	276.74	0.31	250.18	1.28	254.39	0.87	Parallel to rows
	10:46	E1	40	281.07	0.25	281.69	0.27	256.07	1.09	261.68	0.63	"
	10:48	E1	50	286.10	0.37	283.91	0.41	265.97	1.09	271.25	0.96	"
	10:50	E1	60	288.23	0.87	283.44	0.33	269.46	1.35	274.23	0.95	"
	10:56	E3	70	298.01	0.71	274.18	0.23	259.17	1.15	227.80	0.98	First cut
	10:58	E3	60	302.06	0.34	285.25	0.24	275.68	1.05	249.54	1.27	"
	11:02	E3	50	303.11	0.67	291.74	0.21	282.76	1.12	262.38	1.01	"
	11:06	E3	40	303.08	0.35	296.47	0.33	286.53	1.27	272.81	1.00	"
	11:09	E3	30	301.76	0.40	298.35	0.31	286.76	1.38	277.07	0.86	"
	11:12	E3	20	300.93	0.32	299.60	0.26	287.25	1.23	281.25	0.95	"
	11:15	E3	10	300.28	0.53	300.34	0.34	287.92	1.39	284.55	1.30	"
	11:20	E1	10	268.13	1.20	265.35	0.37	237.59	1.01	246.85	0.92	Screens in corn at

11:22	E1	20	264.90	0.51	265.73	0.32	233.04	1.67	231.28	0.92	31" Parallel to rows
11:24	E1	30	266.52	0.57	270.24	0.35	231.62	1.36	229.76	0.96	"
11:26	E1	40	273.80	0.40	276.64	0.35	238.10	1.34	241.20	0.96	"
11:28	E1	50	281.70	0.18	280.65	0.29	245.49	1.64	250.16	1.08	"
11:47	E1	50	247.23	0.32	244.31	0.38	208.23	1.32	194.82	0.81	Screen s in corn at 60"
11:49	E1	40	241.53	0.51	235.81	0.44	198.55	0.86	192.35	0.91	(Boom is 12' above corn)
11:50	E1	30	233.63	0.68	226.88	0.40	190.86	0.91	185.34	0.74	"
11:52	E1	20	221.64	0.26	215.56	0.50	174.36	1.21	175.59	1.05	"
11:54	E1	10	232.29	0.22	219.47	0.43	188.02	1.24	195.86	0.80	"
12:14	E1	10	166.35	0.25	139.66	0.71	121.37	1.10	124.78	0.93	Screen s in corn at 90"
12:16	E1	20	104.70	0.29	103.28	0.77	97.39	1.06	100.33	1.02	"
12:18	E1	30	105.06	0.25	111.55	0.87	103.96	1.67	101.47	1.07	"
12:20	E1	40	117.53	0.21	129.52	0.86	112.29	1.23	106.32	1.10	"
12:22	E1	50	141.78	0.23	157.45	0.79	129.23	0.98	118.43	0.95	"
12:30	E1	50	296.63	0.95	292.40	0.28	288.42	1.40	284.98	0.58	Just posts, no screen s
12:34	E1	40	297.90	0.69	295.21	0.31	289.98	1.16	288.80	1.19	"
12:35	E1	30	297.95	0.76	296.59	0.29	292.90	1.23	290.08	1.13	"
12:37	E1	20	297.26	0.65	297.44	0.32	294.88	1.35	293.51	0.85	

Date	Time (EDT)	Plot	Angle	CV TB	SD	CH TB	SD	LV TB	SD	LH TB	SD	Comments
#####	12:39	E1	10	297.29	0.57	297.56	0.31	295.01	1.16	296.39	0.93	Just posts - no no screen s
	13:39	E3	10	299.63	0.35	298.75	0.37	288.82	3.61	285.06	3.26	Grass - second second cut
	13:40	E3	20	299.62	0.28	297.54	0.28	283.69	1.85	277.66	0.96	"
	13:42	E3	30	299.97	0.81	296.20	0.29	284.71	3.69	276.37	1.61	"
	13:45	E3	40	300.26	0.45	292.82	0.29	278.81	1.21	266.11	1.09	"
	13:47	E3	50	300.04	0.36	286.80	0.34	275.68	1.36	254.83	1.00	"
	13:49	E3	60	297.49	0.30	275.67	0.40	266.94	1.35	235.43	0.94	"
	13:51	E3	70	288.04	0.98	256.65	0.36	243.18	1.79	202.00	0.66	"
	14:04	-	0	116.13	0.18	101.33	0.98	54.08	1.09	114.76	1.02	Screen s on Eccoso rb
	14:14	E5	10	249.93	0.39	256.46	0.48	197.23	1.02	207.15	1.00	Screen s at 4" Parallel to rows
	14:16	E5	20	249.80	0.25	255.17	0.45	202.18	1.35	201.87	1.12	
	14:18	E5	30	255.13	0.42	260.03	0.46	209.93	1.34	203.66	1.18	
	14:19	E5	40	264.80	0.42	268.43	0.36	224.97	1.04	214.77	0.84	
	14:21	E5	50	273.65	0.84	273.92	0.42	239.19	1.16	231.82	0.76	
	14:23	E5	50	262.22	0.40	266.02	0.34	223.55	1.26	211.46	1.07	Screen s at 20"
	14:30	E5	40	247.24	0.62	255.80	0.39	206.55	1.08	191.89	0.91	
	14:33	E5	30	235.46	0.50	243.77	0.47	-	-	194.23	0.94	
	14:35	E5	20	230.69	0.32	238.26	0.55	187.66	2.32	195.74	0.85	
	14:37	E5	10	231.71	0.71	237.58	0.43	176.13	1.24	197.20	1.23	
	14:39	E5	10	85.53	0.30	80.62	0.78	71.79	1.38	83.23	0.96	Screen s at 66"
	14:51	E5	20	75.55	0.26	83.42	0.95	76.02	1.04	78.32	1.05	
	14:52	E5	30	80.81	0.40	89.30	0.77	76.68	1.23	77.73	0.76	

14:54	E5	40	90.33	0.30	102.74	0.89	82.24	1.00	83.20	1.06
14:57	E5	50	106.99	0.29	127.46	0.90	95.05	1.22	89.83	0.75
14:59	E5	50	296.50	0.68	290.33	23.00	285.61	1.15	275.69	0.78
										Just posts - no no screens
15:05	E5	40	295.94	0.20	291.35	0.32	289.20	1.12	281.65	0.72
15:07	E5	30	295.35	0.34	293.30	0.40	289.19	1.67	285.57	1.21
15:10	E5	20	294.04	0.80	293.63	0.35	291.39	1.10	289.43	0.93
15:11	E5	10	294.40	0.36	295.20	0.52	291.37	1.42	291.25	1.17

Date	Time	Plot	Angle	CV		CH		LV		LH		Comments
				TB	SD	TB	SD	TB	SD	TB	SD	
8/3/82	(EDT) 13:17	-	10	48.24	0.43	36.35	0.92	75.75	1.11	69.77	1.04	Screens on Eccosorb - parallel
	13:27	-	10	45.92	0.32	21.88	1.34	72.49	0.91	83.82	1.18	" - perpendicular
	13:46	-	20	61.22	0.31	20.90	1.13	52.34	1.14	49.05	1.15	" boom 3.5' above scr
	13:51	-	20	60.00	0.24	20.91	1.13	49.96	0.94	55.47	1.11	" perp w/extra row or scr
	13:54	-	20	47.13	0.30	27.30	1.14	36.63	0.87	29.59	1.18	" - parallel
	13:55	-	26	42.45	0.28	27.41	0.95	36.78	1.10	30.11	1.08	w/extra row of scr
	13:57	-	20	33.12	0.32	21.61	1.15	59.81	1.36	31.11	0.95	" at 45 degree azimuth to boom
	14:17	-	20	49.32	0.32	52.43	1.02	58.69	0.96	58.09	1.06	Parallel screens on grass-L centered with boom 2' high
	14:21		20	27.34	0.30	34.82	0.88	70.09	0.99	58.80	1.08	C - centered
	8/9/82 08:24	E8	20	274.41	0.49	276.72	0.32	236.24	1.06	231.02	1.00	Full canopy with screens (S) L centered on row
8/9/82	08:31	E8	20	269.47	1.10	272.01	0.39	235.45	1.08	231.89	0.88	L centered <-> rows
	08:34	E8	10	265.85	0.20	266.85	0.30	229.81	1.26	231.07	0.85	"
	08:40	E8	10	285.91	0.35	286.10	0.30	289.77	1.46	285.82	1.10	Full canopy - no screens
	08:42	E8	20	285.80	0.34	285.06	0.32	291.27	1.74	282.01	1.23	"
	08:45	E8	30	286.75	1.01	285.23	0.36	291.21	1.38	280.08	1.00	"

08:47	E8	40	287.29	0.74	284.11	0.35	289.37	1.06	277.32	0.88	"
09:04	E8	20	138.49	0.17	146.89	0.68	190.98	1.15	163.89	1.09	Leaves and ears strippe d, w/scr. (S)
09:06	E8	10	144.67	0.44	153.93	0.76	192.64	1.13	187.77	1.05	"
09:13	E8	10	265.13	0.37	264.54	0.33	280.28	1.35	273.48	0.93	Leaves and ears strippe d, w/no scr (S)
09:14	E8	20	266.68	1.14	261.85	0.37	279.14	1.19	297.03	1.07	"
09:17	E8	30	271.62	0.34	260.84	0.43	282.29	1.37	260.99	1.27	"
09:19	E8	40	279.90	0.31	265.29	0.32	280.90	1.61	259.22	0.73	oversh ooting target a bit
09:31	E8	20	252.70	0.24	257.26	0.45	232.33	1.16	228.28	1.01	Top 1/3 cut (N) w/scre ens
09:33	E8	10	251.86	0.33	252.83	0.33	226.14	1.22	229.44	0.90	"
09:38	E8	10	281.21	0.78	281.56	0.44	287.53	1.29	283.89	0.97	Top 1/3 cut (N) no screen s
09:39	E8	20	281.79	0.45	280.90	0.34	287.92	1.38	281.03	0.90	"
09:42	E8	30	283.12	0.30	280.59	0.32	287.46	1.08	277.91	0.64	"
09:44	E8	40	283.39	1.07	278.95	0.34	285.61	1.54	275.38	1.13	"
09:53	E8	10	129.12	0.22	128.29	0.80	179.33	0.83	171.43	0.87	Tassel s remov ed from stalks (S) w/scre ens

Date	Time	Plot	Angle	CV		CH		LV		LH		Comments
8/9/82	(EDT) 09:57	E8	20	116.44	0.25	122.43	0.80	181.75	0.92	153.12	1.79	Tassels removed from stalks (S) w/screens " w/ no screen s
	09:59	E8	10	264.03	0.36	262.06	0.38	280.98	1.91	275.14	1.57	" w/ no screen s
	10:02	E8	20	265.44	1.05	259.24	0.27	280.84	1.34	268.07	1.00	"
	10:04	E8	30	269.22	0.64	256.71	0.34	280.56	1.31	260.13	0.88	"
	10:06	E8	40	275.41	0.40	254.93	0.35	279.95	1.31	253.98	0.92	"
	10:16	E8	10	128.11	0.23	125.63	0.62	161.45	0.84	153.69	0.77	Middle 1/3 cut (N) - w/screens
	10:18	E8	20	117.28	0.45	124.65	0.86	143.75	0.99	135.02	0.97	"
	10:22	E8	10	266.53	0.37	265.74	0.47	274.78	1.02	268.83	0.87	" w/ no screen s
	10:26	E8	20	267.66	0.19	263.08	0.34	274.42	1.43	263.00	1.14	"
	10:28	E8	30	271.94	0.27	260.66	0.36	275.41	1.17	256.19	0.93	"

10:31	E8	40	277.00	0.27	257.66	0.42	276.26	1.25	249.24	0.84	"
10:41	E8	40	268.07	0.43	238.22	0.42	266.64	1.42	228.50	0.86	Stubble (N)
10:43	E8	30	260.42	0.26	244.09	0.32	261.68	1.16	236.24	0.93	"
10:46	E8	20	256.23	0.45	249.39	0.48	259.63	1.33	244.87	0.99	"
10:50	E8	10	255.60	0.38	254.23	0.32	260.33	1.08	253.54	0.96	"
10:58	E8	10	255.53	0.32	252.66	0.37	264.68	1.24	258.85	1.01	Stubble (S)
11:00	E8	20	256.23	0.60	248.62	0.45	264.74	1.25	249.64	1.06	"
11:03	E8	30	261.30	0.63	244.09	0.39	268.26	0.86	243.05	0.93	"
11:05	E8	40	268.55	0.90	239.05	0.49	270.99	1.17	232.41	0.55	"
11:14	E8	40	244.22	0.33	253.81	0.42	240.01	0.91	267.79	0.80	Cut stalks parallel (S)
11:16	E8	30	237.60	0.39	251.42	0.42	234.39	0.88	271.39	0.88	"
11:18	E8	20	233.26	0.28	250.52	0.46	227.77	1.26	274.07	0.66	"
11:20	E8	10	233.06	0.58	251.51	0.52	230.11	1.01	278.32	0.82	"
11:32	E8	10	249.96	0.25	235.46	0.48	-	-	-	-	Cut stalks perpendicularly (S)
11:33	E8	20	251.04	0.33	233.29	0.42	278.32	1.11	195.20	0.85	"
11:36	E8	30	252.78	0.30	229.52	0.40	278.76	0.93	191.23	0.92	"
11:38	E8	40	255.38	0.29	226.96	0.44	278.60	1.44	186.39	1.31	"
11:47	E8	40	256.73	1.16	248.41	0.42	255.19	1.14	230.91	1.00	Cut stalks randomly (S)
11:48	E8	40	256.28	0.86	247.95	0.49	254.83	1.35	229.98	0.92	"
11:51	E8	40	256.52	1.09	247.61	0.39	-	-	229.14	0.85	"

Date	Time	Plot	Angle	CV		CH		LV		LH		Comments
				TB	SD	TB	SD	TB	SD	TB	SD	
8/9/82	(EDT) 11:52	E8	30	252.74	0.49	248.20	0.48	253.32	1.12	234.67	0.78	Cut stalks randomly (S)
												"
	11:54	E8	20	249.50	0.37	247.64	0.29	251.83	1.20	240.50	0.75	"
	11:57	E8	10	248.38	0.78	249.39	0.44	255.56	1.23	252.12	0.68	"
	12:04	E8	10	280.74	0.89	280.20	0.22	288.14	1.53	277.54	1.13	Everything randomly (S)
												"
	12:07	E8	10	279.89	0.62	278.45	0.28	286.67	1.34	275.78	1.27	"
	12:09	E8	20	279.20	0.91	276.51	0.37	-	-	-	-	"
	12:11	E8	30	278.80	1.39	275.02	0.29	283.91	1.37	270.99	0.93	"
	12:13	E8	40	279.80	1.15	274.74	0.37	282.82	1.05	268.41	0.76	"
	12:17	E8	20	279.81	0.43	277.13	0.32	284.08	1.93	272.56	1.19	"
	13:48	-	20	92.67	0.33	107.07	0.90	76.38	1.02	65.89	0.98	Screens on grass with boom 17' high
												"
	13:53	-	20	92.59	0.21	106.91	0.93	-	-	67.07	0.57	"
	13:54	-	20	92.29	0.31	106.63	0.75	76.76	0.61	67.52	0.84	"
	13:56	-	10	105.97	0.33	114.36	0.83	100.28	1.41	86.07	0.80	"
0	08:48	E7	10	234.00	0.57	238.45	0.43	213.20	1.00	208.14	0.93	Full canopy with screens (S)
8/10/82												"
	08:51	E7	20	232.32	0.28	238.90	0.51	212.38	1.71	203.60	0.89	Full canopy with no screens (S)
	08:54	E7	10	282.38	0.40	281.35	0.45	290.65	1.39	287.49	1.07	"
	08:58	E7	20	282.73	1.09	280.69	0.42	290.12	1.35	283.23	1.33	"

09:01	E7	30	283.59	0.73	279.62	0.29	290.30	1.31	277.08	0.95	"
09:02	E7	40	284.03	0.78	278.72	0.25	289.23	1.14	273.18	0.92	"
09:12	E7	20	101.29	0.26	118.49	0.91	125.89	1.05	120.38	0.78	Leaves and head strippe d from stalks (S) w/scre ens
09:14	E7	10	102.14	0.30	106.25	0.88	121.26	0.93	125.34	0.79	"
09:17	E7	10	272.34	0.27	270.68	0.43	278.67	1.26	274.49	0.77	Leaves and head strippe d from stalks (S) no screen s
09:19	E7	20	273.97	0.69	269.06	0.35	280.09	1.35	269.85	1.02	"
09:21	E7	30	276.54	0.30	266.40	0.41	281.31	1.41	261.09	1.25	"
09:24	E7	40	280.87	0.77	266.70	0.31	284.04	1.25	254.60	0.96	"
09:31	E7	20	219.99	0.30	226.53	0.52	193.29	1.22	183.70	0.95	Heads remove d (N) w/scre ens
09:34	E7	10	219.12	0.21	221.01	0.51	196.72	4.83	193.95	4.87	"
09:36	E7	10	282.72	0.34	281.86	0.22	290.59	1.31	286.71	1.17	Heads remove d (N) w/no screen s
09:38	E7	20	282.85	1.20	280.98	0.33	290.75	1.39	283.43	1.47	"

Date	Time	Plot	Angle	CV		CH		LV		LH		Comments
				TB	SD	TB	SD	TB	SD	TB	SD	
8/10/82	09:40	E7	30	283.23	0.31	279.11	0.38	290.63	0.99	277.54	0.79	Heads remove d (N) - no screen s
09:42	E7	40	283.98	0.78	278.54	0.34	289.66	1.48	274.03	1.06	"	
09:51	E7	40	277.90	0.39	261.83	0.52	277.90	1.43	246.89	0.81	Stubbl e (S)	
09:54	E7	30	273.48	0.98	263.60	0.36	277.08	1.76	256.66	1.03	Grass/ weeds <-> rows	
09:57	E7	20	270.92	0.39	266.16	0.31	275.60	-	265.23	1.07	"	
09:59	E7	10	268.59	0.72	268.66	0.35	274.21	1.01	269.99	1.04	"	
10:06	E7	10	261.88	0.34	271.20	0.34	240.53	0.94	279.03	0.90	Cut stalks parallel (S)	
10:08	E7	20	263.84	0.46	270.46	0.48	242.37	1.18	274.46	1.02	"	
10:10	E7	30	267.31	0.71	269.91	0.32	246.44	1.43	268.96	0.90	"	
10:12	E7	40	272.55	0.96	270.58	0.30	251.48	1.04	260.59	0.75	"	
10:19	E7	40	277.33	0.35	253.13	0.42	279.07	1.33	191.60	0.92	Cut stalks perpen dicular (S)	
10:20	E7	30	275.39	0.91	257.69	0.31	279.80	1.21	205.12	1.20	"	
10:24	E7	20	274.65	0.59	260.83	0.23	278.26	1.20	212.53	0.82	"	
10:26	E7	10	274.15	0.76	263.13	0.38	278.03	1.57	219.69	0.97	"	
10:33	E7	10	269.47	0.78	270.98	0.34	254.88	0.99	252.04	0.75	"	
10:35	E7	20	270.80	0.81	269.89	0.37	255.88	1.18	248.25	0.90	"	

10:37	E7	30	272.37	1.04	268.07	0.31	255.62	1.37	243.47	1.03	"
10:39	E7	40	275.44	0.50	267.32	0.23	256.73	1.30	232.02	0.94	"
10:48	E7	40	281.43	0.57	277.37	0.25	277.12	1.22	268.97	1.08	Everything random (S) leaves wet
10:50	E7	30	280.30	0.94	277.95	0.34	276.91	1.33	271.12	0.61	"
10:52	E7	20	279.23	0.56	278.90	0.33	274.63	1.40	273.53	0.97	"
10:54	E7	10	278.37	0.54	279.10	0.39	272.77	1.48	274.88	0.93	"
11:02	E7	10	125.96	0.66	131.86	0.95	142.88	1.16	138.98	1.03	50% of plants removed (N) w/screens
11:04	E7	20	122.49	0.26	132.31	0.85	150.80	0.91	138.94	0.65	"
11:06	E7	10	279.75	0.53	279.14	0.39	281.87	0.94	277.63	0.59	50% of plants removed (N) no screens
11:09	E7	20	280.88	0.48	277.75	0.27	286.10	1.53	273.74	0.66	"
11:11	E7	30	283.33	0.84	277.89	0.44	286.08	1.23	269.22	1.81	"
11:13	E7	40	285.33	0.86	276.99	0.30	285.71	1.17	261.87	1.15	"
11:29	E7	40	280.26	0.34	264.94	0.34	278.86	1.19	247.75	1.00	Stubble (N)
11:30	E7	30	277.85	0.97	270.57	0.45	278.71	1.29	257.88	0.92	"

Date	Time	Plot	Angle	CV		CH		LV		LH		Comments
				TB	SD	TB	SD	TB	SD	TB	SD	
8/10/82	11:32	E7	20	276.19	1.10	273.01	0.32	277.19	1.13	264.81	0.85	Stubble (N)
	11:34	E7	10	275.15	1.16	274.41	0.31	275.98	1.21	269.85	0.80	"
8/11/82	09:04	E6	10	184.47	0.48	190.48	0.56	169.16	0.93	169.87	0.98	Full canopy (S) w/screens
	09:06	E6	10	184.44	0.64	190.12	0.50	170.58	0.93	171.90	0.78	"
	09:07	E6	20	180.05	0.37	190.15	0.62	161.55	0.95	159.14	0.83	"
	09:10	E6	10	264.66	0.34	263.95	0.31	265.53	1.55	263.41	1.15	"
	09:13	E6	20	264.86	0.52	262.43	0.39	268.14	1.44	259.41	0.86	"
	09:15	E6	30	267.29	0.36	261.27	0.31	272.03	1.48	252.71	1.04	"
	09:17	E6	40	270.61	0.20	260.85	0.36	274.01	1.34	250.03	1.11	"
	09:25	E6	40	277.95	0.47	269.85	0.44	287.64	1.22	267.64	0.89	Full canopy (N) no screens
	09:27	E6	30	276.48	0.37	271.78	0.32	287.82	1.21	272.81	0.99	"
	09:29	E6	20	275.49	0.55	273.61	0.38	287.56	1.31	279.75	0.98	"
	09:30	E6	10	275.25	0.35	275.00	0.39	285.96	1.22	284.30	0.98	"
	09:40	E6	10	148.20	0.39	148.64	0.59	151.32	0.94	145.94	1.09	50% of plants removed (S) w/screens
	09:42	E6	20	142.03	0.44	148.15	0.69	144.24	1.02	134.95	0.92	"
	09:45	E6	10	260.00	0.45	257.54	0.45	261.55	1.20	259.15	3.08	(N) " no screens
	09:47	E6	20	260.87	0.70	255.47	0.48	265.36	1.23	252.80	0.98	"
	09:49	E6	30	263.66	0.70	253.90	0.44	-	-	245.45	0.74	"
	09:51	E6	30	264.02	0.81	254.04	0.35	267.58	1.46	246.07	1.14	"
	09:52	E6	40	268.41	0.82	252.41	0.42	270.50	1.63	239.71	1.00	"
	10:04	E6	40	258.53	0.31	224.54	0.51	262.60	2.17	218.60	0.85	Stubble

												e (S)
Date	Time	Plot	Angle	CV	CH	LV	LH					Comments
	(EDT)			TB	SD	TB	SD	TB	SD	TB	SD	
####	10:38	E1	30	285.02	0.73	284.06	0.34	289.49	1.18	278.89	1.08	Full canopy (S) no screen s
												"
10:40	E1	40	285.82	0.81	283.05	0.37	285.51	1.07	275.46	0.94		
11:00	E1	20	252.24	1.41	257.26	0.34	234.99	1.52	218.02	0.77	25% of plants removed (S) w/screens	
11:03	E1	10	246.77	0.68	250.98	0.38	228.77	1.24	223.96	0.79	"	
11:06	E1	10	280.97	0.59	280.86	0.38	286.80	2.06	283.03	1.13	25% of plants removed (S) no screen s	
11:09	E1	20	281.35	0.57	280.37	0.59	286.62	1.11	276.71	1.06	"	
11:11	E1	30	281.30	0.56	279.13	0.44	285.60	1.48	271.87	0.94	"	
11:13	E1	40	283.46	0.36	279.65	0.38	282.40	1.23	269.51	1.13	"	
11:23	E1	20	221.52	1.14	227.60	0.95	221.12	1.73	200.07	1.03	50% of plants removed (S) w/screens	
11:25	E1	10	222.13	0.84	217.59	0.49	216.40	1.05	216.35	0.86	"	
11:27	E1	10	275.40	0.76	275.54	0.41	283.48	0.94	279.43	0.89	"	
11:29	E1	20	276.50	0.33	275.20	0.43	282.81	0.78	270.30	0.94	"	
11:32	E1	30	279.04	0.42	275.76	0.39	282.67	1.14	264.75	0.97	"	
11:34	E1	40	281.69	0.48	276.93	0.37	282.00	1.01	263.25	1.12	"	
11:47	E1	20	188.52	0.47	192.43	0.69	203.00	2.29	182.54	1.05	75% of plants removed (S) w/screens	
11:49	E1	20	-	-	-	-	202.20	1.29	180.63	0.79	"	
11:52	E1	10	187.29	0.71	184.96	0.56	195.24	1.18	193.39	1.00	"	
11:55	E1	10	268.67	0.88	267.27	0.45	275.73	0.92	272.71	0.90	75% of plants removed (S) no screen s	
11:56	E1	20	271.81	0.49	267.58	0.28	278.72	1.49	266.86	1.24	"	
11:58	E1	30	273.26	0.75	266.88	0.31	277.08	1.50	260.75	1.34	"	
12:00	E1	40	276.93	0.27	266.54	0.40	274.56	1.27	250.42	0.68	"	

12:10	E1	40	259.75	0.36	234.08	0.31	259.96	1.42	223.01	1.14	Stubble
12:12	E1	30	252.85	0.28	237.98	0.42	257.00	1.19	232.40	0.67	"
12:14	E1	20	247.32	0.69	242.15	0.42	253.44	1.42	239.19	0.99	"
12:16	E1	10	246.43	0.37	247.35	0.55	256.09	1.18	249.22	1.17	"
12:22	E1	10	291.29	0.56	291.18	0.40	304.75	1.77	300.65	0.91	Full canopy (N) no scr.
12:24	E1	20	291.30	0.97	290.28	0.33	302.63	1.99	293.38	1.14	"
12:27	E1	30	291.67	0.97	289.47	0.36	302.51	1.55	289.79	1.29	"
12:28	E1	40	291.79	0.27	288.66	0.34	292.68	1.19	285.40	0.65	"

Date	Time	Plot	Angle	CV		CH		LV		LH		Comments
				TB	SD	TB	SD	TB	SD	TB	SD	
8/25/82	(EDT) 10:49	E5	20	256.37	0.31	263.58	0.47	224.18	1.00	235.17	1.62	Full canopy w/screens
	10:52	E5	20	255.80	0.45	264.00	0.63	222.04	1.25	234.04	1.24	"
	10:54	E5	20	255.57	0.94	263.35	0.38	222.83	1.07	232.49	0.92	"
	10:56	E5	10	250.72	1.30	258.27	0.83	213.42	1.26	240.25	1.34	"
	11:00	E5	10	280.86	1.18	282.07	0.27	276.06	1.28	282.60	1.23	Full canopy no screens
	11:02	E5	20	282.17	0.34	281.54	0.31	276.50	0.90	276.49	0.73	"
	11:04	E5	30	283.59	0.68	280.40	0.29	278.53	1.21	270.39	1.03	"
	11:06	E5	40	285.14	0.40	278.72	0.35	281.07	1.45	267.54	0.82	"
	12:47	E5	10	152.07	1.31	157.76	0.90	156.97	1.39	192.84	1.02	Leaves stripped from stalks w/ screens
	12:49	E5	20	-	-	161.10	1.69	178.00	1.90	177.48	1.38	
	12:51	E5	20	166.44	0.71	160.35	1.23	181.03	1.46	174.83	0.76	"
	12:53	E5	10	267.85	0.59	268.65	0.38	263.73	1.07	271.15	1.03	"
	12:55	E5	20	271.68	0.73	271.29	0.33	266.22	1.45	263.54	1.58	"
	12:57	E5	30	274.02	1.38	264.20	0.42	270.41	1.26	253.05	1.19	"
	13:00	E5	40	280.50	0.46	267.95	0.80	271.78	1.96	247.17	1.04	"
	13:14	E5	40	255.37	0.40	229.62	0.54	245.87	1.10	209.16	0.90	Stubble
	13:15	E5	30	240.35	0.27	223.09	0.48	238.28	0.99	215.85	0.98	"
	13:17	E5	20	235.44	0.33	228.50	0.42	232.99	1.56	224.89	0.98	"
	13:21	E5	10	236.73	0.26	234.79	0.47	238.11	1.38	236.01	0.97	Cut stalks parallel
	13:32	E5	10	236.29	0.31	264.02	0.47	199.86	1.15	264.06	0.92	
	13:34	E5	20	235.43	0.73	263.45	0.36	200.54	1.17	259.56	0.89	"
	13:35	E5	30	239.70	0.36	264.98	0.47	202.42	1.06	259.43	0.79	"
	13:37	E5	40	255.97	0.24	273.34	0.50	208.84	1.19	259.11	0.82	
	13:49	E5	40	266.59	1.07	242.79	0.41	260.28	1.36	184.80	1.19	Cut stalks perpendicular
	13:51	E5	30	263.86	0.90	240.27	0.34	259.78	1.37	185.64	1.08	"
	13:53	E5	20	260.85	0.73	243.36	0.44	260.12	1.08	188.77	0.81	"
	13:55	E5	10	260.75	0.29	244.98	0.31	260.22	1.63	191.76	0.87	"
	14:07	E5	10	48.03	0.39	47.81	0.95	69.65	1.11	82.36	1.11	Screens on stubble L-centered
	14:09	E5	20	37.24	0.32	44.89	1.15	61.36	1.01	63.44	0.74	"
	14:22	E5	20	202.72	0.41	212.28	0.49	167.56	1.19	172.50	1.06	280 stalks on screen

Date	Time	Plot	Angle	CV		CH		LV		LH		Comments
				TB	SD	TB	SD	TB	SD	TB	SD	
8/25/82	(EDT) 14:24	E5	10	203.45	0.51	209.36	0.52	168.13	1.25	192.51	0.89	280 stalks on screen s perpendicular
	14:33	E5	10	240.43	0.31	227.12	0.45	228.11	1.21	190.87	0.92	560 stalks on screen s perpendicular
	14:35	E5	20	239.82	0.27	226.99	0.41	225.68	0.88	188.11	0.80	"
	14:53	E5	20	203.94	0.63	208.15	0.83	184.57	0.95	186.92	1.05	280 stalks on screen s parallel
	14:55	E5	10	203.38	0.41	208.13	0.38	193.42	0.81	191.03	0.54	"
	15:02	E5	10	222.04	0.54	240.68	0.37	201.76	1.11	227.90	1.06	560 stalks on screen s parallel
	15:03	E5	20	223.70	0.52	239.65	0.43	203.23	1.03	228.11	0.89	"
	15:14	E5	10	254.24	0.41	258.23	0.37	226.48	1.09	230.27	0.89	Cut stalks randomly
	15:16	E5	20	254.90	0.44	257.37	0.46	226.69	1.07	228.80	1.05	"
	15:17	E5	30	258.46	1.06	257.77	0.42	230.75	1.10	223.58	0.94	"
	15:20	E5	40	263.49	0.78	257.51	0.45	232.53	1.34	220.23	0.80	"
	15:30	E5	40	284.50	0.79	280.39	0.28	271.97	1.26	272.10	0.94	Everything random
#####	15:31	E5	30	282.22	0.28	279.63	0.39	269.66	1.24	272.33	0.90	"
	15:34	E5	20	280.95	0.28	279.84	0.39	271.41	1.01	275.79	0.91	"
	15:36	E5	10	280.11	0.39	279.84	0.31	272.91	0.94	277.96	0.96	"
	09:16	E5	20	262.19	0.44	267.43	0.31	224.56	0.82	225.40	1.01	Full canopy w/screens
	09:20	E5	10	254.76	0.61	257.12	0.25	220.22	1.31	229.11	0.82	"
	09:23	E5	10	281.96	0.55	281.98	0.33	270.94	1.44	271.65	0.99	Full canopy no screens
	09:24	E5	20	279.41	1.12	278.23	0.40	272.19	1.41	269.41	1.02	"
	09:27	E5	30	278.27	0.45	276.43	0.58	273.59	1.32	265.90	0.90	"
	09:29	E5	40	277.88	0.46	270.08	0.37	274.89	1.42	261.61	1.08	"
	09:43	E5	40	273.99	0.75	263.60	0.60	260.91	1.24	248.77	0.83	Top 1/3 cut no screens
	09:45	E5	30	271.30	0.31	265.72	0.98	259.89	1.26	254.43	0.55	"
	09:46	E5	20	266.72	0.44	265.48	0.26	261.23	1.23	258.91	0.91	"
	09:48	E5	10	268.50	0.31	267.74	0.37	264.67	1.53	264.28	0.99	"
	09:54	E5	10	211.09	0.25	221.54	0.45	193.94	1.16	196.42	0.68	Top 1/3 cut

											w/ screen s
Date	Time	Plot	Angle	CV		CH		LV		LH	Comments
	(EDT)			TB	SD	TB	SD	TB	SD	TB	SD
8/26/82	10:20	E5	10	246.88	0.63	246.12	0.48	250.19	1.17	250.30	0.96
	10:21	E5	20	246.94	0.35	243.05	0.47	246.25	1.25	244.61	0.89
	10:24	E5	30	251.21	0.95	239.76	0.53	247.78	1.36	238.29	0.90
	10:26	E5	40	259.18	1.07	236.95	0.38	251.94	1.38	233.99	0.72
	10:37	E5	40	250.01	0.47	217.34	0.47	245.68	1.29	219.75	0.87
	10:38	E5	30	242.80	0.37	225.28	0.44	237.12	0.80	221.07	0.95
	10:42	E5	20	237.39	0.24	229.22	0.40	234.60	1.11	229.71	0.83
	10:44	E5	10	237.74	0.36	235.79	0.46	235.58	0.96	232.27	1.00
	10:47	E5	10	102.87	0.30	101.17	1.18	98.79	0.93	96.73	1.00
	10:51	E5	20	88.78	1.02	96.64	0.68	92.22	1.01	90.79	0.93
	10:53	E8	20	234.20	0.68	225.26	0.50	230.61	0.89	222.20	0.62
	10:57	E8	20	232.66	0.64	223.53	0.30	229.13	1.00	220.77	1.10
	11:01	E8	20	236.77	0.52	227.36	0.49	231.10	1.30	227.54	0.86
	11:16	E8	20	231.71	0.57	222.34	0.52	225.40	1.06	216.56	0.74
	12:47	E8	40	267.45	0.72	251.62	0.39	261.85	1.29	262.93	0.85
	12:50	E8	30	263.10	0.37	254.57	0.33	260.80	1.42	266.80	1.14
	12:52	E8	20	260.07	0.88	254.80	0.34	258.25	1.48	270.95	1.32
	12:54	E8	10	259.20	0.78	256.19	0.41	256.56	0.75	272.09	1.06
	13:06	E8	10	252.77	0.43	260.82	0.41	276.64	1.59	260.27	0.99
	13:09	E8	20	253.60	0.54	258.81	0.46	273.73	1.53	253.96	1.06
	13:11	E8	30	258.55	0.39	258.70	0.42	275.72	1.02	248.56	0.86
	13:13	E8	40	265.99	0.30	259.25	0.40	274.92	1.37	241.39	0.87
	13:18	E8	40	264.21	0.23	227.47	0.40	252.65	1.22	215.41	0.68
	13:20	E8	30	255.94	0.51	235.69	0.44	247.89	1.29	225.16	1.15
	13:22	E8	20	251.09	0.54	242.75	0.47	243.37	0.99	234.69	1.01
	13:24	E8	10	251.33	0.32	248.60	0.57	245.13	1.76	242.77	1.12
	13:42	E8	10	62.07	0.23	60.02	0.92	94.96	1.04	108.94	1.40
	13:45	E8	20	50.26	0.32	54.77	1.06	-	-	53.64	2.44
	13:47	E8	20	50.14	0.36	54.59	1.07	57.72	1.01	51.49	1.20
	14:03	E8	20	68.85	0.31	76.37	0.92	109.96	1.14	99.56	1.10
8/26/82	14:05	E8	10	79.65	0.27	73.23	0.94	118.18	1.00	111.39	0.90
	14:14	E8	10	92.98	0.33	87.08	0.88	133.38	1.07	118.58	1.05
	14:17	E8	20	82.30	0.25	97.68	0.92	107.92	0.90	101.74	0.99
	14:23	E8	20	57.14	0.19	71.71	1.03	64.63	1.20	69.59	1.18
	14:25	E8	10	72.17	0.30	74.64	1.10	71.45	1.16	76.81	1.25
	14:30	E8	10	295.53	0.60	295.14	0.25	274.10	1.07	272.46	1.59
9/15/82	14:31	E8	20	296.38	0.68	293.31	0.31	272.27	1.58	266.35	0.84
	09:30	E8	20	248.58	0.41	236.80	0.36	261.65	1.69	242.74	1.35

09:55	E8	20	238.62	0.92	226.40	0.45	246.45	1.09	231.01	1.00	(S) Stubbl e (S)
10:04	E8	20	227.37	0.36	229.70	0.62	241.27	1.76	246.09	1.21	100 freshly cut stalks parallel (S)
10:09	E8	20	225.98	0.33	234.72	0.47	246.46	1.69	254.39	1.00	200"
10:14	E8	20	224.08	0.34	239.23	0.46	251.46	1.66	260.56	1.37	300"
10:19	E8	20	220.02	0.35	241.30	0.39	256.87	1.58	259.63	1.27	400"
10:23	E8	20	217.46	0.33	243.44	0.59	246.79	1.43	260.28	1.49	500"
10:29	E8	20	221.19	1.01	246.56	0.35	253.70	1.77	262.03	1.04	600"
10:38	E8	20	288.53	0.65	284.96	0.34	290.25	1.40	282.67	1.02	Standi ng stalks (N)
10:52	E8	20	284.38	0.31	279.91	0.45	291.28	1.80	280.75	1.62	Stubbl e (N)
10:59	E8	20	263.10	0.79	272.11	0.37	267.70	1.61	282.63	1.67	100 freshly cut stalks parallel (N)
11:04	E8	20	247.08	0.38	265.47	0.44	266.54	1.22	284.75	1.58	200"
11:09	E8	20	237.03	0.71	261.76	0.43	257.65	1.63	284.54	1.37	300"
11:15	E8	20	234.03	0.45	259.69	0.37	262.62	1.50	283.89	1.16	400"
11:20	E8	20	227.76	0.40	256.46	0.39	267.62	2.01	285.07	1.23	500"
11:27	E8	20	228.82	0.43	258.39	0.52	272.20	1.02	286.45	1.53	600"
12:52	E8	20	228.14	0.87	258.93	0.57	268.54	2.38	276.52	1.44	1200 cut stalks parallel (S)
13:07	E8	20	287.81	0.41	284.19	0.37	288.21	1.62	281.36	1.08	100 dry stalds parallel (N)
13:13	E8	20	287.35	0.54	284.90	0.42	289.92	1.51	282.38	1.68	200"
13:18	E8	20	287.73	0.33	285.42	0.33	290.69	1.68	283.37	1.37	300"
13:26	E8	20	290.41	0.57	288.40	0.24	292.52	1.78	284.65	1.82	500"
13:36	E8	20	264.81	0.35	247.32	0.35	266.62	1.68	243.34	1.06	500 dry stalks parallel (S)

Date	Time	Plot	Angle	CV	CH		LV		LH		Comments
	(EDT)			TB	SD	TB	SD	TB	SD	TB	SD
9/15/82	13:42	E8		245.32	0.43	234.68	0.37	245.84	1.52	233.78	1.22
	13:49	E8		249.59	0.29	238.01	0.44	250.97	1.55	236.25	1.19
	13:53	E8		255.63	0.40	241.90	0.46	259.19	1.29	239.75	1.15
	13:56	E8		260.77	0.33	245.50	0.41	265.06	1.56	242.06	1.28
	14:04	E8		290.64	0.35	285.20	0.31	286.35	1.45	280.34	1.32

Appendix F Vegetation Measurements

Date	Plot	Crop	Comp onent/ Treatm ent	Plant	Canop y	Plant	Wet	Dry	Water	Note
				Height	Cover	Densit y	Weight	Weight	Weight	

				(cm)	%	(per ml)	----- (gm/m ²) -----		
6/18/82	S3	Winter wheat	Heads	80	100	600	1431	780	651
	S3	Winter wheat	Heads	-	-	600	586	390	195
6/23/82	S3	Weeds		15	25	-	88	21	67
	S3	Winter wheat	Heads	80	100	600	1268	827	441
6/25/82	S3	Winter wheat	Heads	-	-	600	464	358	106
	S3	Weeds		15	25	-	219	62	157
7/27/82	E3	Grass		30	100	-	466	257	209
	E3	Grass	Clipped	10	100	-	138	96	42
7/28/82	E1	Corn		275	100	9.3	4746	700	4046
	E1	Corn	Layer removed	150	80	9.3	3708	365	3343
7/29/82	E1	Corn	Layer removed	75	50	9.3	1938	265	1673
	E5	Sweet sorghum		150	100	23.4	4207	564	3643
	E5	Sweet sorghum	Layer removed	60	50	23.4	1417	156	1261

Date	Plot	Crop	Component/Treatment	Height (cm)	Canopy Cover %	Plant Density (per ml)	Plant Weight	Wet Weight	Dry Weight	Water Note
							Weight	Weight	Weight	----- (gm/m ²) -----
8/09/82	E8	Corn		230	100	9.1	6899	891	6008	
	E8	Corn	Layer removed	150	90	9.1	6119	696	5423	
8/10/82	E8	Corn	Layer removed	75	50	9.1	2254	194	2060	
	E8	Corn	Tassels	-	-	9.1	77	29	48	
	E8	Corn	Leaves	-	-	-	1313	289	1024	
	E8	Corn	Cobs	-	-	-	1521	193	1328	
	E8	Corn	Stalks	240	-	9.1	3227	506	2721	
	E5	Sweet sorghum		230	100	23.4	8161	1170	6991	
	E7	Grain sorghum		100	100	11.6	3074	652	2422	
	E7	Grain sorghum	Layer removed	50	50	11.6	1709	360	1349	
	E7	Grain sorghum	Heads	-	-	11.6	418	129	289	
	E7	Grain sorghum	Leaves	-	-	-	900	198	702	
	E7	Grain sorghum	Stalks	100	-	11.6	1755	324	1431	
	E1	Corn (south s.)		275	100	9.3	5978	984	4494	
8/11/82	E1	Corn (north s.)		275	100	9.3	4317	963	3354	
	E1	Corn	Leaves	-	-	-	1020	242	778	
	E1	Corn	Stalks	275	-	9.3	3297	721	2576	
	E5	Sweet sorghum		240	100	23.4	2494	400	2094	
	E5	Sweet sorghum	Leaves	-	-	-	653	164	489	
	E5	Sweet sorghum	Stalks	240	-	23.4	1841	236	1605	

E6	Soybeans	Average	60	90	13.0	1802	187	894
E6	Soybeans	Irrigated	60	90	13.0	1130	192	937
E6	Soybeans	Non-irrigated	60	90	13.0	940	173	767

Date	Plot	Crop	Component/ Treatment	Plant	Canop y	Plant	Wet	Dry	Water
				Height (cm)	Cover %	Densit y (per ml)	Weight Wet (gm/m ²)	Weight Dry (gm/m ²)	Note
8/20/82	E5	Sweet sorghum	240	100	23.4	7023	1360	5663	
8/25/82	E5	Sweet sorghum	240	-	-	1248	-	-	2
	E5	Sweet sorghum	240		23.4	6955	-	-	2
	E5	Sweet sorghum	-	-	15.0	1530	-	-	2
8/26/82	E5	Sweet sorghum	240	100	23.4	6881	-	-	2
	E5	Sweet sorghum	150	100	23.4	4986	-	-	2
	E5	Sweet sorghum	75	50	23.4	2494	-	-	2
9/03/82	E8	Corn Stalks	270	-	15.0	1370	825	545	3
	E1	Corn Leaves	275	100	9.3	4351	1454	2897	
	E1	Corn Stalks	-	-	-	678	236	442	
	E1	Corn Stalks	275	-	9.3	3673	1218	2455	
	E5	Sweet sorghum	260	100	23.4	4801	2022	2779	
	E5	Sweet sorghum	-	-	-	683	256	427	
	E5	Sweet sorghum	260	-	23.4	4118	1766	2352	
9/15/82	E5	Sweet sorghum	260	100	23.4	7225	1870	5355	
	E5	Sweet sorghum	10	-	-	494	101	393	
	E8	Corn S-Stalks	270	-	9.1	1470	367	1103	
	E8	Corn N-Stalks	270	-	9.1	1254	369	885	
	E8	Corn Stalks	240	-	-	54	43	11	4

Notes: 1 - Winter wheat from S3 redistributed on S6.

2 - Drying oven malfunction suspected, weights discarded.

3 - Stalks redistributed.

4 - Values are per stalk.

APPENDIX G Soil Temperature Measurements for Time Series Experiments

Notation:

Canopy/Air Difference

(+) indicates that the surface/canopy is warmer than the air

(-) indicates that the surface/canopy is cooler than the air

Soil Temperature Data for Time Series Measurements at BARC Plots, 1982 (In Degrees C)

Date	Plot	(EDT) Time	Canopy/Air Dif.	Sfc.	1 cm	3 cm	7.5 cm	Comments
8/2/82	E4	10:35		29.2				Time Series I - Bare (Day 1)
		10:45		29.6				
		11:00		30.5				
		11:15		30.7				
		12:00		31.0				
		12:33		32.0	30.3	29.7		
		13:00		31.4	31.7	30.0	29.4	
		13:30		31.8	32.2	30.6	29.7	
		14:00		31.0	32.8	31.1	30.0	
		14:30		32.1	33.9	31.7	30.6	
		15:00		31.7	32.8	31.7	30.6	
		15:45		30.4	31.7	30.6	30.0	
8/2/82	E5	12:24		28.5				Time Series I - Sweet Sorghum (Day 1)
		12:45	A in near side	28.6	28.9	27.8	25.6	
			B in far side	29.4	27.8	26.1		
		13:15	A	28.0	28.9	27.8	25.6	
			B	28.9	27.8	26.1		
		13:45	A	28.4	28.9	27.5	25.6	
			B	29.4	27.8	26.1		
		14:15	A	29.2	28.9	27.8	26.7	
			B	28.9	27.8	26.1		
		14:45	A	29.3	29.4	28.3	26.7	
			B	30.0	28.3	26.1		
		15:00	A	29.4	30.0	28.3	26.1	
8/3/82	E4	15:45	A	29.1	29.4	28.3	26.1	Time Series I - Bare (Day 2)
		11:15		30.1	29.4	28.3	27.8	
		11:30		30.4	30.6	29.4	28.3	
		12:00		29.5	31.7	29.4	28.3	
		12:30		31.8	32.2	30.6	29.4	
Date	Plot	(EDT) Time	Canopy/Air Dif.	Sfc.	1 cm	3 cm	7.5 cm	Comments
8/3/82	E4 (cont.)	13:00		33.3	32.5	31.1	31.1	
		13:30		33.3	32.0	30.3	31.1	
		14:07		33.4	34.4	31.7	31.4	
		14:35		33.0	32.8	31.7	31.7	
8/3/82	E5	11:20	A (-1.2)	26.4	26.1	25.0	23.3	Time Series I - Sweet Sorghum (Day 2)
			B		26.7	25.6	23.3	
		11:35	A (-2.5)	27.2	26.7	25.6	23.9	
			B		27.2	25.6	23.3	
		11:50	A (-2.2)	27.1	26.7	25.6	23.9	
			B		27.2	25.6	23.3	
		12:15	A (-2.0)	28.0	26.7	26.1	24.4	
			B		27.8	26.7	23.3	
		12:45	A (-1.1)	28.6	27.2	26.7	25.0	
			B		27.8	26.7	23.9	
8/4/82	E4	14:07	A	29.6	29.4	28.3	26.1	
			B		29.4	27.5	25.6	
		14:20		29.8				
		11:05		29.5	29.2	29.2	28.9	Time Series I - Bare (Day 3) (Additional measurement at 1 cm taken with small thermometer which was exposed to direct sun)
		11:30	+1.20	32.0	31.1	30.0	29.4	
					31.5			
		12:00	+0.20	31.9	30.6	30.0	30.0	
					31.6			
8/4/82	E5	12:35	+1.00	34.1	31.7	31.1	30.6	
					33.6			
		13:00	+1.10	32.6	31.7	31.1	31.1	
		13:30		33.7	32.8	31.7	31.1	
					35.1			

Date	Plot	(EDT) Time	Canopy/Air Dif.	Sfc.	1 cm	3 cm	7.5 cm	Comments
8/4/82	E4 (cont.)	14:00		33.8	32.2	32.0	31.1	
					33.5			
8/4/82	E5 A	11:17	-1.0	27.8	27.5	25.9	23.9	Time Series I - Sweet Sorghum (Day 3)
		B			27.8	26.1	23.3	
		A	-3.2	27.8	28.3	26.4	24.4	
		B			28.9	26.7	24.4	
		A	-2.0	29.0	28.3	26.7	24.7	
		B			29.4	27.5	25.3	
		A	-2.5	29.5	27.8	29.4	25.0	
		B			30.6	27.8	25.9	
		A		29.6	28.9	29.4	25.6	
		B			31.1	29.2	26.1	
		A	-1.1	29.5	30.6	28.9	26.1	
		B			31.1	28.3	26.4	
		A	-2.6	30.1	32.0	28.9	26.7	
		B			31.7	29.4	27.5	
8/5/82	E4	11:30		31.0	31.4	29.7	29.2	Time Series I - Bare (Day 4)
					31.1			
			+2.3	33.6	33.3	31.1	29.4	
					32.3			
			+1.7	35.0	33.6	31.7	30.6	
					33.3			
8/5/82	E4	13:00	+2.5	34.7	33.6	31.7	30.9	Time Series I - Bare (Day 4)
					33.1			
			+2.4	34.9	33.9	32.0	31.1	
					33.7			

Date	Plot	(EDT) Time	Canopy/Air Dif.	Sfc.	1 cm	3 cm	7.5 cm	Comments
8/5/82	E4 (cont.)	14:04	+2.7 (dry)	35.2	34.2	32.2	31.7	
			+0.9 (wet)	33.8	34.0			
8/5/82	E5 A	14:25	+2.9	35.2	35.0	32.5	31.7	
		B			28.9	27.8	26.1	Time Series I - Sweet Sorghum (Day 4)
		A	-0.5			29.4	27.8	
		B	-0.8	28.5	28.9	27.8	26.1	
		A			29.4	27.8	26.1	
		B	-1	29.9	29.7	28.6	26.7	
		A			30.6	28.9	26.7	
		B	-0.6	30.2	30.3	28.9	26.7	
		A			30.9	28.9	27.2	
		B			30.9	28.9	27.2	
		A	-1.8	31.7	30.9	29.4	27.2	
		B			32.2	29.4	27.2	
		A	1.3	30.9	32.2	30.6	27.8	
8/9/82	E4	13:10	+5.4	34.8	33.3	34.4	34.4	Time Series I - Bare (Day 8)
		14:05	+4.4	34.1				
8/9/82	E5 A	13:25	-1.2	28.6	28.9	27.8	26.7	Time Series I - Sweet Sorghum (Day 8)
		B			28.3	27.8	26.1	
#####		13:20	+10.3	40.4	34.4	34.4	32.8	Time Series I - Bare (Day 9)
					38.9			
					37.9			
					35.4			

Date	Plot	(EDT) Time	Canopy/Air Dif.	Sfc.	1 cm	3 cm	7.5 cm	Comments
8/10/82	E5 A	13:25	-3.6	28.8	29.4	27.8	25.0	Time Series I - Sweet Sorghum (Day 9)
		B			28.9	27.8	25.6	
		A	-0.8	29.6	29.4	27.8	25.6	

B				28.9	27.8	25.6		
A	14:20	-2.1	27.3	28.3	27.2	25.6		
B				28.9	27.8	25.6		
8/11/82	E4	13:05		38.0	31.7	33.3	32.2	Time Series I -Bare (Day 10)
				35.0	35.9			(sfc measurement over tire track)
		13:31		40.4	32.0	33.3	32.8	
				37.0	36.1			(sfc measurement over tire track)
		14:02	+12.0	39.8	31.7	32.8	32.8	
				37.0	35.3			(sfc measurement over tire track)
8/11/82	E5 A	13:14	-1.0	26.7	26.7	26.1	24.4	Time Series I - Sweet Sorghum (Day 10)
	A	13:45	-1.4	25.3	26.1	26.7	24.4	
	B				26.1	26.1	24.4	
	A	14:15	+0.6	27.6	27.8	27.2	25.0	
	B				27.2	26.7	25.0	
8/16/82	S4	10:50	0.1 to +0.5	28.9	27.2	27.8	28.1	Time Series II - Bare
		11:00	-0.8	29.0	28.3	28.3	28.3	(Day 1)
		11:20	-0.4	29.3	28.6	29.2	28.9	
					29.9			
		11:33	+0.6	30.1	29.4	29.7	29.2	
					29.9			
		12:02	+0.3	30.7	30.0	30.0	29.4	
					30.2			
		12:30	-0.4	30.6	30.6	30.6	30.0	
					30.2			
		13:10	+0.5	31.5	29.4	30.9	30.6	
					30.1			

Date	Plot	(EDT) Time	Canop y/Air Dif.	Sfc.	1 cm	3 cm	7.5 cm	Comments
8/16/82	S4 (cont.)	13:37	+0.5	32.2	30.3	31.4	30.6	
				30.5*	31.1			* in shadow of radiometer
		14:01	+1.2	32.0	30.0	31.1	31.1	
					31.2			
		14:31	-0.8	31.8	31.1	32.2	31.7	
					31.6			
		15:00	+0.7	31.4	31.4	31.7	31.7	
					31.0			
8/16/82	S5	11:17	-1.6	26.6	24.7	23.3	21.7	Time Series II - soybeans
		11:47	-0.3	27.7	25.0	23.3	21.7	(Day 1)
		12:19	-2.4	29.2	26.1	23.9	22.2	
		13:12	-2.6	29.2	26.1	23.9	22.2	
		13:52	-2.2	29.0	26.1	24.2	22.2	
		14:15	-2.5	29.4	25.6	24.4	22.8	
		14:47	-3.1	29.6	26.7	24.4	22.8	
8/17/82	S4	11:05	0.0	29.4	29.4	29.4	27.8	Time Series II - Bare
				28.4				(Day 2)
		11:27	+0.3	29.8	30.6	30.0	28.3	
					28.7			
		11:59	-0.7	30.0	31.4	30.6	28.9	
					29.0			
		12:28	-1	30.8	31.7	30.6	29.2	
					28.9			
		12:56	-2.7	30.4	31.7	30.3	29.2	
					29.0			
		13:24	-1.7	30.6	32.5	30.9	29.4	
					29.7			
		13:56	-2.4	30.6	32.0	29.4	28.6	
					29.4			

Date	Plot	(EDT) Time	Canop y/Air Dif.	Sfc.	1 cm	3 cm	7.5 cm	Comments
8/17/82	S4 (cont.)	14:26	-2.6	29.2	32.2	28.9	29.2	
					28.3			
8/17/82	S5	11:14	-2.4	27.1	25.6	23.3	21.7	Time Series 11 - Soybeans
		11:50	-0.6	28.2	26.7	23.9	22.2	(Day 2)
		12:15	-3	27.7	27.2	23.9	22.2	
		12:41	-4.4	28.1	27.2	24.4	22.8	
		13:17	-4.2	28.6	27.2	24.4	22.8	

		13:41	-4	29.2	26.7	24.4	22.8	
		14:12	-4.3	27.5	26.7	24.4	23.1	
8/18/82	S4	11:06	+1.6	26.4	27.8	27.0	29.2	Time Series II - Bare (Day 3)
				27.9				
		11:28	+1.4	27.3	27.5	26.7	28.9	
					27.8			
		11:54	+1.3	26.6	27.5	26.7	28.9	
					27.6			
		12:30	+1.4	28.4	27.5	27.0	28.9	
					27.7			
		13:03	+1.5	28.4	28.3	27.8	29.4	
					28.0			
		13:30	+ 0.5 to + 1.5	28.5*	28.3	27.8	29.4	varied from 27.50 to 28.50
					27.2			
		14:00	+0.8	29.4	28.6	27.8	29.4	
					27.4			
		14:30	+0.7	29.0	28.9	27.8	29.4	
					27.6			
8/18/82	S5	11:15	-0.2	24.2	22.8	21.1	20.3	Time Series II - Soybeans (Day 3)
		11:43	-0.7	24.1	23.3	21.1	20.6	
		12:15	-0.9	24.3	23.3	21.7	21.1	

Date	Plot	(EDT) Time	Canop y/Air Dif.	Sfc.	1 cm	3 cm	7.5 cm	Comments
8/18/82	S5 (cont.)	12:45	-0.8	25.5	23.9	22.0	21.1	
		13:10	-3.7	25.4	23.9	22.0	21.1	
		13:45	-1.4	27.3	23.9	22.0	21.1	
		14:15	-2.3	26.4	23.9	22.0	21.1	
8/19/82	S4	11:26	-1.8	28.2	29.7	28.9	27.0	Time Series II - Bare (Day 4)
					28.4			
		12:09	0.0	29.1	29.7	28.9	27.8	
					29.0			
		12:30	-0.6	29.9	30.0	29.2	28.1	
					29.4			
		13:00	-1.6	29.8	30.6	30.0	28.3	
					29.6			
		13:30	-2.3	30.3	32.8	31.1	28.9	
					30.0			
		14:00	-2.4	30.0	32.6	31.1	29.2	
					29.6			
		14:30	-2.5 thru - 2.8	29.6	32.6	31.1	29.4	
					29.4			
		15:57	-1.7	29.0	34.4* 32.1*	31.1*	30.0*	* temperature probes in new location after accidental removal from old site
8/19/82	S5	12:15	-2.2	27.5	25.0	22.2	21.1	Time Series II - Soybeans (Day 4)
		12:45	-1.6	27.1	25.6	22.5	21.7	
		13:15	-1.1	28.1	25.9	22.8	21.7	
		13:45	-3.1	27.9	25.9	22.8	21.7	
		14:415	-2.2	28.1	25.9	22.8	21.7	
		14:51	-3.8	27.7	25.6	23.3	21.7	
8/20/82	S4	11:01	-1.4	27.6	31.7	28.9	26.7	Time Series II - Bare (Day 5)
					29.6			

Date	Plot	(EDT) Time	Canop y/Air Dif.	Sfc.	1 cm	3 cm	7.5 cm	Comments
8/20/82	S4	11:32	-1.1	28.2	31.1	29.2	27.8	
				29.8				
		12:03	-0.5	30.2	33.3	30.6	28.9	
					30.5			
		12:33	0.1	31.1	33.6	31.1	29.4	
					31.1			
		13:00	0.1	30.9	33.9	31.7	29.7	
					31.3			
		13:30	-0.8	31.3	33.6	32.8	31.1	
					32.2			
		14:00	0.6	32.6	35.6	33.6	31.7	
					33.6			

S5	11:16	-2.2	27.8	25.6	22.8	21.1	Time Series 11 - Soybeans
	11:47	-4	29.2	26.7	22.8	21.1	(Day 5)
	12:17	-3.1	28.1	26.7	23.3	21.7	
	12:47	-2.7	28.3	26.7	23.3	21.7	
	13:15	-1.3	29.2	27.0	23.3	22.0	
	13:45	-4.7	28.9	27.2	23.6	22.0	
	14:15	-4.6	28.4	27.5	23.9	22.2	
	14:45	-5.3	26.9	27.2	23.9	22.2	
8/23/82	S4	11:10	-2.6	26.0			Time Series II Bare
		12:00	-1.4	24.9	26.7	27.0	(Day 8)
					26.8		
					27.5		
					27.2	27.0	27.8
					27.2		
					28.6		
					28.6		
					29.6*		* dry portion of plot

Date	Plot	(EDT) Time	Canop y/Air Dif.	Sfc.	1 cm	3 cm	7.5 cm	Comments
9/1/82	Gish Bare	11:33	0.0	24.0	25.6 23.2	23.3	22.5	Time Series III Bare
		12:03	0.3	24.3	-26.1	23.6	22.8 23.5	(Day 2)
		12:35	0.5	27.0	28.6 25.0	25.0	23.1	
		12:58	0.7	25.5	26.7 24.6	24.4	23.3	
		13:34	0.7	26.5	27.8 25.1	25.6	23.9	
		14:02	0.1	27.7	29.7 26.4	26.7	24.4	
		14:27	0.1	27.7	29.4 26.4	26.7	24.4	
9/1/82	Gish Corn	11:17	0.8	24.4	23.3	22.2	21.1	Time Series III Corn
		11:42	0.4	24.7	23.9	22.2	21.4	(Day 2)
		12:17	0.1	25.4	24.4	22.8	21.4	
		12:42	0.5	26.7	25.6	23.3	21.7	
		13:15	0.0	26.8	25.6	23.3	22.2	
		13:43	-0.7	27.6	26.1	23.9	22.2	
		14:18	-1.5	27.8	26.4	24.2	22.8	
9/2/82	Gish Bare	11:00	+1.9	31.2	32.8	28.9	26.1	Time Series III Bare
				31.6*	29.3			(Day 3)
		11:27	+0.0	31.8	33.3 29.2	28.9	26.7	
		12:03	+0.7	34.1	35.6 30.5	30.0	27.2	
		12:31	+0.4	31.0	32.5 29.3	28.9	27.5	

Date	Plot	(EDT) Time	Canop y/Air Dif.	Sfc.	1 cm	3 cm	7.5 cm	Comments
9/2/82	Gish Bare (cont.)	13:03	+0.7	32.2	34.2 29.5	29.2	27.8	
		13:28	+1.0	33.7	33.3 29.6	29.4	27.8	
		14:04	+0.0	30.7	32.2 29.4	28.9	28.3	
		14:25	-0.9	31.9	34.4 29.7	29.4	28.1	
9/2/82	Gish Corn	11:11	-0.9	29.6	28.1	25.3	23.3	Time Series III - Corn
		11:41	-4.2	29.2	28.9	25.6	23.3	(Day 3)
		12:19	-0.7	30.0	28.6	26.1	23.9	
		12:46	-0.8	30.2	28.9	26.1	24.2	
		13:17	-4.1	30.7	29.4	26.4	24.2	
		13:48	-1.9	30.2	30.0	26.7	24.4	
		14:17	-2.2	29.5	28.9	26.4	24.4	

APPENDIX H
Soil Moisture and Microwave Data for Time Series Experiments

Notation:

CV = 5 GHz vertical polarization
 CH = 5 GHz horizontal polarization
 LV = 1.4 GHz vertical polarization
 LH = 1.4 GHz horizontal polarization

SD = standard deviation of 20-30 samples averaged to give one TB value

Soil Moisture and Microwave Data for Time Series Measurements at BARC Plots, 1982
 (Incidence Angle = 20 degree Azimuth Angle = 45 degree to row direction)

Time Series 1: Plot E4-Bare

Date	Time	VSM	VSM	CV		CH		LV		LH		Comments
		(EDT)	0 - 2 cm	0 - 4 cm		TB	SD	TB	SD	TB	SD	
8/2/82	09:38	-	-	165.29	0.73	147.64	0.64	154.69	1.19	140.16	1.06	~ 90% cov. standing water ~ 30% cov. standing water ~ 3% cov. by standing water no standing water
	10:14	32.4	32.2	195.43	0.25	180.60	0.59	197.80	1.48	181.67	1.01	
	10:28	30.2	29.9	201.68	0.43	188.27	0.53	205.22	1.36	189.54	1.16	
	10:43	28.4	28.1	204.75	0.34	191.87	0.53	208.24	0.81	192.85	0.76	
	10:58	27.2	26.7	206.43	0.72	193.99	0.62	211.47	0.90	196.25	0.88	
	11:13	26.3	25.9	208.47	0.38	196.12	0.49	212.50	1.14	197.90	0.96	
	11:24	25.8	25.4	209.43	0.89	197.01	0.50	214.39	1.04	198.60	1.18	
	11:27	25.6	25.3	209.40	0.24	196.96	0.42	213.89	1.34	199.12	0.79	
	11:55	24.5	24.0	211.93	0.34	199.54	0.70	215.76	1.05	200.60	0.53	
	12:22	23.7	23.2	213.23	0.44	200.33	0.42	217.87	0.90	202.82	0.90	
	12:30	23.5	22.8	212.98	0.46	199.99	0.67	217.87	1.06	203.05	0.66	
	12:58	22.4	21.9	212.57	0.55	199.28	0.56	218.83	0.77	203.99	0.84	
	13:28	22.0	21.5	215.58	0.23	202.95	0.46	219.40	1.23	205.33	0.95	
	13:59	22.0	21.5	217.14	0.49	204.71	0.52	220.81	1.55	208.07	1.33	
	14:27	-	-	218.07	0.40	205.37	0.53	222.33	1.15	209.02	0.77	
	14:44	21.9	21.4	218.19	0.40	204.98	0.39	221.92	1.19	208.59	1.20	
	14:57	21.9	21.4	219.10	0.35	205.92	0.56	223.50	1.26	209.12	0.81	
	15:26	21.9	21.4	219.00	0.19	205.81	0.52	224.18	1.36	210.80	0.82	Day 2
	11:06	18.2	19.3	227.44	0.51	214.17	0.40	230.99	1.47	215.84	0.71	
	11:10	18.0	19.2	225.77	0.26	213.29	0.50	230.98	1.33	215.77	0.83	
	11:31	17.6	18.6	229.02	0.30	215.94	0.47	232.71	1.38	217.34	0.98	
	11:58	17.0	17.9	229.86	0.35	216.79	0.47	233.74	1.15	218.43	1.21	
8/3/82	12:27	16.7	17.6	230.44	0.30	218.58	0.55	234.50	1.37	220.31	0.84	Day 2
	12:58	17.4	17.9	233.24	0.62	221.28	0.55	236.53	1.56	221.17	0.71	
	13:29	18.2	18.4	233.94	0.37	221.97	0.53	235.35	1.39	220.42	1.07	
	13:59	19.1	19.0	235.43	0.66	224.21	0.49	236.24	1.26	222.65	0.85	
	14:30	19.9	19.5	238.27	0.33	225.47	0.47	238.20	1.31	222.83	1.14	
	10:59	16.6	16.2	242.02	0.46	230.26	0.48	240.26	1.11	224.22	0.93	
	11:27	16.1	15.9	243.03	0.42	231.53	0.39	241.31	1.23	226.35	0.92	
	11:57	15.6	15.5	243.81	0.34	232.75	0.39	241.47	0.92	226.92	0.75	
	12:27	15.1	15.3	245.66	0.51	234.55	0.47	242.67	1.18	228.41	1.22	
	12:58	14.5	15.2	248.27	0.74	237.74	0.57	243.91	1.24	229.83	0.79	
8/4/82	13:00	14.5	15.2	247.98	0.72	237.52	0.39	244.00	0.97	229.55	0.83	Day 3
	13:25	15.0	15.3	249.90	0.21	239.83	0.40	245.32	1.27	232.32	0.94	
	13:56	15.9	15.8	249.78	1.03	239.82	0.40	245.09	1.22	231.87	0.77	
	14:26	16.9	16.5	255.01	0.62	244.75	0.45	244.58	1.37	232.84	0.69	

8/5/82	11:27	12.3	13.4	256.42	0.32	245.75	0.36	250.43	0.95	236.09	1.10	Day 4
	11:58	11.6	12.8	258.84	0.91	248.38	0.35	253.60	0.89	237.68	0.78	
	12:28	11.1	12.2	264.46	0.66	253.69	0.39	254.30	1.17	239.73	1.11	
	12:57	10.6	11.7	264.86	1.09	254.13	0.33	254.61	1.10	240.54	0.87	
	13:28	10.5	11.5	268.44	0.56	257.62	0.52	260.73	3.18	242.19	1.14	
	13:59	11.2	12.2	268.97	0.40	258.62	0.49	261.46	2.85	243.95	1.04	
	14:01	11.2	12.2	268.75	0.73	258.67	0.36	259.91	1.33	244.35	1.16	
8/9/82	14:30	12.1	13.1	271.37	0.27	260.98	0.40	256.23	1.37	243.92	0.86	
	13:27	11.1	12.1	282.13	0.58	275.03	0.39	266.21	1.13	253.00	0.98	Day 8
	13:58	11.1	12.1	283.17	0.67	276.62	0.34	267.22	1.79	255.44	1.26	
	13:08	6.0	7.9	293.31	0.37	288.30	0.27	271.99	1.11	260.42	1.02	Day 9
8/10/82	13:10	6.0	7.9	293.01	0.48	288.25	0.36	271.90	1.19	260.51	1.08	
	13:28	6.0	7.9	294.85	1.12	290.48	0.31	273.27	1.52	261.15	0.73	
	13:59	5.7	7.8	296.33	0.22	291.45	0.27	273.79	1.29	262.07	1.03	
	14:28	5.5	7.8	297.19	0.67	292.63	0.36	274.78	1.27	263.02	0.96	
	12:56	5.9	7.8	294.85	1.01	290.40	0.32	276.99	1.33	263.93	0.79	Day 10
	13:27	5.9	7.8	297.52	0.97	293.23	0.41	276.96	1.18	265.42	0.92	
	13:57	5.9	7.8	298.16	1.03	293.76	0.21	277.37	1.63	265.83	0.88	

Time Series I: Plot E5 - Sweet Sorghum

Date	Time	VSM	VSM	CV	CH		LV		LH		Comments	
		(EDT)	0 - 2 cm	0 - 4 cm	TB	SD	TB	SD	TB	SD		
8/2/82	12:08	32.4	30.1	284.57	1.21	284.23	0.33	273.41	1.13	271.29	0.91	~1% standing water no standing water
	12:18	32.4	30.1	285.18	0.34	284.40	0.52	276.03	1.40	278.00	0.99	
	12:43	31.5	29.0	285.07	0.33	283.97	0.48	277.75	1.29	267.03	0.89	
	12:45	31.5	29.0	284.99	1.00	284.43	0.34	276.18	1.33	265.29	0.76	
	13:13	29.8	27.9	285.00	0.93	284.68	0.20	271.91	1.16	257.90	1.06	
	13:42	27.3	27.1	284.99	1.20	284.26	0.17	271.46	1.21	256.86	0.91	
	14:11	25.0	26.2	284.98	0.28	284.08	0.33	272.15	1.26	259.01	0.80	
	14:49	27.7	27.4	286.25	0.38	285.66	0.28	273.72	1.68	259.71	0.58	
	15:12	29.6	28.1	285.56	0.84	285.46	0.34	272.77	1.27	258.79	1.18	
	15:17	29.6	28.1	285.85	1.08	285.84	0.35	273.81	1.13	259.55	0.90	
8/3/82	15:41	29.6	28.1	285.62	1.36	285.05	0.35	272.81	1.24	259.06	0.74	Day 2
	11:12	25.3	24.5	285.36	0.79	285.10	0.41	276.64	1.27	263.19	1.18	
	11:15	25.3	24.5	287.35	0.40	285.89	0.44	279.18	1.22	262.27	0.96	
	11:45	24.7	23.9	286.06	0.60	285.16	0.39	278.79	1.16	266.16	1.25	
	12:14	24.0	23.2	287.64	0.43	287.26	0.33	280.06	1.67	274.68	1.06	
	12:45	23.5	22.7	288.02	1.17	287.71	0.33	280.71	1.01	269.51	1.04	
	13:14	23.1	22.2	287.10	0.71	286.35	0.29	277.71	0.94	264.76	0.90	
8/4/82	13:43	23.0	21.8	287.71	0.28	286.40	0.60	276.74	1.13	265.25	0.78	Day 3
	14:14	22.4	21.6	287.46	0.79	287.31	0.53	277.42	1.48	265.39	0.94	
	11:13	19.6	18.9	287.35	1.12	286.85	0.37	281.48	1.21	267.81	0.99	
	11:42	19.4	18.8	288.46	1.13	287.79	0.36	281.51	1.25	270.39	1.26	
	12:12	19.2	18.7	288.88	0.54	287.94	0.31	282.55	1.49	274.27	0.90	
	12:43	19.0	18.7	289.24	0.40	288.80	0.24	283.37	1.36	272.06	0.79	
	13:13	18.7	18.6	289.58	0.37	289.03	0.37	281.31	1.29	270.76	0.87	
8/5/82	13:43	18.5	18.6	288.85	0.99	288.06	0.36	280.52	1.35	269.17	0.75	Day 4
	14:13	18.4	18.5	290.27	0.75	289.68	0.31	280.32	1.06	269.32	0.79	
	14:41	18.2	18.4	290.49	0.48	289.59	0.15	278.94	0.93	268.78	0.61	
	11:25	19.0	18.0	290.49	0.37	289.78	0.31	285.83	1.57	272.92	1.18	
	11:44	18.5	17.7	290.90	0.47	290.24	0.34	285.17	1.50	273.21	0.92	
	12:14	17.5	16.9	291.24	0.43	291.08	0.26	285.18	1.36	274.80	0.93	
	12:43	16.6	16.2	291.18	0.52	290.44	0.29	283.11	0.97	271.95	0.83	
8/9/82	13:14	16.6	16.2	292.19	0.26	291.18	0.46	287.36	2.82	273.62	0.77	Day 8
	13:44	16.3	15.8	292.03	0.27	291.58	0.37	286.02	1.60	273.71	1.36	
	14:15	15.0	14.5	292.01	0.36	291.49	0.44	282.83	1.27	272.24	1.09	
	13:40	14.7	15.2	288.15	0.36	286.71	0.38	286.32	1.66	273.02	1.04	
8/10/82	14:13	14.7	15.2	287.01	0.93	286.11	0.26	286.72	1.42	273.30	1.15	
	13:11	12.6	13.1	289.51	0.37	288.73	0.45	289.21	1.44	275.40	0.99	Day 9
	13:42	12.6	13.1	288.16	0.68	288.13	0.29	288.31	1.05	273.48	1.05	

Date	Time	VSM	VSM	CV	CH		LV		LH		Comments	
(EDT)	0 - 2 cm	0 - 4 cm	TB	SD	TB	SD	TB	SD	TB	SD		
8/5/82	11:44	18.5	17.7	290.90	0.47	290.24	0.34	285.17	1.50	273.21	0.92	Day 4
	12:14	17.5	16.9	291.24	0.43	291.08	0.26	285.18	1.36	274.80	0.93	
	12:43	16.6	16.2	291.18	0.52	290.44	0.29	283.11	0.97	271.95	0.83	
	13:14	16.6	16.2	292.19	0.26	291.18	0.46	287.36	2.82	273.62	0.77	
	13:44	16.3	15.8	292.03	0.27	291.58	0.37	286.02	1.60	273.71	1.36	
	14:15	15.0	14.5	292.01	0.36	291.49	0.44	282.83	1.27	272.24	1.09	
	13:40	14.7	15.2	288.15	0.36	286.71	0.38	286.32	1.66	273.02	1.04	
	14:13	14.7	15.2	287.01	0.93	286.11	0.26	286.72	1.42	273.30	1.15	
	13:11	12.6	13.1	289.51	0.37	288.73	0.45	289.21	1.44	275.40	0.99	
	13:42	12.6	13.1	288.16	0.68	288.13	0.29	288.31	1.05	273.48	1.05	

8/11/82	14:12	12.6	13.1	286.08	0.86	285.70	0.33	288.79	1.17	273.19	0.85	Day 10
	13:09	10.3	10.7	287.01	1.09	286.22	0.37	289.18	1.31	275.02	1.13	
	13:42	10.3	10.7	286.45	0.49	285.88	0.26	289.36	1.69	274.82	0.74	
	14:11	10.3	10.7	287.96	0.28	286.55	0.25	291.16	1.35	277.11	1.05	

Time Series 11: Plot S4-Bare

Date	Time	VSM	VSM	CV		CH		LV		LH		Comments
		(EDT)	0 - 2 cm	0 - 4 cm		TB	SD	TB	SD	TB	SD	
8/16/82	10:45	35.8	34.1	175.72	0.62	160.91	0.68	193.57	1.37	177.63	1.11	Day 1
	10:59	35.5	33.9	188.67	0.31	173.39	0.63	199.34	1.08	183.46	0.88	
	11:14	35.2	33.5	188.82	0.26	174.81	0.52	199.10	1.14	184.74	0.59	
	11:30	34.8	33.2	188.71	0.40	174.21	0.56	200.11	1.03	185.07	0.90	
	11:56	34.2	32.6	189.98	0.69	175.21	0.60	201.62	1.23	186.07	0.81	
	12:26	33.6	32.0	190.60	0.42	176.22	0.54	201.92	1.33	186.45	1.00	
	12:59	33.0	31.3	189.29	0.19	174.74	0.56	201.68	1.04	186.51	0.88	
	13:31	32.2	30.6	191.36	0.30	177.54	0.56	203.66	1.20	188.75	0.97	
	13:58	31.6	30.0	191.42	0.43	176.99	0.58	202.75	1.12	187.89	1.00	
	14:36	31.0	29.4	191.10	0.40	176.10	0.56	203.76	0.94	189.84	0.90	
8/17/82	14:56	30.4	28.8	191.72	0.34	176.85	0.61	204.20	1.38	189.25	0.86	Day 2
	11:01	26.2	25.5	195.18	0.63	179.54	0.65	208.39	1.55	187.35	0.85	
	11:31	26.2	25.5	191.43	0.48	177.02	0.58	207.04	1.55	189.91	0.87	
	12:01	26.1	25.5	191.26	0.42	176.64	0.61	207.77	1.28	191.57	1.17	
	12:30	26.0	25.4	190.92	0.24	177.14	0.66	208.39	1.38	192.45	0.70	
	13:00	26.0	25.4	191.21	0.36	176.95	0.66	210.68	1.22	194.72	0.83	
	13:30	25.9	25.3	193.71	0.56	178.78	0.65	209.69	1.29	193.73	0.92	
	13:59	25.7	25.3	192.50	0.50	178.71	0.64	211.62	1.29	196.82	0.82	
	14:15	25.7	25.3	192.04	0.57	177.70	0.57	213.69	1.24	196.51	0.80	
	14:31	25.7	25.3	192.70	0.31	177.08	0.61	212.64	0.97	196.98	0.81	
8/18/82	11:03	27.4	26.5	192.32	0.46	175.61	0.72	211.36	1.16	195.12	0.89	Day 3
	11:32	27.4	26.5	191.96	0.50	178.27	0.58	213.42	1.26	198.16	0.87	
	11:58	27.3	26.5	193.21	0.32	178.71	0.54	214.72	1.23	199.24	0.93	
	12:30	27.2	26.2	193.75	0.40	178.96	0.64	216.75	0.85	201.86	1.08	
	12:59	26.7	25.9	195.80	0.21	181.57	0.55	219.99	1.33	204.61	0.80	
	13:27	26.2	25.4	199.22	0.25	182.97	0.57	221.69	1.10	205.90	1.17	
	13:59	25.5	24.7	201.48	0.36	186.16	0.61	224.58	0.86	209.55	1.00	
	14:29	24.6	23.8	207.08	0.33	189.79	0.57	226.30	1.59	212.34	1.05	

Date	Time	VSM	VSM	CV		CH		LV		LH		Comments
		(EDT)	0 - 2 cm	0 - 4 cm		TB	SD	TB	SD	TB	SD	
8/19/82	11:32	20.5	21.0	233.46	0.33	216.91	0.49	-	-	229.55	0.65	Day 4
	11:35	20.5	21.0	233.65	0.34	217.16	0.49	241.33	1.28	229.26	1.25	
	12:06	19.9	20.5	238.74	0.32	222.01	0.44	245.51	1.31	233.22	1.08	
	12:29	19.0	20.0	242.02	0.94	226.76	0.37	246.89	1.34	236.16	1.10	
	12:58	18.0	19.4	248.07	0.36	232.40	0.46	250.52	1.49	239.40	0.89	
	13:29	16.7	18.6	253.54	0.35	237.81	0.42	252.42	1.08	241.11	0.79	
	14:01	14.7	17.4	256.48	0.24	241.02	0.30	253.61	1.25	243.21	1.12	
	14:29	12.9	16.2	259.41	0.43	244.86	0.43	254.99	1.05	244.25	0.79	
	15:04	11.0	14.6	264.54	0.95	251.16	0.44	258.30	1.26	246.30	1.19	
	15:07	11.0	14.6	264.85	1.13	251.64	0.37	257.77	1.26	246.19	0.90	
8/20/82	10:57	14.3	16.4	264.99	0.24	252.54	0.39	257.51	1.19	244.06	0.74	Day 5
	11:27	14.1	16.4	269.34	0.58	258.22	0.47	258.54	1.35	245.92	0.83	
	12:00	13.8	16.0	273.88	0.79	264.12	0.38	260.42	1.55	248.05	1.15	
	12:30	13.5	15.8	277.22	0.38	267.35	0.37	260.87	1.29	249.29	1.00	
	12:59	13.1	15.4	280.64	0.84	271.00	0.28	262.61	1.23	249.79	0.96	
8/23/82	13:29	12.6	15.1	282.38	0.67	273.39	0.34	263.23	1.33	249.74	0.90	Day 8
	13:58	12.0	14.6	284.71	0.39	275.71	0.42	263.71	1.23	251.16	1.21	
	11:08	11.5	14.1	269.95	0.32	257.51	0.36	258.05	2.07	246.52	1.25	
	11:14	11.5	14.1	268.76	0.31	256.64	0.39	258.22	1.83	246.42	1.85	
	11:58	11.3	14.1	267.09	0.33	255.76	0.33	257.12	1.97	247.45	1.62	
8/24/82	12:00	-	-	268.07	0.25	255.29	0.42	255.34	1.90	243.54	1.97	dry center of plot of moist edge of plot
	12:06	-	-	264.80	0.64	258.36	0.34	237.37	2.23	222.17	1.63	
	12:29	11.2	14.1	268.15	0.39	256.81	0.34	257.58	2.75	247.60	1.42	

12:31	11.2	14.1	267.87	0.87	256.75	0.41	257.25	1.96	246.78	1.31
12:58	11.0	14.1	268.01	0.52	256.46	0.29	259.34	1.67	248.07	1.41
13:29	11.0	14.1	268.05	0.39	256.89	0.33	258.70	2.05	248.82	1.56
13:57	7.2	10.9	288.83	0.28	282.25	0.33	271.62	2.07	263.72	1.71

dry
area of
plot

Time Series 11: Plot S5 -Soybeans

Date	Time	VSM	VSM	CV	CH		LV		LH		Comments	
		(EDT)	0 - 2 cm	0 - 4 cm	TB	SD	TB	SD	TB	SD		
8/16/82	11:10	31.5	30.5	284.36	1.30	282.44	0.43	262.97	1.02	248.02	0.75	Day 1
	11:43	30.6	30.1	284.41	0.32	282.12	0.39	263.46	1.43	249.66	0.82	
	12:12	29.7	29.5	285.58	0.31	283.11	0.45	265.30	1.17	251.79	1.14	
	13:01	28.4	28.7	285.36	1.05	283.33	0.38	266.18	1.43	251.82	0.55	
	13:08	28.2	28.6	285.46	0.32	283.20	0.36	265.90	1.11	252.28	1.07	
	13:19	27.8	28.2	285.15	0.42	283.14	0.36	267.64	1.38	252.89	0.83	
	13:47	26.9	27.5	284.54	0.60	282.45	0.29	267.64	1.33	252.97	0.99	
	14:12	26.1	26.6	284.25	0.34	281.43	0.30	265.31	1.08	252.55	0.66	
	14:53	24.6	25.0	285.05	0.26	281.36	0.48	266.71	1.19	252.31	1.22	
	11:19	22.5	22.3	284.71	0.49	283.31	0.28	273.74	1.43	259.96	0.89	Day 2
8/17/82	11:47	22.2	22.0	284.62	0.84	283.74	0.35	274.40	1.32	261.20	0.80	
	12:12	21.9	21.8	285.76	0.27	284.50	0.37	274.45	1.01	262.08	0.96	
	12:45	21.6	21.5	285.08	0.98	283.87	0.32	275.65	1.24	262.78	0.80	
	13:15	21.3	21.3	286.25	0.36	284.77	0.32	275.33	1.06	262.20	0.89	
	13:45	20.9	20.9	284.38	0.92	283.18	0.29	276.00	1.37	263.85	0.74	
8/19/82	14:17	20.6	20.7	284.90	0.61	282.82	0.28	277.13	1.20	263.86	0.94	Day 3
	11:16	22.9	21.7	282.16	0.53	281.06	0.19	267.90	1.16	259.88	1.10	
	11:47	22.5	21.6	282.40	0.31	281.17	0.27	268.70	1.32	261.08	0.96	
	12:14	22.0	21.4	283.43	0.56	282.18	0.34	272.66	1.31	261.99	1.04	
	12:45	21.6	21.2	283.57	0.73	282.79	0.32	274.16	1.31	262.72	1.02	
	13:16	21.2	20.9	282.62	0.60	282.58	0.45	274.65	1.32	262.66	0.92	
	13:45	20.7	20.7	281.67	0.21	282.36	0.40	276.28	1.74	265.04	0.88	
	14:14	20.2	20.5	282.03	0.32	281.31	0.38	274.77	1.15	264.46	0.78	
	12:16	18.2	18.4	287.35	0.75	286.48	0.33	278.37	0.99	271.10	0.86	Day 4
	12:43	17.8	18.0	286.47	0.34	285.74	0.43	279.22	1.32	271.11	1.21	
	13:15	17.5	17.7	286.26	0.35	285.15	0.26	280.06	1.71	271.62	1.17	
	13:44	17.1	17.3	286.86	0.41	286.25	0.36	282.93	1.24	272.98	1.25	
Date	Time	VSM	VSM	CV	CH		LV		LH		Comments	
(EDT)	0 - 2 cm	0 - 4 cm	TB	SD	TB	SD	TB	SD	TB	SD		
8/19/82	13:46	17.1	17.3	287.06	1.16	286.92	0.47	282.51	1.20	272.78	0.77	
	14:14	16.9	17.1	285.67	0.66	284.24	0.38	280.85	1.48	271.69	0.72	
8/20/82	14:46	16.5	16.8	288.33	0.18	286.48	0.44	281.37	1.49	272.68	0.85	
	11:14	11.5	12.5	287.10	0.53	286.20	0.41	285.68	1.81	276.77	0.84	Day 5
	11:45	11.4	12.5	287.93	0.25	286.43	0.27	286.57	0.86	276.56	0.72	
	12:15	11.3	12.5	288.79	0.59	288.26	0.23	288.39	1.21	280.21	0.81	
	12:44	11.2	12.5	289.63	0.29	288.52	0.31	288.12	1.03	279.34	0.92	
	13:14	11.2	12.5	288.95	0.32	288.28	0.32	288.01	1.00	278.43	1.17	
	13:43	11.1	12.5	287.47	0.37	287.69	0.29	287.69	1.31	278.90	0.92	
	14:14	11.0	12.5	287.03	0.51	285.81	0.38	286.19	1.17	276.66	0.94	
	14:43	11.0	12.5	285.36	1.01	284.50	0.30	284.71	1.36	276.70	0.91	
	11:18	7.4	8.3	283.19	1.25	282.57	0.29	285.78	1.97	281.09	1.41	Day 8
8/23/82	11:47	7.3	8.2	281.62	0.58	280.67	0.33	281.67	2.24	277.52	1.68	
	11:51	7.3	8.2	281.48	0.66	280.42	0.39	281.24	2.57	277.94	2.08	
	12:12	7.2	8.3	282.44	0.58	281.26	0.32	284.49	1.55	279.64	1.17	
	12:42	7.1	8.3	281.74	0.92	280.79	0.32	284.75	2.49	280.12	1.64	
	12:45	7.1	8.3	281.84	1.16	280.79	0.35	284.54	1.90	278.92	1.88	
	13:15	6.9	8.3	283.06	0.96	281.88	0.39	284.72	2.37	281.22	1.77	
	13:17	6.9	8.3	283.32	0.94	282.29	0.48	284.01	2.27	280.95	1.73	
Date	Time	VSM	VSM	CV	CH		LV		LH		Comments	
(EDT)	0 - 2 cm	0 - 4 cm	TB	SD	TB	SD	TB	SD	TB	SD		
8/31/82	10:24	35.1	34.3	176.69	0.62	164.19	0.68	199.27	2.98	180.63	0.78	Day I
	10:35	35.1	34.3	176.77	0.36	164.17	0.62	198.92	1.15	181.52	1.71	

	10:57	34.6	33.8	177.06	0.34	164.41	0.67	199.79	1.10	183.87	0.82
	11:28	34.1	33.2	177.80	0.27	165.67	0.62	201.76	1.40	187.62	1.04
	11:58	33.6	32.9	179.31	0.22	165.91	0.62	202.65	1.30	186.94	0.89
	12:25	33.1	32.4	179.29	0.58	168.93	0.72	207.71	1.29	190.54	1.25
	12:55	32.8	32.0	182.31	0.40	170.66	0.56	217.82	1.05	191.63	0.82
	13:26	32.4	31.5	182.80	0.31	170.60	0.61	227.62	1.33	193.98	0.72
	13:58	32.2	31.2	183.03	0.36	169.75	0.60	213.28	1.43	196.28	0.83
	14:09	32.2	31.2	182.30	0.39	169.31	0.61	213.08	1.26	196.77	1.22
	14:24	32.0	31.2	182.07	0.44	170.36	0.66	212.29	1.12	196.29	0.81
9/1/82	11:28	31.1	30.2	179.41	0.34	167.21	0.68	212.28	1.44	195.80	0.55
	11:59	30.8	30.0	179.60	0.40	167.51	0.63	210.96	1.10	194.18	0.79
	12:29	30.4	30.0	181.62	0.19	169.52	0.64	215.99	1.10	196.72	0.57
	13:00	30.1	29.6	181.67	0.59	173.40	0.64	224.08	1.18	196.50	0.99
	13:29	29.8	29.4	182.77	0.29	173.50	0.61	225.97	0.76	196.75	0.86
	13:58	29.5	29.3	183.99	0.27	173.34	0.74	216.15	1.33	198.22	0.99
	14:28	29.4	29.2	184.40	0.51	172.04	0.57	216.84	1.20	200.50	1.07
9/2/82	10:55	29.4	29.2	190.09	0.40	178.34	0.59	219.98	0.93	202.46	1.00
	11:29	29.0	29.2	191.03	0.30	179.71	0.83	222.58	1.22	209.66	0.85
	11:59	28.5	28.7	194.06	0.20	182.06	0.63	224.44	1.25	208.75	1.15
	12:27	27.8	29.0	193.61	0.31	181.79	0.44	226.10	1.05	208.52	1.08
	12:58	27.2	28.4	197.09	0.32	184.86	0.62	235.18	1.18	210.96	0.88
	13:26	26.7	27.1	198.68	0.49	186.43	0.52	241.36	1.02	212.23	0.77
	13:59	26.2	26.7	195.94	0.34	183.72	0.52	228.77	0.94	213.46	1.09
	14:29	25.7	26.2	196.39	0.20	184.18	0.61	226.77	1.38	213.25	0.86

Time Series III: Gish-Corn

Date	Time	VSM	VSM	CV	CH		LV		LH		Comments
		(EDT)	0 - 2 cm	0 - 4 cm	TB	SD	TB	SD	TB	SD	
8/31/82	10:40	31.4	30.7	278.82	0.18	279.11	0.43	276.87	1.19	270.16	0.87
	10:53	31.3	30.6	280.45	0.52	280.52	0.31	272.59	1.64	265.42	0.91
	11:16	31.2	30.4	281.70	0.54	281.84	0.32	274.14	1.33	266.80	1.26
	11:41	31.1	30.3	282.30	1.02	282.36	0.27	275.10	1.50	266.43	0.74
	11:43	31.1	20.3	282.14	0.85	282.09	0.39	274.76	1.09	265.75	0.73
	12:16	30.8	30.1	282.33	0.35	282.67	0.38	276.04	1.08	270.29	1.28
	12:41	30.7	30.0	283.73	0.50	283.79	0.36	276.65	1.34	269.64	1.14
	13:10	30.5	29.8	284.08	0.76	283.79	0.41	278.22	1.19	270.14	0.87
	13:42	30.4	29.7	283.96	0.52	283.73	0.28	278.35	1.36	270.74	1.15
	14:11	30.2	29.5	285.07	0.64	284.53	0.33	279.51	1.53	270.83	1.08
9/1/82	11:12	28.0	27.5	282.72	0.46	282.13	0.30	278.04	0.98	269.45	0.96
	11:43	27.8	27.4	281.40	0.39	280.59	0.40	277.68	1.35	271.02	1.09
	12:14	27.6	27.3	281.56	1.01	280.84	0.23	278.44	1.13	271.81	1.11
	12:44	27.4	27.2	282.59	0.46	282.30	0.38	278.39	1.69	272.12	0.95
	13:13	27.2	27.1	282.96	1.13	282.58	0.43	279.59	1.06	272.77	0.76
	13:47	27.0	26.9	283.96	0.49	284.09	0.28	281.66	1.21	272.91	0.97
	14:13	26.8	26.8	282.89	0.66	283.28	0.48	279.29	1.46	271.25	1.20
9/2/82	11:14	26.1	25.6	286.33	0.39	286.07	0.31	283.58	1.40	276.96	1.02
	11:45	25.4	25.2	286.34	0.57	285.95	0.32	283.85	1.13	277.34	1.08
	12:15	24.7	24.8	284.96	0.42	284.54	0.31	281.25	1.53	274.58	0.94
	12:43	23.9	24.2	285.71	1.26	285.59	0.32	281.33	1.16	275.57	0.99
	13:13	23.2	23.8	285.85	1.17	285.90	0.24	282.13	0.79	277.98	0.94
	13:44	22.5	23.2	286.00	0.44	285.36	0.41	283.69	1.18	278.36	1.11
	14:12	21.6	122.7	285.16	0.38	284.29	0.38	282.70	1.51	279.13	1.08