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**REMOTE MEASUREMENTS OF SOIL MOISTURE  
BY MICROWAVE RADIOMETERS AT BARC  
TEST SITE, II**

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June 1982

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## **ABSTRACT**

Remote measurements of soil moisture content by microwave radiometers at frequencies of 1.4 GHz, 5 GHz, and 37 GHz were made over both bare and vegetated fields during July-September of 1980. All three radiometers were mounted on a mobile tower and measured brightness temperatures over 10°-70° incidence angles in vertical and horizontal polarizations simultaneously. Five types of field cover were included in the measurements: bare, 10-cm tall orchard grass, 30-cm tall orchard grass, soybean, and corn, in a test site managed by Beltsville Agricultural Research Center (BARC). Ground truth on soil moisture content and temperature, as well as biomass of the vegetation was acquired in support of the microwave radiometric measurements. This document gives a tabulation of the measured data and a brief discussion of the sensors as well as operational problems associated with the measurements.

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**REMOTE MEASUREMENTS OF SOIL  
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BY MICROWAVE RADIOMETERS AT BARC  
TEST SITE, 11**

**1. INTRODUCTION**

An experiment on the remote sensing of soil moisture content by microwave radiometer techniques was conducted during July-September of 1980 by personnel from both NASA/Goddard Space Flight Center and USDA/Beltsville Agricultural Research Center. The experiment was supported by the AgRISTARS (Agriculture and Resources Inventory Surveys Through Aerospace Remote Sensing) program. The major objectives of the experiment were to study the effects of soil texture, surface roughness, and vegetation cover on the remote estimate of soil moisture content by microwave radiometers. This report contains the reduced data in tabulated form obtained from the experiment.

A similar experiment was conducted in October 1979. The experimental procedure, sensor package, sensor calibrations, ground truth data acquisition, and data reduction of that experiment were described in detail by Wang et al. (1980 a, b). There were only a few minor changes made in the 1980 experiment. Thus, the following description of the experiment will be limited to those changes and those items considered necessary for the completeness of the report.

**2. MICROWAVE SENSOR SYSTEMS AND CALIBRATIONS**

There were three microwave radiometers at the frequencies of 1.4 GHz, 5 GHz, and 37 GHz mounted on a mobile tower and used in the field measurements. All three radiometers are of Dicke type and measure thermal microwave emission in both vertical and horizontal polarizations simultaneously. The 1.4 GHz (L-band) radiometer system was the same one used in the 1979 field experiment (Wang et al., 1980a). The 5 GHz (C-band) radiometer also was the same one used in 1979, but the original phased array antenna (3-dB beamwidth of  $\sim 6^\circ$ ) was replaced by two corrugated horns, one for each polarization. The reason for this C-band antenna replacement was due to the results of the 1979 experiment, in which lower brightness temperatures occurred at C-

band than at L-band under high soil moisture conditions. It was thought at the time that a significant side lobe at  $\sim 80^\circ$  away from the main beam of the C-band phase-array antenna, which pointed toward the cold sky during the field measurements, was the main cause of the observed low brightness temperature. It turns out that the side lobe of the phased array antenna could not be the main reason for the observed low brightness temperatures as will be shown in a later section. The observed phenomenon could be more fundamental in nature.

The third radiometer at 37 GHz (Q-band) had a circular horn type antenna. The signal collected by the antenna was split into vertical and horizontal polarizations by waveguides. All three radiometers had a comparable 3-dB beamwidth of  $\sim 13^\circ$ .

Absolute calibration of the sensor system was made by pointing the radiometer antennas at three external targets whose brightness temperatures can be either calculated or measured accurately, namely, Eccosorb slabs, sky, and a calm water surface. The Eccosorb slabs are 23-cm thick and have an absorption coefficient at 1.4 GHz frequency of 0.99. They adequately provide a calibration target at ambient temperature for all three radiometers. The calm water surface gives a range of brightness temperatures depending on incidence angle  $\theta$ , which can be calculated fairly accurately knowing the water temperature and the dielectric relaxation spectrum (Lane and Saxton, 1952). The sky brightness temperatures in zenith direction at 1.4 GHz and 5 GHz frequencies are calculated to be  $4.9^\circ\text{K}$  and  $5.2^\circ\text{K}$  respectively, and do not change by more than  $0.2^\circ\text{K}$ , when the amount of atmospheric water vapor content is varied from 0.5 cm to 3.55 cm. At 37 GHz frequency the calculated sky brightness temperature is  $13.7^\circ\text{K}$  for an atmospheric water content of 0.53 cm, and a change to  $28.4^\circ\text{K}$  is obtained when the water content is varied from 0.53 cm to 3.55 cm. This uncertainty will introduce errors in the calibration and in the calibrated radiometric outputs. Fortunately, the measured brightness temperatures for  $\theta \leq 50^\circ$  over bare or vegetated fields are  $\leq 150^\circ\text{K}$  at 37 GHz frequency, values more than  $120^\circ\text{K}$  above the sky brightness of  $28^\circ\text{K}$ .

As long as the calibrations with Eccosorb slabs and calm water surface are made properly, the day-to-day variation in the sky brightness at this frequency is not critical. But the uncertainty in the calibrated brightness temperatures may be a couple of degrees larger at this frequency than at 1.4 GHz or 5 GHz frequency.

The results of radiometer calibrations are given in Figure 1 where the known target brightness temperature  $T_{BP}$  are plotted as a function of normalized antenna voltage  $N_P$  (subscript P stands for either V for vertical polarization or H for horizontal polarization).  $N_P$  is given by

$$N_P = \frac{V_A - V_H}{V_C - V_H} \quad (1)$$

Here  $V_A$  is the output voltage of a radiometer when the antenna is pointing at an external target.  $V_H$  and  $V_C$  are the output voltages when the radiometer is looking at internal hot and cold reference loads respectively. Applying a linear regression to the calibration data shown in Figure 1 gives the dependence of  $T_{BP}$  on  $N_P$  for each of the three radiometers' as:

at 1.4 GHz frequency,

$$T_{BV} = 339.1 - 270.0 N_V \quad (2)$$

$$T_{BH} = 340.8 - 343.2 N_H \quad (3)$$

at 5 GHz frequency,

$$T_{BV} = 322.2 - 256.3 N_V \quad (4)$$

$$T_{BH} = 318.6 - 290.1 N_H \quad (5)$$

at 37 GHz frequency,

$$T_{BV} = 338.8 - 422.7 N_V \quad (6)$$

$$T_{BH} = 337.6 - 257.5 N_H \quad (7)$$

These equations are used to obtain the calibrated  $T_{BP}$ 's. The estimated accuracy of calibrated  $T_{BP}$ 's is about  $\pm 3^{\circ}\text{K}$  at 1.4 GHz and 5 GHz. At 37 GHz the accuracy of  $T_{BP}$ 's should be good to about  $\pm 5^{\circ}\text{K}$ .

### 3. FIELD DESCRIPTION AND OPERATION

The test site selected for the 1980 experiment was the same one used in 1979 (Wang et al., 1980a). The soil type in the test site was Elinsboro sandy loam. The layout of the fields used for the radiometric measurements is shown in Figure 2. Each of these fields was approximately 18 m X 18 m in size. Fields 23 and 21 were bare, while fields 61 and 63 were planted with soybeans, and field 31 with corn. The space between fields 21 and 31 was grown with Orchard grass which was maintained at ~10 cm tall. The vast space south of these fields was covered with -30 cm tall Orchard grass. The vegetated fields were prepared, fertilized and planted according to conventional practices. Dekalb XL64A corn (*Zea mays* L.) was planted in field 8 on May 23, 1980 in rows 76 cm apart. Within each row the approximate spacing between corn plants was about 20 cm. On May 30, 1980, fields 7 and 10 were planted with Essex soybeans (*Glycine max.* L.), the spacing was about 60 cm. between rows and approximately 10 cm within each row. Both short (-10 cm tall) and tall (-30 cm tall) Orchard grass fields were from an existing stand, established in the fall of 1979. Both bare fields were kept free of vegetation by periodically spraying with herbicide paraquat.

All three radiometers were mounted on the same platform which was tightly secured to the end of a cherry picker crane. The radiometric measurements over a given field were made at incidence angles ranging from 10° to 70° in 10° steps. The measurements at 0° incidence were not made because of the radiometers' self-emission problem observed in the previous experiment (Wang et al., 1980b). The radiometer systems were maneuvered such that the main beams of the radiometer antennas always aimed at the same spots regardless of incidence angles. This maneuvering was accomplished by placing a marker on a spot which was then monitored by a TV camera mounted on the platform. Measurements by this approach minimized the variations in the radiometric outputs due to the field inhomogeneities. The entire measurements covered a 3-month period from July 1 to September 23, 1980. Between July 18 and August 20 the entire sensor system stopped functioning after it was struck by lightning in a severe storm.

Concurrent with radiometric measurements two soil samples within the footprint of the sensors were measured gravimetrically for moisture content at the depths of 0-0.5 cm, 0-2.5 cm, 2.5-5.0 cm, and 5.0-10.0 cm. Ambient temperature (or canopy temperature in the case of vegetated field) was measured by a thermometer, and the soil temperature at the depths of 0.25 cm, 1.25 cm, 2.5 cm, 7.5 cm, and 15.0 cm, by the Omega platinum resistance probes. More extensive soil sampling

covering the entire field uniformly and extending to deeper layers were made within  $\pm 2$  hours of radiometric measurements as discussed in the next section. Soil bulk densities for the bare field were sampled three times during the entire measurement period with a cylindrical tube of aluminum 2.5 cm tall and 5 cm in diameter. The average values at the two layers of 0-2.5 cm and 2.5-5.0 cm were 1.34 g/cm<sup>3</sup> and 1.40 g/cm<sup>3</sup> respectively. These values were comparable to the gamma ray meter measurements discussed in the next section.

#### 4. GROUND TRUTH ACQUISITION AND PROCESSING

##### 4.1 Soil Moisture Sampling

Extensive water balance data were collected on each of the three plots to conduct daily water balance calculations and soil water profile models. The emphasis of the data collection activities was on the soil moisture. Soil moisture was determined by several methods at up to 6 locations and at up to 10 depths per plot. Climatic data for determining rainfall input and evapotranspiration were collected at a Class A weather station set up specifically for these experiments. For these experiments it was assumed that surface runoff would be zero; therefore, the water balance was estimated for the following:

$$P = ET + \bullet SM - GW - RO \quad (8)$$

where P = daily rainfall input

ET = daily evapotranspiration

ASM = loss or gain in soil moisture

GW = deep seepage to ground water

RO = surface runoff

The GW Term was also assumed to be zero. Except for exceedingly wet periods, this assumption is reasonable for the growing season when evapotranspiration is fairly high.

Details of the instrumentation and data collection were given by Wang et al., (1980a, b). Only differences in the data collection and analysis from the 1979 experiments are discussed below.

#### 4.1.1 Field Measurement Program

Precipitation and pan evaporation were determined on a daily basis. Soil moisture was measured at least twice a week and every time microwave measurements were made. Table 1 summarizes the soil moisture sampling for each plot.

#### 4.1.2 Field and Laboratory Procedures

##### (a) Gravimetric:

At each of the six sites on each plot (approximate locations shown in Figure 7), a sample of approximately 100 grams was taken for each of the four depths. The samples were carved from the face of a shallow hole with a special sampling tool. The sample was placed in a prelabeled plastic jar and sealed with a moisture tight lid.

The samples were taken into the lab and weighed (wet weight) that same day. The samples were then oven dried for 80 minutes in a microwave oven and the samples were weighed again (dry weight). All containers weighed  $5.60 \pm 0.01$  gms, which was considered to be constant. These three weights were punched on cards with the proper date and plot identification information

Table 1  
Soil Moisture Measurement Program for Each Plot

Method	Number Sample Sites	Depth (cm)
Gravimetric	6	0- 2. 2- 4. 4- 10. 10-15.
Surface neutron	6	

Two probe gamma	1	3.8*
		8.9
		14.0
		19.1
		24.1
		29.2
		34.3
		39.4
		47.0
		54.6
		62.2
		77.7
		92.7
		100.0

\*These are the depths at which the source center was located. The effectively measured layer is from 1 cm above to 1 cm below the center; i.e., 3.8 cm measures from 2.5 to 5 cm.

for computer calculation of soil moisture. Volumetric soil moisture is calculated by the following:

$$\theta_v = \left[ \frac{\text{wet weight} - \text{container weight}}{\text{dry weight} - \text{container weight}} - 1 \right] D_B \quad (9)$$

where  $D_B$  is the bulk density.

#### (b) Surface soil moisture - neutron meter.

At each of six marked points in each plot, two 1-minute counts were made to measure the surface (approximately 15 cm) soil moisture. These counts were used, with shield counts before and after the series of plot measurements, as input data to the computer program. The program determined the count ratio (CR) by the following:

$$CR = \frac{\text{avg counts/min at sample site}}{\text{avg counts/min with shield}} \quad (10)$$

Soil moisture was then determined by the following relationship:

$$\% \text{ Soil Moisture} = -68.9593 + 125.3604 (CR)$$

where the coefficients of this linear equation were determined by a least squares fit of the calibration data.

(c) Profile soil moisture with 2-probe gamma meter

Profile soil moisture was measured at one location in each plot with the 2-probe gamma meter. Two parallel aluminum access tubes were installed to a depth of approximately one m in each plot. Measurements were made by lowering the source and counting probe to the depths listed in Table 1 and recording the count rate over one minute. The count ratio was determined according to

$$CR = \frac{\text{counts/min at each depth}}{\text{counts/min for Magnesium standard}} \quad (11)$$

The wet density (Dbw) is then determined directly from the count ratio with the following relationship

$$CR = a e^{(-b) Dbw} \quad (12)$$

where a and b are instrument constants:

$$a = 18.89795 \text{ and } b = 0.027009$$

After solving for Dbw, the volumetric soil moisture  $\theta_v$  is calculated from

$$\theta_v = (DBW - DB) / 100 \quad (13)$$

(d) Bulk density from two probe gamma meter

Bulk density (Db) can be measured directly with the two probe gamma meter. This instrument gives us the capability to determine Db by layer. The general procedure used was to measure the-met bulk density (Dbw) with the two pobe gamma meter and- its moisture content gravimetrically. Bulk density was then calculated by:

$$DB = DBW / \left[ 1 + \frac{\theta_w}{100} \right] \quad (14)$$

where  $\theta_w$  is the percent moisture on a dry weight basis.

Examination of the bulk density measurements from the 1979 data showed that these values may not be constant either among plots or by depth. Most of the bulk density changes occurred in the 'plow' layer (upper 15 cm) of the plots. For this layer on each plot the bulk density was determined by the dual probe gamma meter measurement of wet bulk density and the average gravimetric ( $\theta_w$ ) moisture content for that plot. The depth correspondence for these measurements is shown below:

<u>Depth of <math>D_{BW}</math></u> <u>(dual gamma probe)</u>	<u>Depth of <math>\theta_w</math></u> <u>(average gravimetric)</u>
1.9 cm	0- 2 cm
3.8 cm	2- 4 cm
8.9 cm	4-10 cm
14.0 cm	10-16 cm

Bulk density values were calculated for each date that both ( $D_{bw}$  and  $\theta_w$ ) values were available; these new values were then used in all subsequent calculations. The bulk density value used is listed in Table 2.

For depths deeper than 16 cm, it was assumed that the bulk density did not change with time. These values were determined after the data collection season was over by destroying the site to obtain  $\theta_w$  values for each depth that  $D_{bw}$  was measured. The bulk density values used at each depth below 16 cm are given in Tables A1 5-A18 in Appendix A which lists the dual probe data.

Table 2  
Average Soil Bulk Density

Plot No.	Plot Type	Depth (cm)		
		0-4	4-10	10-16
21	Bare	1.308	1.376	1.392
31	Corn	1.511	1.663	1.696
61	Soybean	1.265	1.288	1.305
63	Soybean	1.312	1.417	1.679

#### 4.2 Moisture-Tension Observations

##### 4.2.1 Laboratory Analysis

Laboratory analyses were conducted to determine the particle-size distribution and moisture-tension relationship for the BARC sites. These analyses were conducted by the U.S. Army Corps of Engineers Cold Regions Research and Engineering Laboratory located in Hanover, New Hampshire.

Only two samples were analyzed, one for a depth interval of 12.5 to 22.5 cm and one for the interval of 30 to 40 cm. Due to the frequent working of the soil over the years, these should be fairly representative of wider depth intervals.

Particle size distributions were derived from sieve and hydrometer measurements. Figures 3 and 4 show the relationships for the two depth samples. The 30-40 cm layer is a slightly heavier soil. Based on the USDA soil classification system, the particle size distribution indicates that the soil is a sandy loam.

Both drying and wetting moisture-tension curves were developed using a falling head permeometer. Figure 5 shows the moisture-tension relationships for the two depths. The divergence between the wetting and drying curves indicates that hysteresis should be considered for this soil. These curves are derived from gravimetric measurements and converted using bulk density data. A bulk density of 1.61 g/cm<sup>3</sup> was observed for the first sample and 1.65 g/cm<sup>3</sup> for the second.

The moisture-tension relationships shown in Figure 5 cover only the lower tension values. These data can be extended using a theoretical model of the relationships such as that developed by Clapp and Hornberger (1978). In that model, the following equation is used to predict tension in cm ( $\Psi$ ) from the relative moisture content  $W$  (moisture content/ saturation moisture content):

$$\Psi = \Psi' W^{-b} \quad (4.2)$$

where  $\Psi'$  is the air entry tension and  $b$  is a parameter related to soil texture. This form applies as long as  $W > 0.9$ .

Using data from the drying curves in Figure 5 and an optimization routine, values of  $0'$  and  $b$  were determined for each sample. Values of  $0' = -15$  cm and  $b = 4.1$  were obtained for the first sample and  $-15$  cm and 5.3 for the second sample. These compare to soil texture class estimates of  $\Psi' = -21$  cm and  $b = 4.9$  obtained by Clapp and Hornberger (1978).

Using the data and equations described above, several pairs of moisture-tension values of general interest were computed and are summarized in Table 3.

Table 3  
Computed Moisture Contents at Specified Tensions

Tension	<u>Volumetric Moisture Content (%)</u>	
	Soil Sample 1	Soil Sample 2
Wilting Point (-15,000 cm)	7.5	10.8
Field Capacity (-300 cm)	19.3	22.7
Saturation	40.0	40.0

#### 4.2.2 Field Observations

Porous cup type tensiometers with pressure gages were installed in one of the corn plots at depths of 30, 45, and 75 cm. Two tensiometers were installed at the 30 cm depth, one in the corn row and one in the furrow between the rows. All of the deeper depths were samples in the furrow.

The tensiometers were installed on June 30, 1980. Due to unusually dry conditions, the measurements were discontinued on July 31 on the 30 and 45 cm tensiometers and on August 15 for the 75 cm. Observed values of tension are summarized in Figure 6.

As might be expected, the shallower depths are more responsive to climatic variations than the 75 cm tensiometer. At this depth, the general trend of drying is observed with very little fluctuation.

Based on Equation 4.2 and the parameters of the 30 to 40 cm layer, the moisture range encountered was about 18 to 24%, which is relatively narrow. Field observations of soil moisture did not agree with these values.

Soil temperature probes were installed in the general area of the tensiometers at depths of 15, 30, and 45 cm. Data collected over the period showed that temperatures at all three depths rarely varied and, therefore, only one depth is plotted in Figure 7 which summarizes the results.

#### 4.3 Agronomic Data

The vegetation parameters were sampled about once a week. Mean values of 10 plant samples were taken on each date for agronomic data on corn and soybeans. Five .25 m<sup>2</sup> areas were sampled for each date for Orchard grass. All agronomic data were then adjusted to a square meter basis from counts of plants and forage per unit area. Square centimeters of leaf area were determined by passing the leaf biomass of each sample through an optically scanning leaf area meter, which records the cross sectional surface area of opaque objects passing through. Cumulative cm<sup>2</sup> of leaf area per sample was adjusted to a square meter basis by multiplying by the average ground area occupied by each sample. Plant height was measured in centimeters. Green biomass measurements were made by harvesting the entire above ground portion of the plants for a small area. Fresh green weight of the harvested material was recorded. The samples were oven dried at a temperature of 68°C for 72 hr. to ~0% moisture and reweighed to obtain dry biomass weight and water content.

## 5. RESULTS

The data collected by microwave radiometers were processed in a similar manner described by Wang et al. (1980a), based on the calibration results of Figure I in Section 2. The calibrated brightness temperatures at all three frequencies, the soil moisture and temperature data, and the vegetation biomass data are all listed in the appendices. Appendix A gives soil moisture contents sampled at 6 stations in each plot and those determined by gamma-ray and neutron meters. Meteorological data containing the daily rainfall, pan evaporation, maximum and minimum air and water temperatures, average wind speed, and relative humidity are also listed at the end of the

appendix. The vegetation biomass in g/m<sup>2</sup> leave area index per m<sup>2</sup>, plant height in cm, and the percentage of vegetation cover are given in Appendix B. Appendix C contains the calibrated radiometer data at all three frequencies taken over bare as well as vegetated fields. Additional entries in this appendix included the average soil moisture contents derived from two sets of samples at the layers of 0-0.5 cm, 0-2.5 cm, 2.5-5.0 cm, and 5.0-10.0 cm, and soil temperatures at the depths of -0.25 cm, 1.25 cm, 2.50 cm, 7.50 cm, and 15.00 cm. These data sets were taken concurrently with the radiometric measurements. The soil samples for moisture content determination were taken within the footprint of the sensors.

Figure 8 shows the normalized brightness temperatures TNB's measured at 10° incidence angle and horizontal polarization for the bare fields plotted against the 0-2.5 cm soil moisture content in percent by dry weight. Plots a and b respectively refer to the results at 1.4 GHz and 5 GHz frequencies. TNB is defined as the ratio of the observed brightness temperature TB and the soil temperature measured at 1.25 cm depth. Both measurements made in 1979 and 1980 were shown here for comparison. Since the same test area was used, and the fields were prepared in the same way in both years of measurements, the effects of soil texture and surface roughness were minimized. The measurement made in 1980 was mostly over a dry soil and so most data points clustered around the low moisture region of the plots. In a few cases when the moisture content was ~10-15%, the 1980 data points mixed well with those from the 1979 measurement at both frequencies. This indicated the consistency obtained in the two years of the radiometric measurement program.

Figure 9 shows a comparison of Tb's at 1.4 GHz and 5 GHz frequencies taken over the same bare fields in both 1979 and 1980 measurements. The observations were made at 10° incidence angle and covered both vertical and horizontal polarizations. It is clear that, after the replacement of the 5 GHz antenna system in 1980, there is no apparent change in the observed pattern established from the 1979 measurements (Wang et al., 1980a). During the period of 1980 measurement, the field soil remained dry most of the time so that the observed Tb's were high. Because of the smaller sampling depth, the Tb's at 5 GHz were higher than those at 1.4 GHz. When the field was wet and relatively uniform, the observed Tb's were low. But the Tb's at 5 GHz were lower than those at 1.4 GHz for most of the wet soil conditions, a phenomenon totally unexpected from the current

radiative transfer model for soils. The addition of another radiometer at 0.6 GHz in the 1981 measurement (Wang et al., 1982) further reinforced this observed feature. More studies are needed to understand this unexpected phenomenon.

## 6. SUMMARY

An experiment to study remote sensing of soil moisture with microwave radiometers mounted on a mobile tower was carried out during the summer of 1980. The experiment was a continuation of the measurement program launched in 1979 (Wang et al., 1980a). During most of the 1980 measurement period the field soil was dry, which nicely complemented the 1979 measurement over the same test area when the field soil was wet most of the time. A comparison of the data sets taken over the bare fields during the two-year period showed measurement consistency in both 1.4 GHz and 5 GHz radiometers. The previously observed lower brightness temperatures at 5 GHz than at 1.4 GHz when the bare field was wet and smooth were reinforced by the data presented here. This suggests that the observed phenomenon could be fundamental and significant and needs to be studied more fully in the future.

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bare and vegetated fields, Geophys. Res. Letters, 9(4), 416-419, 1982.

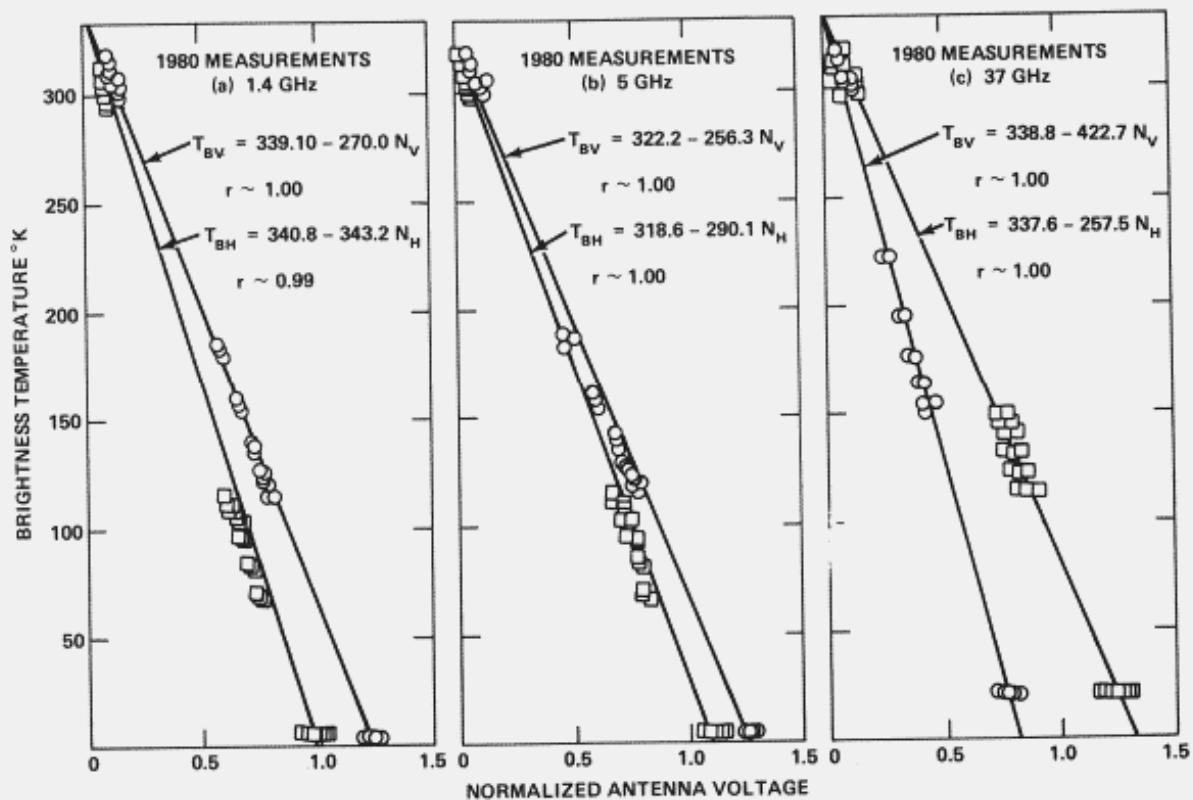


Figure 1. The calibration data and results: (a) 1.4 GHz, (b) 5 GHz, and (c) 37 GHz.

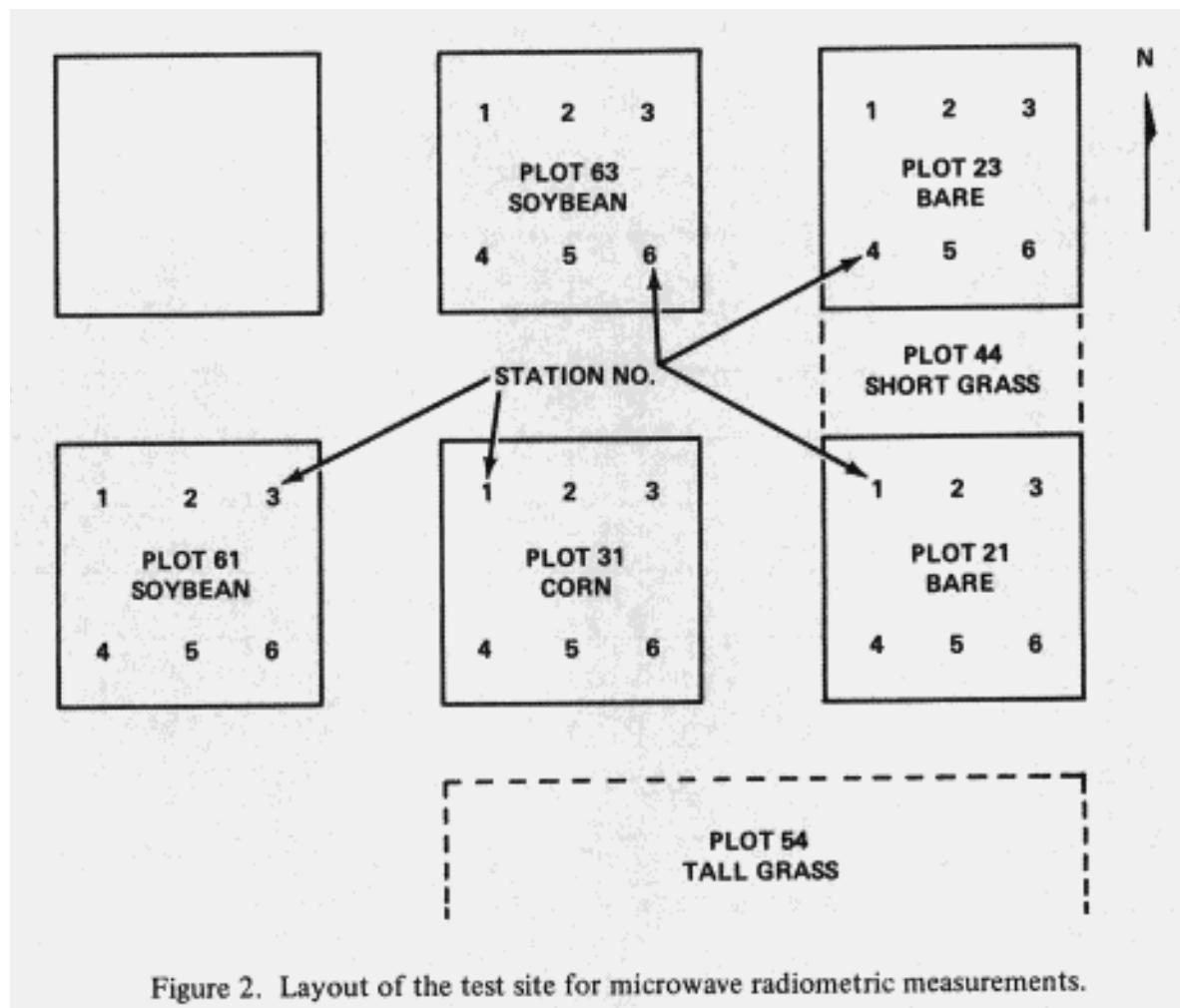


Figure 2. Layout of the test site for microwave radiometric measurements.

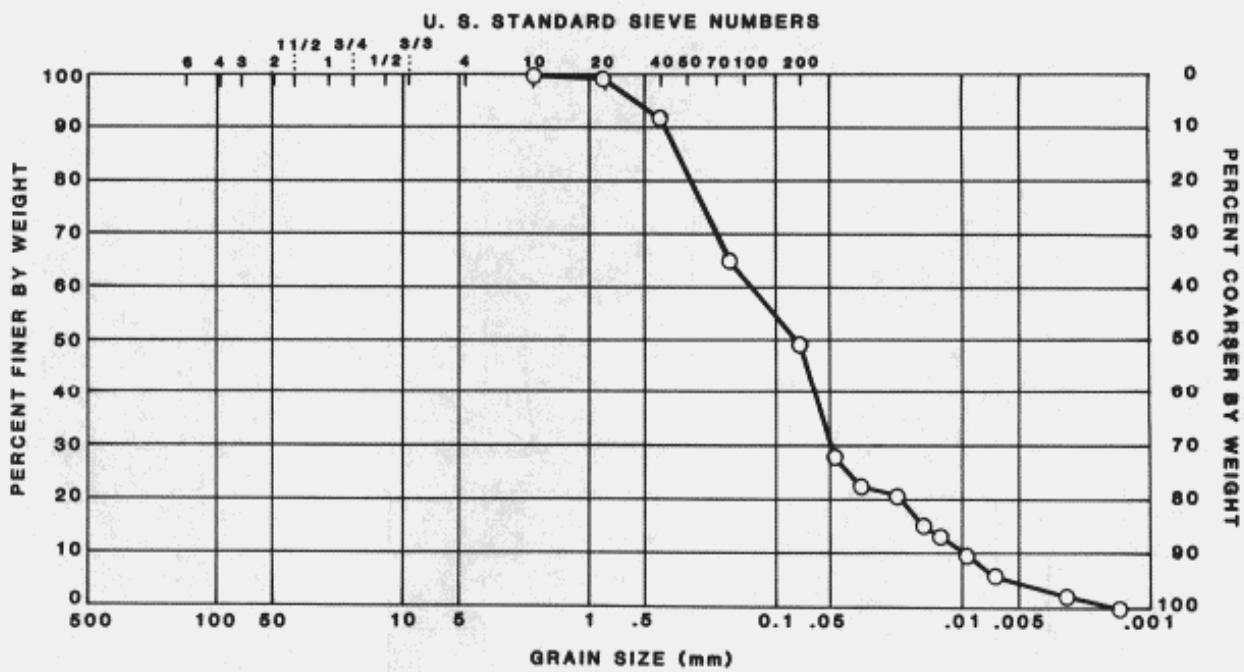


Figure 3. Particle size distribution for Elinsboro Sandy Loam in 12.5 to 22.5 cm layer.

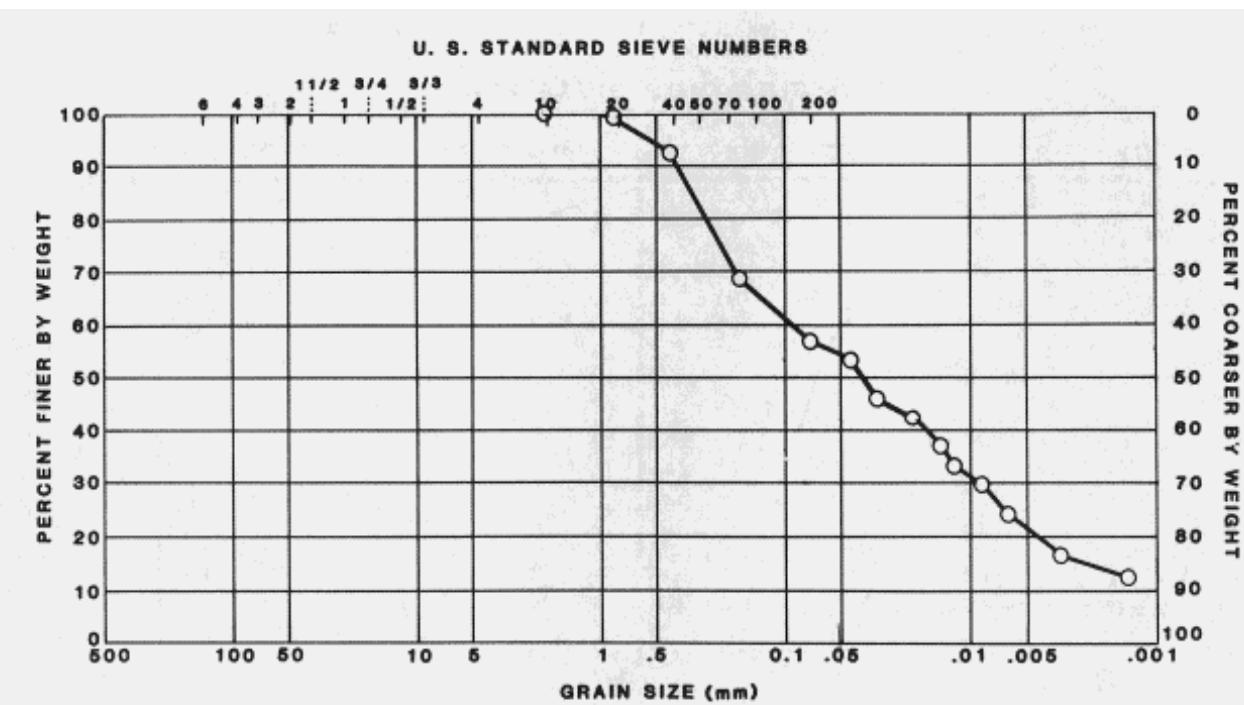


Figure 4. Particle size distribution for Elinsboro Sandy Loam in 30 to 40 cm layer.

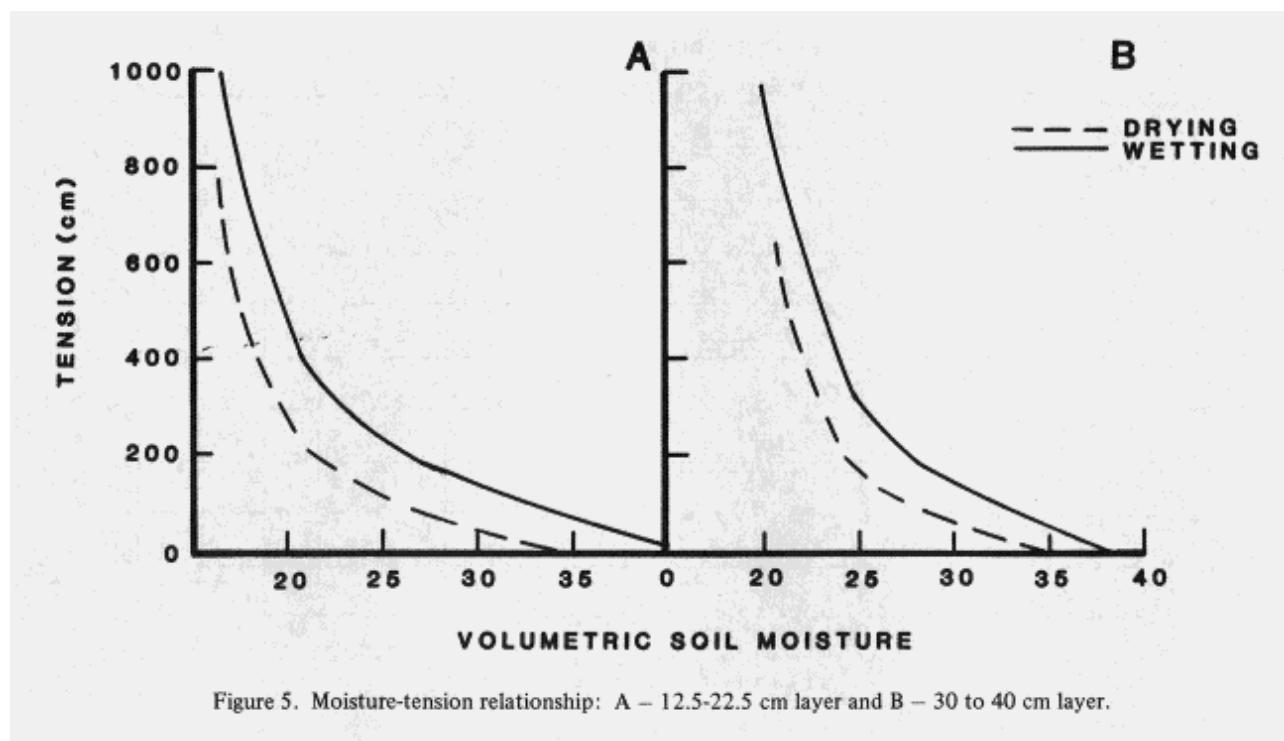


Figure 5. Moisture-tension relationship: A – 12.5-22.5 cm layer and B – 30 to 40 cm layer.

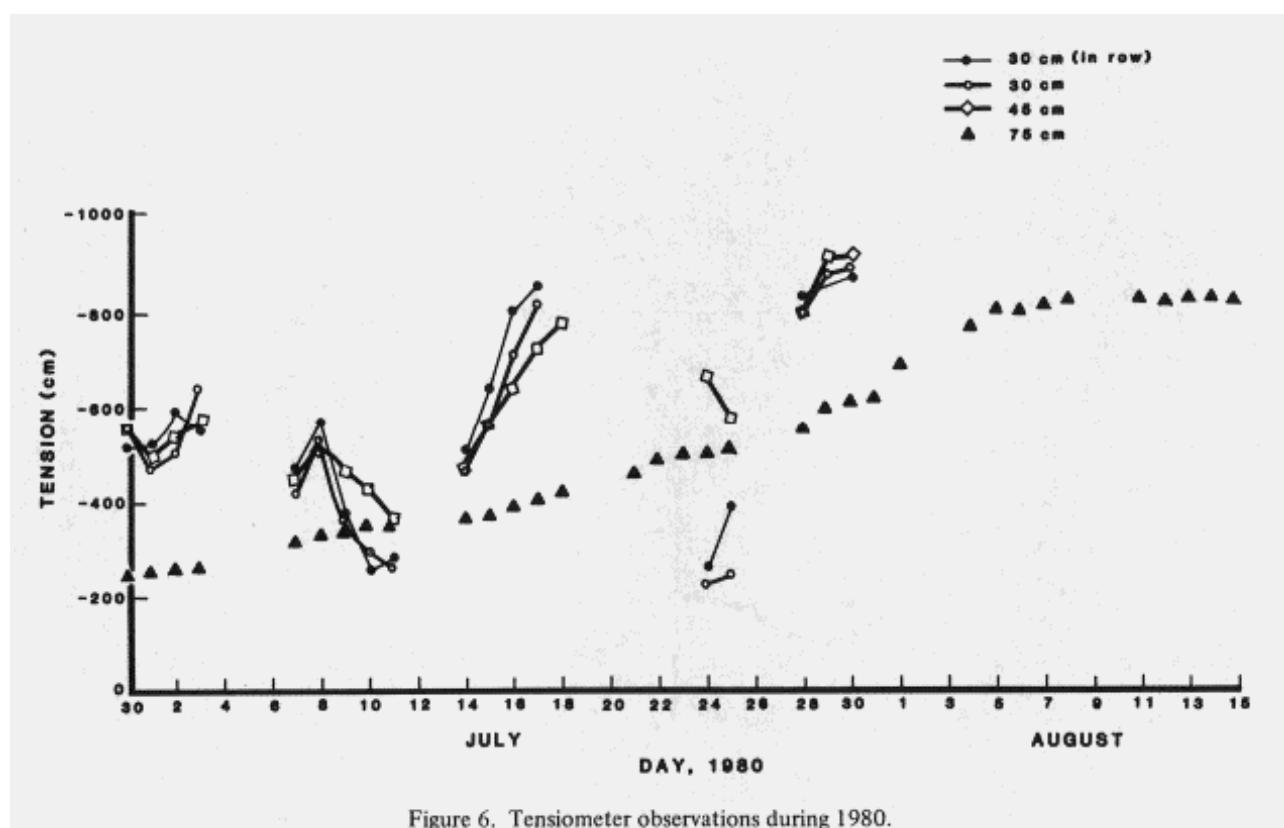


Figure 6. Tensiometer observations during 1980.

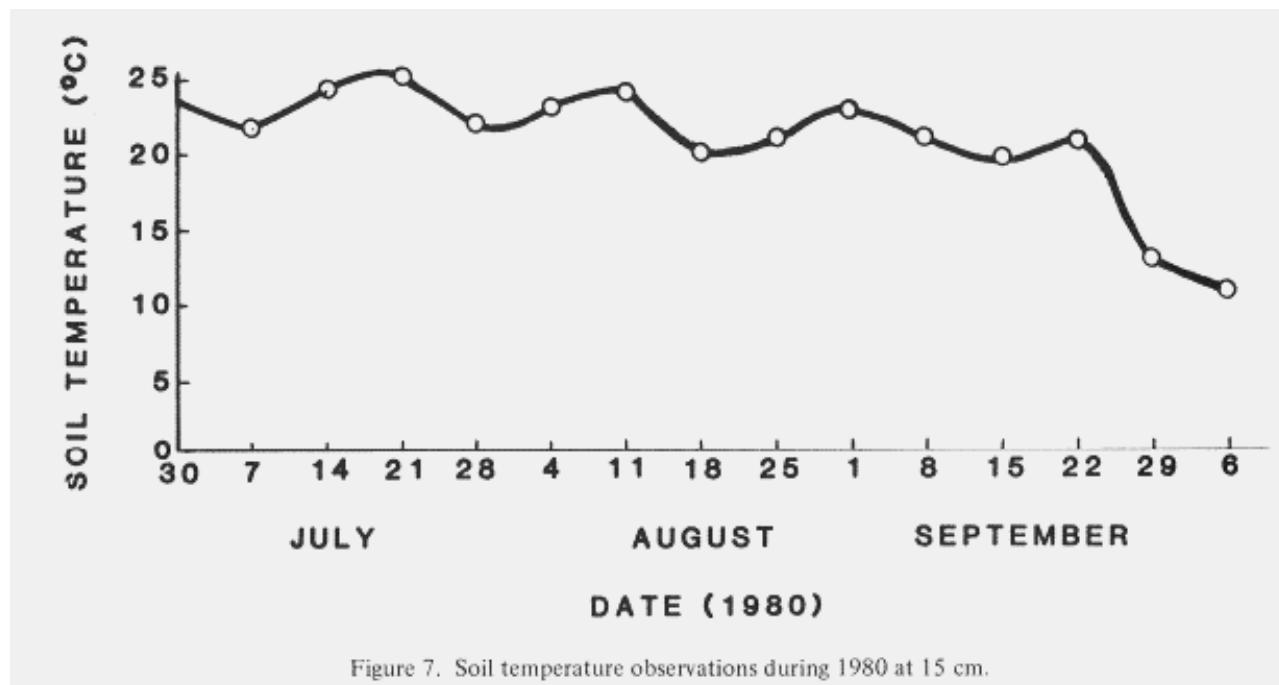
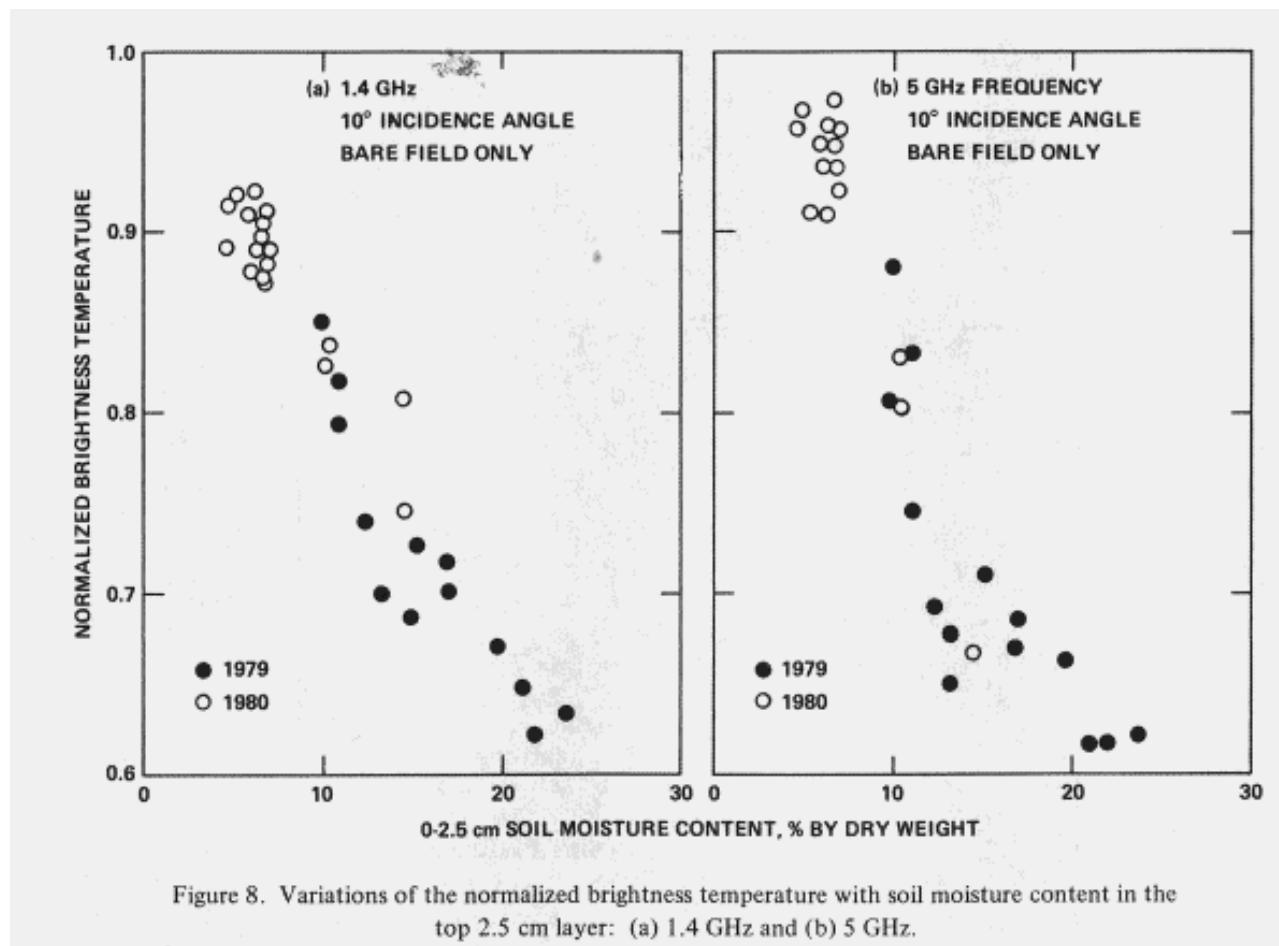


Figure 7. Soil temperature observations during 1980 at 15 cm.



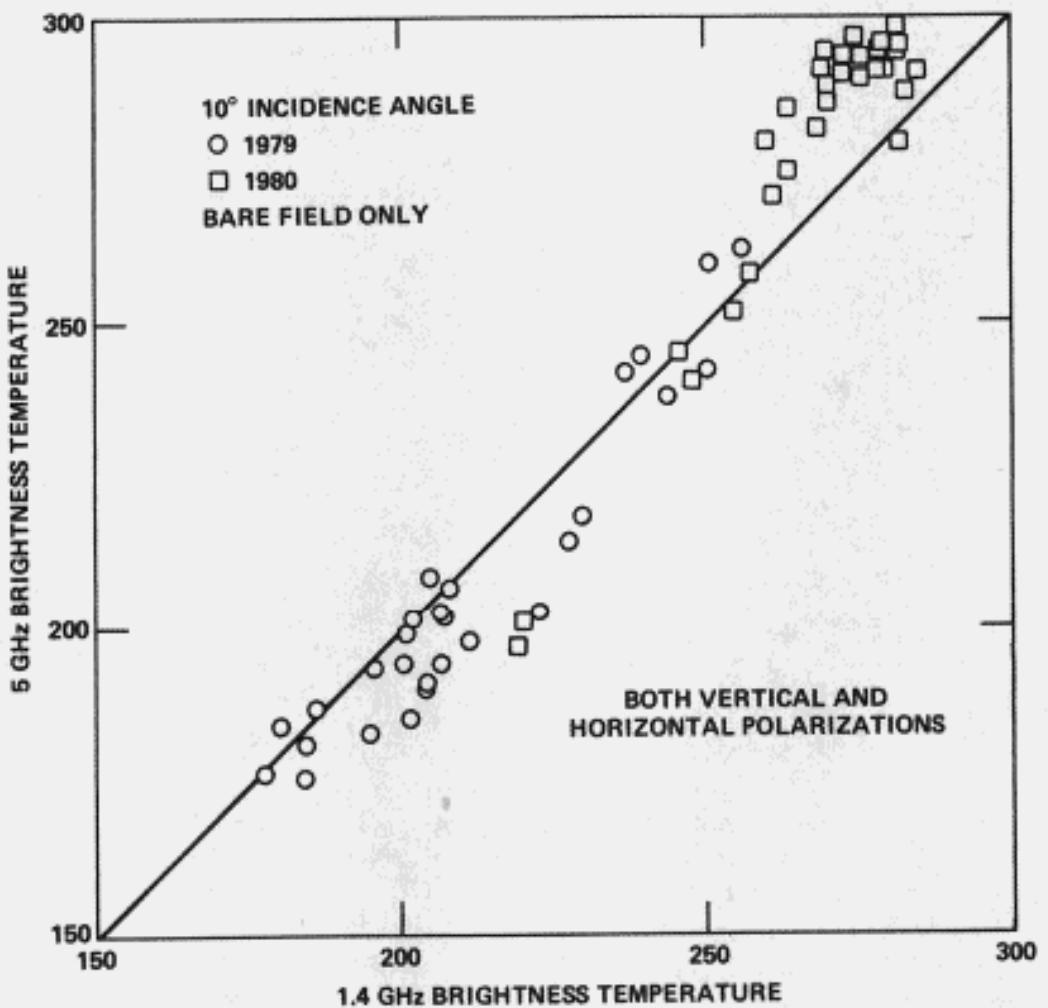


Figure 9. A comparison of measured brightness temperatures at 1.4 GHz and 5 GHz frequencies.

**Table A1**  
**Gravimetric/Volumetric Soil Moisture**

**Field: Bare Plot 21**

Date	Station	Depth (cm)							
		0-2 %byWt.	0-2 %byVol.	2-4 %byWt.	2-4 %byVol.	4-10 %byWt.	4-10 %byVol.	10-16 %byWt.	10-16 %byVol.
6/23/80	1	0.00	0.00	11.13	13.54	13.29	18.24	14.71	20.23
	2	3.78	4.60	9.60	11.68	11.22	15.39	11.65	16.02
	3	3.93	4.78	10.49	12.76	12.34	16.93	13.49	18.55
	4	5.03	6.12	11.90	14.48	13.73	18.83	14.84	20.40
	5	6.85	8.34	13.02	15.85	14.32	19.65	15.30	21.03
	6	4.67	5.68	11.83	14.39	14.27	19.58	15.78	21.70
6/26/80	Avg.	4.85	5.90	11.33	13.78	13.19	18.10	14.30	19.66
	1	6.49	7.85	10.86	13.14	11.18	15.20	13.40	18.43
	2	5.71	6.90	10.51	12.72	11.82	16.07	12.66	17.40
	3	3.83	4.63	8.45	10.23	12.56	17.07	13.80	18.98
	4	4.40	5.32	10.39	12.57	13.03	17.71	14.62	20.10
	5	3.97	4.81	11.38	13.77	12.92	17.56	14.56	20.02
7/1/80	6	7.36	8.90	11.99	14.50	13.84	18.81	14.97	20.59
	Avg.	5.29	6.40	10.60	12.82	12.56	17.07	14.00	19.25
	1	5.60	7.63	10.81	14.73	11.90	16.36	12.94	17.93
	2	4.76	6.49	9.95	13.56	11.84	16.26	12.67	17.56
	3	6.50	8.86	9.92	13.53	12.87	17.69	13.39	18.56
	4	9.22	12.56	13.28	18.11	14.56	20.00	15.12	20.96
7/9/80	5	5.70	7.77	11.19	15.25	13.22	18.17	14.25	19.75
	6	6.38	8.70	9.94	13.55	13.78	18.93	14.57	20.19
	Avg.	6.36	8.67	10.85	14.79	13.03	17.90	13.82	19.16
	1	9.57	12.99	12.56	17.05	15.15	21.08	15.11	21.56
	2	9.48	12.86	13.48	18.29	14.70	20.45	14.86	21.20
	3	9.44	12.81	14.22	19.30	16.10	22.40	15.63	22.30
7/17/80	4	13.87	18.83	15.09	20.47	16.97	23.61	17.74	25.32
	5	9.48	12.87	14.26	19.36	16.24	22.59	16.11	23.00
	6	11.69	15.86	14.70	19.95	16.23	22.58	16.54	23.60
	Avg.	10.59	14.37	14.05	19.07	15.90	22.12	16.00	22.83
	1	9.17	12.53	11.01	15.05	11.75	16.27	13.03	18.26
	2	8.32	11.38	10.10	13.80	11.21	15.53	12.31	17.24
7/24/80	3	7.66	10.48	10.15	13.87	11.55	15.99	12.93	18.12
	4	10.65	14.56	12.56	17.17	14.36	19.88	15.11	21.16
	5	8.79	12.02	10.85	14.83	12.73	17.63	14.44	20.23
	6	8.22	11.23	11.25	15.38	13.26	18.36	14.45	20.25
	Avg.	8.80	12.03	10.99	15.02	12.47	17.28	13.71	19.21
	1	13.20	17.60	14.46	19.27	15.68	21.52	16.01	22.23
7/31/80	2	11.79	15.71	14.55	19.40	15.88	21.79	16.17	22.44
	3	13.64	18.18	14.70	19.59	16.81	23.06	16.04	22.27
	4	14.32	19.09	15.38	20.50	17.68	24.26	17.32	24.04
	5	13.95	18.60	15.85	21.13	18.14	24.89	18.07	25.08
	6	14.69	19.58	15.89	21.18	16.62	22.81	16.95	23.52
	Avg.	13.60	18.13	15.14	20.18	16.80	23.05	16.76	23.26
8/1/80	1	8.57	11.42	11.31	15.07	12.18	16.71	13.03	18.09
	2	6.04	8.05	10.29	13.72	11.79	16.17	12.93	17.94
	3	5.47	7.29	11.64	15.52	12.64	17.34	13.78	19.12
	4	6.85	9.13	12.27	16.36	14.28	19.59	15.02	20.85
	5	11.11	14.80	11.99	15.98	14.52	19.92	15.42	21.40
	6	8.75	11.67	12.03	16.04	13.97	19.16	15.38	21.35
8/10/80	Avg.	7.80	10.39	11.59	15.45	13.23	18.15	14.26	19.79
	1.00	5.78	7.71	10.00	13.34	12.65	17.36	13.88	19.27
	2	4.18	5.58	9.26	12.35	10.95	15.02	12.15	16.86
8/11/80	3	3.73	4.97	9.22	12.29	11.70	16.05	13.69	19.00

8/7/80	4	3.59	4.78	11.09	14.78	13.16	18.06	14.22	19.74
	5	7.53	10.04	11.04	14.71	12.88	17.67	14.25	19.79
	6	2.61	3.48	10.37	13.83	13.31	18.26	14.54	20.19
	Avg.	4.57	6.09	10.16	13.55	12.44	17.07	13.79	19.14
	1	6.42	8.56	10.39	13.85	12.32	16.90	13.26	18.40
	2	6.23	8.31	9.80	13.07	11.79	16.18	12.98	18.02
	3	5.47	7.28	11.15	14.87	12.24	16.79	13.29	18.44
8/13/80	4	7.24	9.65	10.64	14.18	12.88	17.68	14.25	19.79
	5	6.46	8.62	9.25	12.33	12.26	16.82	14.53	20.17
	6	7.95	10.59	13.00	17.33	12.26	16.82	13.60	18.87
	Avg.	6.63	8.84	10.71	14.27	12.29	16.86	13.65	18.95
	1	6.21	8.28	9.18	12.23	10.45	14.34	11.56	16.04
	2	8.60	11.47	11.08	14.77	11.69	16.04	12.89	17.89
	3	5.20	6.94	10.46	13.94	11.95	16.40	12.68	17.60
8/15/80	4	7.27	9.69	10.80	14.40	12.70	17.42	13.77	19.11
	5	5.66	7.54	10.28	13.71	12.98	17.80	14.59	20.25
	6	7.53	10.04	10.41	13.87	12.44	17.07	14.58	20.24
	Avg.	6.75	8.99	10.37	13.82	12.04	16.51	13.34	18.52
	1	8.97	11.96	11.06	14.75	11.96	16.41	12.36	17.16
	2	8.47	11.29	11.14	14.84	11.83	16.23	12.54	17.41
	3	10.79	14.38	11.59	15.45	12.27	16.83	13.22	18.35
8/21/80	4	10.86	14.47	12.38	16.50	13.22	18.14	14.08	19.54
	5	9.49	12.65	12.28	16.37	12.91	17.72	13.24	18.38
	6	9.89	13.18	12.33	16.43	13.02	17.87	14.55	20.19
	Avg.	9.74	12.99	11.80	15.73	12.54	17.20	13.33	18.50
	1	1.94	2.58	8.82	11.75	10.95	15.03	11.56	16.05
	2	2.41	3.22	7.47	9.96	10.82	14.85	12.02	16.69
	3	8.65	11.54	11.07	14.75	12.04	16.52	13.47	18.70
8/28/80	4	2.27	3.02	8.53	11.37	9.86	13.53	10.88	15.11
	5	4.67	16.23	8.03	10.71	9.15	12.55	10.71	14.87
	6	1.31	11.75	9.44	12.58	9.24	12.68	10.21	14.18
	Avg.	3.54	14.72	8.89	11.85	10.35	14.19	11.48	15.93
	1	2.79	3.72	9.62	12.82	11.76	16.13	10.22	14.19
	2	2.75	3.67	7.43	9.90	10.29	14.12	9.91	13.76
	3	3.62	4.83	8.67	11.56	10.65	14.61	11.62	16.13
9/9/80	4	4.82	6.42	10.01	13.35	9.33	12.80	13.57	18.84
	5	3.56	4.74	8.69	11.58	10.80	14.82	11.34	15.74
	6	5.92	7.89	11.25	14.99	13.31	18.26	12.83	17.81
	Avg.	3.91	5.21	9.28	12.37	11.02	15.12	11.58	16.08
	1	5.52	7.36	10.18	13.57	11.41	15.65	12.11	16.81
	2	4.79	6.38	8.78	11.71	10.04	13.77	11.18	15.51
	3	5.82	7.75	9.86	13.14	13.07	17.93	12.35	17.14
9/11/80	4	4.98	6.63	10.21	13.60	13.02	17.86	13.78	19.12
	5	7.61	10.14	11.33	15.10	12.59	17.28	13.74	19.07
	6	11.39	15.18	12.58	16.77	13.91	19.09	14.06	19.51
	Avg.	6.68	8.91	10.49	13.98	12.34	16.93	12.87	17.86
	1	6.72	8.96	9.51	12.68	10.09	13.84	11.37	15.78
	2	4.40	5.87	8.83	11.77	10.57	14.50	11.40	15.82
	3	7.41	9.87	10.23	13.64	11.24	15.42	11.84	16.43
9/16/80	4	7.09	9.45	11.72	15.63	12.65	17.35	13.31	18.48
	5	6.55	8.74	11.01	14.67	12.37	16.98	13.68	18.99
	6	6.95	9.27	13.63	18.18	12.62	17.32	13.39	18.59
	Avg.	6.52	8.69	10.82	14.43	11.59	15.90	12.50	17.35
	1	6.08	8.11	9.73	12.97	11.54	15.83	12.65	17.55
	2	5.95	7.93	9.18	12.23	10.83	14.85	11.95	16.59
	3	6.45	8.60	9.85	13.13	11.40	15.64	12.08	16.77
9/17/80	4	5.96	7.94	10.60	14.12	12.50	17.15	13.16	18.27
	5	4.78	6.37	10.28	13.70	12.28	16.85	13.65	18.95

	6	5.98	7.97	10.17	13.55	12.73	17.47	13.20	18.32
	Avg.	5.87	7.82	9.97	13.29	11.88	16.30	12.78	17.74
	1	5.57	7.42	10.75	14.33	11.91	16.34	13.05	18.11
	2	5.45	7.27	9.75	13.01	11.13	15.27	11.66	16.18
	3	7.47	9.96	9.35	12.46	11.85	16.26	11.87	16.47
9/18/80	4	9.13	12.17	10.79	14.39	12.13	16.64	12.77	17.73
	5	8.06	10.74	10.70	14.27	11.94	16.39	12.39	17.20
	6	5.96	7.95	11.06	14.74	12.59	17.28	13.70	19.02
	Avg.	6.94	9.25	10.40	13.86	11.92	16.36	12.57	17.45
	1	8.58	11.44	9.90	13.20	11.00	15.09	11.67	16.20
	2	8.41	11.22	9.59	12.79	10.48	14.38	10.99	15.25
	3	10.02	13.36	11.04	14.72	11.49	15.77	12.60	17.49
9/23/80	4	8.32	11.09	11.57	15.42	13.23	18.15	13.35	18.53
	5	8.17	10.89	11.44	15.25	12.62	17.32	13.60	18.87
	6	9.11	12.15	10.53	14.04	12.18	16.70	12.43	17.26
	Avg.	8.77	11.69	10.68	14.24	11.83	16.24	12.44	17.27

**Table A2**  
**Gravimetric/Volumetric Soil Moisture**

Field: Bare Plot 23

Date	Site	Depth (cm)						36449.00	36449.00
		0-2 %byWt.	0-2 %byVol.	2-4 %byWt.	2-4 %byVol.	4-10 %byWt.	4-10 %byVol.		
	1	5.70	7.74	10.17	13.80	12.39	17.23	12.54	17.90
	2	2.73	3.70	9.46	12.84	11.11	15.46	12.16	17.35
	3	7.83	10.63	12.07	16.38	14.93	20.77	15.74	22.47
7/16/80	4	4.04	5.48	7.83	10.63	9.63	13.39	11.34	16.19
	5	4.63	6.28	8.67	11.77	10.21	14.20	12.04	17.17
	6	7.20	9.76	10.61	14.40	12.16	16.91	13.17	18.80
	Avg.	5.35	7.26	9.80	13.30	11.74	16.33	12.83	18.31
	1	10.30	13.73	17.25	22.99	15.63	21.44	16.47	22.86
	2	10.15	13.53	13.40	17.86	16.26	22.31	16.85	23.39
	3	10.46	13.94	13.66	18.21	16.64	22.83	16.61	23.06
7/24/80	4	9.84	13.12	12.15	16.20	15.56	21.35	16.00	22.20
	5	9.10	12.13	12.04	16.05	14.12	19.37	14.23	19.75
	6	9.79	13.05	13.24	17.65	14.88	20.42	15.38	21.35
	Avg.	9.94	13.25	13.63	18.16	15.51	21.29	15.92	22.10
	1	5.30	7.07	10.36	13.81	12.35	16.94	13.09	18.17
	2	5.92	7.90	10.45	13.94	11.33	15.54	12.87	17.86
	3	5.99	7.99	11.85	15.79	14.36	19.71	15.58	21.62
7/31/80	4	4.94	6.58	9.92	13.23	11.73	16.10	12.57	17.45
	5	5.23	6.98	9.16	12.21	11.06	15.18	12.20	16.94
	6	6.51	8.68	4.08	5.44	12.66	17.37	13.55	18.80
	Avg.	5.65	7.53	9.30	12.40	12.25	16.81	13.31	18.47
	1	5.33	7.10	9.06	12.08	10.47	14.37	11.04	15.32
	2	2.83	3.77	9.71	12.94	10.68	14.66	11.72	16.27
	3	8.11	10.81	10.81	14.40	12.26	16.82	14.26	19.79
8/7/80	4	5.60	7.47	8.87	11.82	10.50	14.41	11.27	15.64
	5	3.77	5.03	8.38	11.17	9.64	13.23	10.89	15.11
	6	4.99	6.66	9.41	12.55	11.84	16.24	12.92	17.93
	Avg.	5.11	6.81	9.37	12.49	10.90	14.95	12.02	16.68
	1	8.62	11.49	9.74	12.98	12.37	16.97	12.84	17.82
	2	8.41	11.20	10.20	13.60	11.18	15.34	13.12	18.20
	3	9.38	12.50	12.90	17.20	14.48	19.87	15.59	21.64
8/13/80	4	6.06	8.08	9.20	12.26	10.98	15.07	12.11	16.81
	5	7.03	9.34	8.39	11.19	9.22	12.65	10.06	13.97
	6	6.81	9.08	9.44	12.58	10.60	14.49	11.44	15.88

8/21/80	Avg.	7.72	10.29	9.98	13.00	11.47	15.73	12.53	17.39
	1	6.92	9.23	9.72	12.95	11.21	15.38	12.51	17.36
	2	6.00	8.00	10.42	13.88	11.75	16.12	12.96	17.99
	3	7.67	10.22	11.98	15.97	13.58	18.63	14.55	20.20
	4	6.24	8.31	9.21	12.28	10.46	14.35	11.28	15.66
	5	5.84	7.78	9.22	12.28	10.66	14.63	11.42	15.85
	6	5.49	7.32	8.72	11.62	10.72	14.71	10.98	15.23
	Avg.	6.36	8.48	9.88	13.17	11.40	15.64	12.28	17.05
	1	2.84	3.79	10.35	13.80	9.02	12.37	10.30	14.30
	2	7.61	10.14	9.69	12.91	10.79	14.80	12.56	17.44
9/4/80	3	7.77	10.35	11.02	14.69	12.65	17.35	13.88	19.26
	4	4.08	5.44	8.74	11.65	11.13	15.27	12.20	16.95
	5	6.81	9.08	8.25	11.00	9.82	13.47	10.11	14.03
	6	5.79	7.71	8.73	11.64	10.38	14.25	10.88	15.11
	Avg.	5.81	7.75	9.46	12.61	10.63	14.59	11.66	16.18
9/11/80	1	-	-	-	-	-	-	-	-
	2	-	-	-	-	-	-	-	-
	3	-	-	-	-	-	-	-	-
	4	-	-	-	-	-	-	13.29	18.45
	5	4.27	5.69	9.66	12.88	10.21	14.00	9.81	13.62
	6	-	-	-	-	-	-	-	-
	Avg.	4.27	5.69	9.66	12.88	10.21	14.00	11.55	16.04
	1	3.27	5.40	10.17	16.79	9.75	16.09	11.02	18.19
	2	6.01	9.91	8.77	14.47	10.61	17.50	11.09	18.29
	3	9.24	15.24	-	-	13.02	21.49	14.94	24.65
9/16/80	4	5.38	8.87	7.53	12.42	9.32	15.37	10.08	16.63
	5	7.71	12.72	9.03	14.90	9.71	16.02	9.96	16.44
	6	9.14	15.09	9.51	15.69	10.31	17.01	11.90	19.64
	Avg.	6.79	11.20	9.00	14.85	10.70	17.66	11.50	18.97
	1	3.05	4.07	8.12	10.83	10.81	14.82	11.09	15.40
	2	3.19	4.25	5.59	7.45	10.09	13.84	10.95	15.20
	3	4.31	5.75	11.39	15.19	13.66	18.74	14.13	19.61
	4	2.19	2.92	7.14	9.52	9.10	12.48	9.65	13.40
	5	2.60	3.47	6.88	9.18	8.86	12.16	9.46	13.13
	6	1.89	2.52	7.48	9.97	10.00	13.72	10.77	14.95
9/17/80	Avg.	2.87	3.83	7.77	10.35	10.42	14.29	11.01	15.28
	1	3.38	4.50	8.51	11.34	10.90	14.96	11.96	16.60
	2	6.87	9.15	9.29	12.38	11.15	15.30	12.22	16.96
	3	9.45	12.59	11.55	15.40	13.48	18.49	13.65	18.95
	4	6.95	9.26	10.51	14.01	8.69	11.92	10.10	14.01
	5	7.40	9.86	9.81	13.08	9.64	13.22	10.15	14.08
	6	7.37	9.82	9.46	12.61	9.83	13.49	10.77	14.95
	Avg.	6.90	9.20	9.85	13.14	10.61	14.56	11.47	15.93
	1	3.92	5.23	10.08	13.43	-	-	9.89	13.73
	2	10.27	13.69	11.27	15.03	12.32	16.91	12.63	17.54
9/23/80	3	10.70	14.26	11.76	15.68	13.22	18.14	13.58	18.85
	4	5.62	7.49	9.03	12.03	10.20	13.99	10.69	14.83
	5	8.22	10.96	8.94	11.91	9.50	13.04	10.08	14.00
	6	6.29	8.39	8.83	11.77	9.87	13.54	10.62	14.75
	Avg.	7.50	10.00	9.79	13.05	11.02	15.12	11.25	15.61

**Table A3**  
**Gravimetric/Volumetric Soil Moisture**

**Field: Soybean Plot 61**

Date	Site	Depth (cm)							
		0-2 %byWt.	0-2 %byVol.	2-4 %byWt.	2-4 %byVol.	4-10 %byWt.	4-10 %byVol.	10-16 %byWt.	10-16 %byVol.

	1	7.95	10.14	11.48	14.65	12.84	16.78	14.13	18.96
	2	7.30	9.32	11.89	15.17	13.34	17.44	14.55	19.53
	3	6.42	8.19	10.07	12.85	11.80	15.42	12.42	16.67
6/20/80	4	9.50	12.13	16.24	20.72	18.07	23.62	19.08	25.60
	5	10.40	13.27	15.66	19.98	17.23	22.52	18.68	25.07
	6	11.24	14.34	15.66	19.98	16.85	22.03	18.08	24.27
	Avg.	8.80	11.23	13.50	17.23	15.02	19.63	16.16	21.68
	1	3.91	4.99	8.44	10.77	10.43	13.63	12.14	16.29
	2	8.09	10.32	9.35	11.93	11.45	14.97	13.36	17.92
6/26/80	3	3.96	5.05	7.43	9.48	9.74	12.73	11.86	15.92
	4	10.10	12.89	13.80	17.61	15.31	20.01	17.17	23.04
	5	6.05	7.72	12.86	16.41	15.60	20.39	16.73	22.46
	6	5.48	6.99	11.20	14.29	13.36	17.45	14.16	19.01
	Avg.	6.26	7.99	10.51	13.42	12.65	16.53	14.24	19.11
	1	6.36	8.32	9.34	12.22	11.69	15.29	13.00	16.78
	2	4.85	6.34	7.74	10.13	11.44	14.97	14.29	18.45
	3	4.31	5.64	7.49	9.80	10.24	13.39	12.13	15.66
7/2/80	4	8.49	11.10	12.24	16.01	14.52	18.99	16.99	21.93
	5	6.41	8.38	11.74	15.35	14.60	19.10	16.47	21.26
	6	4.45	5.82	11.09	14.51	14.24	18.62	22.80	29.43
	Avg.	5.81	7.60	9.94	13.00	12.79	16.73	15.95	20.59
	1	18.72	23.25	18.52	23.00	18.55	23.64	18.51	23.92
	2	16.27	20.21	16.71	20.75	18.08	23.04	16.95	21.89
	3	15.42	19.15	15.16	18.83	15.43	19.66	14.92	19.28
7/10/80	4	21.43	26.62	21.30	26.45	20.98	26.72	20.81	26.89
	5	20.85	25.89	21.31	26.46	21.69	27.64	21.33	27.56
	6	20.27	25.18	19.71	24.48	21.35	27.20	20.21	26.11
	Avg.	18.83	23.38	18.78	23.39	19.35	24.65	18.79	24.27
	1	13.54	16.69	13.95	17.20	15.49	19.55	15.54	20.08
	2	12.78	15.76	12.76	15.73	14.33	18.08	15.73	20.32
	3	13.11	16.16	13.09	16.14	14.28	18.03	14.95	19.32
7/25/80	4	19.33	23.83	19.23	23.71	19.73	24.90	20.12	26.00
	5	17.23	21.24	18.34	22.61	19.15	24.17	20.12	25.99
	6	13.87	17.10	16.18	19.94	18.40	23.21	18.34	23.69
	Avg.	14.97	18.46	15.59	19.22	16.90	21.32	17.47	22.57

**Table A4**  
**Gravimetric/Volumetric Soil Moisture**

**Field: Soybean Plot 63**

Date	Site	Depth (cm)							
		0-2 %byWt.	0-2 %byVol.	2-4 %byWt.	2-4 %byVol.	4-10 %byWt.	4-10 %byVol.	10-16 %byWt.	10-16 %byVol.
	1	5.24	6.88	10.37	13.61	13.06	18.51	13.59	22.81
	2	3.89	5.10	9.84	12.91	12.25	17.36	12.85	21.57
	3	4.34	5.69	9.83	12.90	12.78	18.10	13.53	22.72
7/16/80	4	5.68	7.46	10.07	13.21	12.26	17.37	12.37	20.78
	5	6.28	8.24	10.75	14.11	13.15	18.64	13.79	23.16
	6	4.47	5.87	9.13	11.98	13.01	18.43	13.50	22.66
	Avg.	4.98	6.54	10.00	13.12	12.75	18.07	13.27	22.28
	1	13.21	17.33	13.84	18.16	16.46	23.33	17.08	28.68
	2	12.26	16.08	13.17	17.28	15.71	22.26	15.53	26.08
	3	14.81	19.43	13.79	18.09	17.11	24.24	16.41	27.56
7/24/80	4	12.71	16.67	12.45	16.34	14.49	20.53	15.73	26.41
	5	12.80	16.79	13.23	17.36	15.05	21.32	15.58	26.16
	6	12.02	15.77	11.54	15.15	15.60	22.10	17.05	28.63
	Avg.	12.97	17.01	13.00	17.06	15.74	22.30	16.23	27.25
	1	5.57	7.31	9.63	12.64	11.22	15.90	12.60	21.16

7/31/80	2	6.23	8.17	9.26	12.15	10.37	14.70	11.79	19.79
	3	4.71	6.18	8.61	11.29	9.50	13.46	10.59	17.77
	4	3.99	5.23	8.08	10.60	9.40	13.33	10.12	17.00
	5	3.79	4.97	9.05	11.87	1126.00	15.96	10.94	18.37
	6	3.99	5.24	8.40	11.03	10.56	14.97	11.72	19.68
	Avg.	4.71	6.18	8.84	11.60	10.39	14.72	11.29	18.96
8/7/80	1	5.27	6.91	20.04	26.30	8.61	12.20	9.39	15.76
	2	7.09	9.31	8.27	10.85	8.74	12.38	9.40	15.79
	3	6.20	8.14	8.17	10.71	8.58	12.15	8.96	15.05
	4	3.55	4.65	6.24	8.18	6.38	9.04	7.00	11.75
	5	3.31	4.35	5.93	7.78	6.04	8.56	6.17	10.36
	6	5.04	6.61	6.06	7.95	6.73	9.53	7.15	12.01
8/13/80	Avg.	5.08	6.66	9.12	11.96	7.51	10.64	8.01	13.45
	1	7.87	10.33	8.61	11.29	8.00	11.33	7.64	12.83
	2	6.59	8.64	7.36	9.66	6.26	8.87	6.00	10.07
	3	6.69	8.77	7.95	10.43	7.16	10.15	7.00	11.76
	4	6.38	8.37	7.31	9.59	6.73	9.53	6.44	10.81
	5	5.47	7.18	6.34	8.32	5.61	7.95	4.66	7.82
8/21/80	6	5.48	7.19	6.82	8.95	6.73	9.54	5.07	8.52
	Avg.	6.41	8.41	7.40	9.71	6.75	9.56	6.14	10.30
	1	9.97	13.09	10.29	13.50	10.77	15.26	10.78	18.10
	2	10.46	13.73	10.21	13.40	10.64	15.08	10.65	17.89
	3	10.99	14.42	10.79	14.16	11.06	15.68	10.97	18.42
	4	9.95	13.06	9.67	12.69	9.09	12.89	8.80	14.78
8/22/80	5	8.73	11.45	8.74	11.46	8.84	12.53	8.45	14.19
	6	7.50	9.84	7.76	10.18	8.00	11.34	8.42	14.14
	Avg.	9.60	12.60	9.58	12.56	9.74	13.80	9.68	16.25
	1	8.01	10.51	9.26	12.14	9.81	13.90	10.02	16.82
	2	11.38	14.94	11.12	14.59	11.42	16.18	11.93	20.03
	3	11.05	14.50	10.58	13.88	10.38	14.70	10.37	17.41
8/28/80	4	10.65	13.98	10.06	13.20	11.06	15.67	11.49	19.29
	5	22.52	29.55	10.52	13.80	10.31	14.61	10.66	17.90
	6	8.85	11.61	9.54	12.51	9.77	13.84	9.96	16.73
	Avg.	12.08	15.84	10.18	13.36	10.46	14.82	10.74	18.03
	1	3.27	4.29	5.59	7.33	6.17	8.74	7.07	11.87
	2	3.89	5.10	5.74	7.53	6.97	9.87	7.08	11.89
9/9/80	3	3.89	5.10	6.28	8.23	-	-	7.90	13.26
	4	6.83	8.97	7.46	9.79	7.63	10.82	9.01	15.13
	5	4.05	5.32	6.24	8.19	6.85	9.70	7.75	13.02
	6	4.42	5.80	5.87	7.70	6.75	9.57	7.23	12.15
	Avg.	4.39	5.76	6.20	8.13	6.81	9.65	7.67	12.89
	1	3.50	4.59	5.34	7.01	5.69	8.07	6.16	10.34
9/11/80	2	2.20	2.89	3.29	4.32	5.30	7.52	5.42	9.11
	3	5.97	7.83	5.03	6.59	6.01	8.51	6.45	10.83
	4	1.84	2.41	3.93	5.16	4.73	6.70	5.65	9.49
	5	3.38	4.43	4.81	6.31	5.20	7.37	5.53	9.28
	6	1.63	2.14	3.42	4.49	4.06	5.75	4.25	7.13
	Avg.	3.09	4.05	4.30	5.65	5.16	7.32	5.58	9.36
9/11/80	1	-	-	8.45	11.09	7.98	11.31	6.98	11.73
	2	6.91	9.06	7.10	9.32	6.45	9.13	5.53	9.29
	3	7.24	9.49	7.79	10.22	7.38	10.46	6.73	11.29
	4	4.97	6.52	6.52	8.56	5.76	8.16	5.21	8.75
	5	5.39	7.07	5.77	7.57	4.97	7.04	4.96	8.33
	6	5.86	7.69	6.20	8.14	6.00	8.50	5.02	8.43
	Avg	6.07	7.97	6.97	9.15	6.42	9.10	5.74	9.64
	1	3.65	4.79	4.39	5.76	5.74	8.14	6.37	10.69
	2	3.79	4.96	4.73	6.20	5.61	7.94	6.09	10.23
	3	2.72	3.57	4.59	6.02	5.20	7.37	5.46	9.16

9/16/80	4	3.89	5.10	4.46	5.85	4.89	6.92	5.00	8.40
	5	17.46	22.91	4.67	6.13	5.09	7.21	5.47	9.18
	6	1.62	2.12	3.26	4.28	4.47	6.33	4.63	7.77
	Avg.	5.52	7.24	4.35	5.71	5.17	7.32	5.50	9.24
	1	2.49	3.26	4.13	5.42	4.89	6.93	4.79	8.03
	2	2.15	2.82	3.68	4.83	5.01	7.10	5.49	9.22
	3	3.12	4.09	3.99	5.23	5.21	7.39	5.48	9.20
9/17/80	4	1.68	2.20	2.86	3.75	4.28	6.07	4.47	7.50
	5	2.69	3.53	4.32	5.67	4.93	6.99	4.89	8.21
	6	-	-	3.26	4.27	4.49	6.36	4.63	7.78
	Avg.	2.42	3.18	3.71	4.86	4.80	6.81	4.96	8.32
	1	2.42	3.18	4.25	5.58	5.58	7.90	5.56	9.34
	2	1.45	1.91	3.52	4.62	4.59	6.50	4.84	8.13
	3	2.84	3.73	4.04	5.30	5.26	7.46	5.47	9.18
9/18/80	4	1.95	2.56	2.89	3.79	3.97	5.62	4.42	7.42
	5	2.24	2.94	3.87	5.08	4.68	6.63	5.13	8.61
	6	2.82	3.70	3.51	4.61	4.18	5.92	4.68	7.86
	Avg.	2.29	3.00	3.68	4.83	4.71	6.67	5.02	8.42
	1	2.16	2.84	3.91	5.13	4.73	6.70	4.98	8.36
	2	1.54	2.02	3.55	4.66	4.29	6.08	4.91	8.25
	3	2.32	3.04	4.84	6.35	5.42	7.68	5.64	9.47
9/23/80	4	1.79	2.35	26.38	34.61	4.20	5.95	4.82	8.10
	5	1.64	2.15	3.31	4.34	4.32	6.12	4.77	8.00
	6	1.52	2.00	3.94	5.17	4.44	6.29	4.57	7.67
	Avg.	1.83	2.40	7.66	10.05	4.57	6.47	4.95	8.31

**Table A5**  
**Gravimetric/Volumetric Soil Moisture**

**Field: Corn Plot 31**

Date	Site	Depth (cm)							
		0-2 %byWt.	0-2 %byVol.	2-4 %byWt.	2-4 %byVol.	4-10 %byWt.	4-10 %byVol.	10-16 %byWt.	10-16 %byVol.
6/23/80	1	3.54	5.35	8.61	13.00	10.64	18.02	11.02	18.76
	2	2.48	3.74	8.04	12.14	9.06	15.34	11.52	19.62
	3	1.80	2.72	6.48	9.78	10.22	17.31	11.60	19.75
	4	9.15	13.81	12.02	18.16	13.68	23.18	14.89	25.35
	5	5.02	7.58	12.64	19.09	14.25	24.14	15.96	27.18
	6	10.09	15.23	12.26	18.51	14.13	23.94	14.44	24.59
6/26/80	Avg.	5.35	8.07	10.01	15.11	12.00	20.32	13.24	22.54
	1	1.32	1.99	5.00	7.55	6.92	11.72	8.05	13.78
	2	6.53	9.87	9.23	13.95	10.38	17.57	10.87	18.60
	3	5.10	7.70	8.55	12.92	9.79	16.58	10.62	18.18
	4	9.17	13.85	11.21	16.94	12.87	21.78	13.96	23.89
	5	9.76	14.74	13.40	20.25	14.46	24.47	15.20	26.00
7/1/80	6	7.40	11.18	11.17	16.88	12.95	21.92	12.88	22.04
	Avg.	6.54	9.89	9.76	14.75	11.23	19.01	11.93	20.42
	1	6.04	9.20	7.96	12.13	9.51	15.70	10.06	17.07
	2	4.79	7.29	7.69	11.72	9.39	15.50	9.95	16.90
	3	2.10	3.21	6.19	9.43	7.77	12.84	7.97	13.54
	4	3.48	5.30	5.53	8.42	9.38	15.49	9.38	15.92
7/10/80	5	9.01	13.72	11.50	17.53	12.75	21.06	14.54	24.69
	6	9.19	14.01	11.62	17.70	13.24	21.85	13.92	23.63
	Avg.	5.77	8.79	8.41	12.82	10.34	17.07	10.97	18.63
	1	15.13	22.93	15.25	23.10	13.90	22.94	12.40	20.94
	2	16.21	24.57	16.70	25.30	15.95	26.31	14.08	23.79
	3	15.30	23.18	14.42	21.84	14.13	23.31	12.50	21.11
7/10/80	4	17.34	26.28	17.13	25.95	18.10	29.87	16.48	27.83

	5	16.73	25.35	17.16	25.99	17.51	28.88	15.80	26.69
	6	17.00	25.75	16.17	24.50	15.12	24.95	14.59	24.64
	Avg.	16.29	24.68	16.14	24.45	15.78	26.04	14.31	24.17
	1	8.30	12.57	9.71	14.71	10.80	17.82	10.81	18.26
	2	6.38	9.66	8.05	12.20	8.61	14.20	8.66	14.62
	3	7.50	11.36	8.74	13.24	9.16	15.11	9.64	16.28
7/16/80	4	5.41	8.19	9.68	14.67	10.70	17.66	10.75	18.15
	5	10.73	16.26	12.67	19.20	13.12	21.64	13.55	22.88
	6	12.69	19.23	12.96	19.64	13.72	22.63	14.37	24.27
	Avg.	8.50	12.88	10.30	15.61	11.02	18.18	11.30	19.08
	1	10.51	15.71	10.69	15.97	11.31	18.40	11.42	19.15
	2	12.48	18.64	11.84	17.68	12.26	19.95	12.54	21.03
	3	12.61	18.83	11.96	17.87	12.29	19.99	12.21	20.47
7/25/80	4	13.95	20.85	14.85	22.18	14.88	24.21	14.96	25.08
	5	14.41	21.53	15.13	22.60	15.90	25.88	15.96	26.76
	6	18.49	27.63	18.13	27.09	18.19	29.59	17.56	29.45
	Avg.	13.74	20.53	13.77	20.57	14.14	23.00	14.11	23.66
	1	4.47	6.67	5.79	8.65	6.16	10.01	6.82	11.44
	2	5.70	8.51	7.44	11.11	7.69	12.51	7.42	12.45
	3	5.46	8.15	6.21	9.28	6.56	10.67	6.65	11.14
8/7/80	4	20.64	30.83	10.08	15.05	10.10	16.43	10.22	17.14
	5	8.40	12.54	9.06	13.54	8.95	14.56	8.49	14.24
	6	12.59	18.81	11.77	17.58	11.73	19.08	11.49	19.27
	Avg.	9.54	14.25	8.39	12.54	8.53	13.88	8.52	14.28
	1	6.59	9.85	7.39	11.05	6.72	10.94	5.55	9.30
	2	6.81	10.17	7.85	11.73	7.50	12.20	6.13	10.28
	3	6.03	9.01	6.84	10.22	6.66	10.84	5.88	9.86
8/13/80	4	7.11	10.63	9.13	13.64	8.36	13.59	6.74	11.31
	5	9.03	13.49	10.85	16.21	10.18	16.56	8.44	14.16
	6	7.60	11.35	8.77	13.10	8.40	13.67	7.88	13.22
	Avg.	7.20	10.75	8.47	12.66	7.97	12.97	6.77	11.35
	1	7.58	11.33	8.42	12.58	8.86	14.41	8.12	13.61
	2	10.55	15.77	8.85	13.22	9.09	14.79	8.65	14.51
	3	8.65	12.93	9.20	13.74	9.26	15.07	9.44	15.83
8/21/80	4	9.92	14.83	11.24	16.79	11.25	18.30	10.48	17.58
	5	11.80	17.62	11.68	17.45	11.83	19.25	10.52	17.65
	6	10.16	15.18	11.20	16.73	11.21	18.23	10.27	17.22
	Avg.	9.78	14.61	10.10	15.09	10.25	16.67	9.58	16.07
	1	6.48	9.68	7.55	11.27	7.98	12.99	7.66	12.84
	2	6.75	10.09	7.98	11.93	8.08	13.14	7.69	12.90
	3	7.61	11.37	8.21	12.26	8.50	13.83	8.08	13.54
8/22/80	4	9.13	13.64	10.56	15.78	10.44	16.98	9.48	15.89
	5	11.00	16.43	11.75	17.56	11.47	18.67	10.62	17.81
	6	10.08	15.07	10.87	16.24	10.71	17.42	9.89	16.58
	Avg.	8.51	12.71	9.49	14.17	9.53	15.51	8.90	14.93
	1	1.84	2.74	4.43	6.63	5.57	9.06	5.69	9.55
	2	1.61	2.40	3.20	4.79	4.26	6.93	4.45	7.47
	3	2.47	3.69	4.58	6.84	5.28	8.60	4.79	8.03
8/28/80	4	3.34	4.99	5.80	8.66	6.37	10.36	6.42	10.76
	5	4.85	7.24	6.69	9.99	6.86	11.15	6.40	10.74
	6	3.79	5.66	6.00	8.96	6.16	10.02	6.04	10.12
	Avg.	2.98	4.45	5.12	7.64	5.75	9.35	5.63	9.44
	1	1.20	1.80	2.45	3.67	4.05	6.59	4.26	7.14
	2	1.12	1.67	2.61	3.90	4.44	7.23	4.61	7.74
	3	0.92	1.37	1.63	2.43	2.51	4.08	4.03	6.76
9/4/80	4	1.69	2.52	2.89	4.31	5.24	8.52	5.56	9.32
	5	1.80	2.69	3.88	5.80	5.59	9.10	5.36	8.99
	6	1.36	2.04	3.30	4.93	4.89	7.95	4.83	8.09

	Avg.	1.35	2.01	2.79	4.17	4.45	7.25	4.77	8.01
9/9/80	1	1.55	2.31	2.22	3.32	3.61	5.87	3.91	6.56
	2	1.36	2.03	2.91	4.34	3.30	5.38	3.77	6.33
	3	1.68	2.51	3.15	4.71	3.47	5.65	3.67	6.15
	4	2.23	3.33	4.41	6.59	3.05	4.96	5.05	8.47
	5	3.58	5.34	5.48	8.19	5.93	9.65	5.47	9.18
	6	1.77	2.64	1.71	2.55	4.30	7.00	4.67	7.83
	Avg.	2.03	3.03	3.31	4.95	3.94	6.42	4.43	7.42
9/11/80	1	3.57	5.33	4.90	7.31	4.17	6.79	3.72	6.24
	2	-	-	6.07	9.06	4.74	7.71	3.78	6.33
	3	6.45	9.63	6.95	10.38	6.21	10.11	5.73	9.60
	4	7.17	10.71	8.38	12.51	8.00	13.01	6.04	10.13
	5	6.59	9.85	8.34	12.46	7.56	12.31	6.61	11.08
	6	6.00	8.97	7.21	10.76	6.86	11.16	5.34	8.95
	Avg.	5.96	8.90	6.97	10.42	6.26	10.18	5.20	8.72
9/16/80	1	2.44	3.65	4.35	6.50	4.76	7.74	4.64	7.78
	2	2.39	3.57	4.48	6.70	4.54	7.38	4.01	6.72
	3	1.81	2.70	4.62	6.91	5.12	8.34	4.35	7.30
	4	2.63	3.93	5.26	7.85	6.11	9.94	5.19	8.71
	5	4.17	6.23	4.63	6.92	5.49	8.94	5.65	9.48
	6	2.56	3.83	5.71	8.53	6.30	10.24	5.83	9.78
	Avg.	2.67	3.98	4.84	7.24	5.39	8.77	4.95	8.30
9/17/80	1	1.66	2.48	2.85	4.26	4.18	6.80	3.40	6.65
	2	2.16	3.22	3.80	5.67	5.22	8.50	4.90	8.21
	3	2.11	3.14	4.21	6.30	4.80	7.80	4.31	7.23
	4	3.40	5.08	4.95	7.39	6.17	10.04	5.51	9.25
	5	2.85	4.25	5.76	8.61	7.23	11.77	6.85	11.49
	6	2.07	3.09	3.78	5.64	6.14	9.99	6.07	10.19
	Avg.	2.37	3.55	4.22	6.31	5.62	9.15	5.27	8.84
9/18/80	1	3.02	4.51	3.72	5.55	4.43	7.21	3.90	6.54
	2	2.73	4.08	4.00	5.97	4.74	7.71	4.52	7.57
	3	2.45	3.67	3.84	5.74	4.81	7.82	4.41	7.39
	4	2.88	4.30	4.09	6.10	6.09	9.92	5.63	9.44
	5	3.61	5.40	5.62	8.40	6.29	10.24	6.23	10.45
	6	6.11	9.13	6.06	9.06	6.93	11.27	-	-
	Avg.	3.51	5.24	4.56	6.81	5.55	9.03	4.94	8.28
9/23/80	1	1.22	1.82	2.45	3.66	3.78	6.15	3.88	6.51
	2	2.23	3.33	1.12	1.67	3.53	5.74	3.53	5.92
	3	1.46	2.19	3.17	4.74	3.92	6.38	3.83	6.42
	4	2.07	3.09	3.09	4.62	4.93	8.01	4.93	8.27
	5	2.90	4.33	5.70	8.51	6.88	11.20	6.61	11.09
	6	2.65	3.96	4.29	6.41	6.02	9.79	5.99	10.05
	Avg.	2.09	3.12	3.30	4.93	4.84	7.88	4.80	8.04

**Table A6**  
**Gravimetric/Volumetric Soil Moisture**

#### **Field: Short Grass Plot 44**

	Avg.	7.99	8.38	7.61	9.13	7.47	9.71	7.25	9.78
7/9/80	1	14.33	15.05	12.37	14.84	12.55	16.31	11.00	14.85
	2	16.98	17.83	13.25	15.90	11.88	15.44	11.62	15.68
	3	12.32	12.94	12.41	14.90	12.40	16.11	12.04	16.25
	4	14.47	15.19	11.93	14.31	13.03	16.94	11.89	16.05
	5	-	-	-	-	-	-	-	-
	6	-	-	-	-	-	-	-	-
7/17/80	Avg.	14.52	15.25	12.49	14.99	12.46	16.20	11.64	15.71
	1	11.90	12.50	11.52	13.82	11.18	14.53	11.30	15.26
	2	13.56	14.24	11.99	14.39	11.83	15.38	12.40	16.75
	3	10.01	10.51	10.01	12.01	10.98	14.27	10.57	14.27
	4	12.76	13.40	9.68	11.62	10.30	13.38	10.72	14.47
	5	-	-	-	-	-	-	-	-
9/11/80	6	-	-	-	-	-	-	-	-
	Avg.	12.06	12.66	10.80	12.96	11.07	14.39	11.25	15.19
	1	8.32	8.74	8.06	9.67	6.78	8.82	6.41	8.65
	2	5.50	5.78	5.20	6.24	4.76	6.19	4.72	6.37
	3	6.23	6.54	6.37	7.65	5.61	7.29	5.28	7.13
	4	7.51	7.88	9.93	11.91	6.33	8.22	6.58	8.89
9/16/80	5	-	-	-	-	-	-	-	-
	6	-	-	-	-	-	-	-	-
	Avg.	6.89	7.24	7.39	8.87	5.87	7.63	5.75	7.76
	1	2.24	2.35	3.44	4.13	4.29	5.58	4.71	6.35
	2	2.00	2.10	3.31	3.97	3.34	4.35	3.75	5.06
	3	2.51	2.64	3.49	4.19	3.58	4.66	3.80	5.13
	4	3.29	3.46	4.51	5.42	4.77	6.20	5.21	7.04
	5	-	-	-	-	-	-	-	-
	6	-	-	-	-	-	-	-	-
	Avg.	2.51	2.64	3.69	4.43	4.00	5.20	4.37	5.90

**Table A7**  
**Gravimetric/Volumetric Soil Moisture**

**Field: Tall Grass Plot 54**

Date	Site	Depth (cm)									
		0-2 %byWt.	0-2 %byVol.	2-4 %byWt.	2-4 %byVol.	4-10 %byWt.	4-10 %byVol.	10-16 %byWt.	10-16 %byVol.		
7/2/80	1	7.67	7.67	8.64	9.94	8.96	11.65	9.72	13.12		
	2	5.68	5.68	8.04	9.24	8.79	11.42	9.49	12.81		
	3	13.83	13.83	12.78	14.70	12.50	16.25	11.96	16.15		
	4	6.88	6.88	8.43	9.69	8.85	11.50	8.85	11.95		
	5	-	-	-	-	-	-	-	-		
	6	-	-	-	-	-	-	-	-		
7/17/80	Avg.	8.52	8.52	9.47	10.89	9.77	12.71	10.00	13.50		
	1	20.48	20.48	18.42	21.19	17.68	22.98	18.21	24.58		
	2	21.99	21.99	20.25	23.28	19.64	25.53	19.32	26.09		
	3	21.48	21.48	20.19	23.22	18.78	24.42	20.89	28.21		
	4	19.55	19.55	18.25	20.98	15.81	20.55	17.06	23.04		
	5	-	-	-	-	-	-	-	-		
9/11/80	6	-	-	-	-	-	-	-	-		
	Avg.	20.88	20.88	19.28	22.17	17.98	23.37	18.87	25.48		
	1	12.02	12.02	12.84	14.76	11.92	15.49	12.70	17.14		
	2	13.51	13.51	13.47	15.49	12.95	16.83	12.77	17.24		
	3	11.21	11.21	13.15	15.12	14.87	19.34	14.40	19.44		
	4	12.80	12.80	14.77	16.99	14.59	18.96	14.18	19.14		
	5	-	-	-	-	-	-	-	-		
	6	-	-	-	-	-	-	-	-		
	Avg.	12.38	12.38	13.56	15.59	13.58	17.65	13.51	18.24		

	1	3.28	3.28	9.86	11.34	12.23	15.90	13.73	18.53
	2	10.31	10.31	9.77	11.24	11.14	14.48	11.91	16.08
	3	10.21	10.21	11.02	12.68	11.00	15.59	12.83	17.32
9/16/80	4	10.94	10.94	12.17	13.99	12.34	16.04	12.53	16.91
	5	-	-	-	-	-	-	-	-
	6	-	-	-	-	-	-	-	-
	Avg.	8.68	8.68	10.71	12.31	11.93	15.50	12.75	17.21
	1	6.01	6.01	7.81	8.98	10.26	13.33	11.28	15.23
	2	9.04	9.04	11.40	13.12	13.17	17.13	13.29	17.94
9/17/80	3	7.80	7.80	10.74	12.35	11.49	14.94	12.37	16.69
	4	9.74	9.74	10.47	12.04	10.92	14.19	12.49	16.82
	5	-	-	-	-	-	-	-	-
	6	-	-	-	-	-	-	-	-
	Avg.	8.15	8.15	10.11	11.62	11.46	14.90	12.35	16.67
	1	7.35	7.35	10.35	11.90	8.91	11.58	12.10	16.33
	2	8.86	8.86	9.46	10.87	9.99	12.99	10.21	13.78
9/18/80	3	9.24	9.24	10.91	12.55	11.50	14.95	12.50	16.88
	4	8.09	8.09	9.17	10.55	10.42	13.55	11.13	15.02
	5	-	-	-	-	-	-	-	-
	6	-	-	-	-	-	-	-	-
	Avg.	8.38	8.38	9.97	11.47	10.21	13.27	11.48	15.50

**Table A8**  
**Neutron Surface Measurements**  
**% Soil Moisture**

**Field: Bare Plot 21**

Date	1	2.00	3.00	4.00	5.00	6.00	Plot
							Avg.
6/23/80	13.48	1.32	14.20	12.36	14.58	16.44	13.90
6/26/80	13.32	10.67	11.71	10.96	12.53	14.16	12.22
7/1/80	14.33	13.65	15.11	15.01	16.72	17.18	15.33
7/9/80	20.57	18.65	20.09	20.85	21.15	22.00	20.55
7/16/80	12.60	15.20	13.09	6.76	13.87	14.88	12.74
7/17/80	17.05	17.21	16.86	18.07	16.28	18.63	17.35
7/24/80	20.08	23.34	19.67	22.16	23.84	23.48	22.09
7/31/80	14.60	15.23	12.92	15.72	14.12	16.12	14.78
8/7/80	11.71	13.30	12.01	13.14	15.20	13.25	13.10
8/8/80	12.09	13.28	11.88	12.63	15.16	13.30	13.06
8/13/80	12.95	13.21	11.64	14.02	14.32	14.05	13.36
8/13/80	11.99	12.80	11.18	12.91	13.27	13.20	12.56
8/21/80	15.48	17.26	15.07	1710.00	16.24	17.60	16.46
9/4/80	10.17	10.64	9.84	12.71	12.27	11.69	11.22
9/16/80	14.24	13.66	10.47	11.64	12.11	13.35	12.58
9/24/80	14.94	13.05	10.96	11.64	10.68	12.37	12.27

**Table A9**  
**Neutron Surface Measurements**  
**% Soil Moisture**

**Field: Bare Plot 23**

Date	1	2.00	3.00	4.00	5.00	6.00	Plot
							Avg.
7/16/80	13.58	15.66	16.72	12.56	5.59	15.55	13.28
7/24/80	18.51	20.51	21.46	16.29	19.93	19.13	19.30
8/21/80	13.72	15.50	17.54	14.49	13.54	14.91	14.95
9/4/80	10.62	13.18	15.30	9.98	11.21	-	12.06
9/16/80	10.55	12.61	13.81	8.21	9.29	8.62	10.52

9/24/80	9.39	12.48	11.91	8.69	6.59	11.26	10.05
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**Table A10**  
**Neutron Surface Measurements**  
**% Soil Moisture**

**Field: Soybean Plot 61**

Date	Station						Plot
	1	2.00	3.00	4.00	5.00	6.00	
6/20/80	17.08	18.06	14.85	20.24	16.64	20.60	17.91
6/26/80	18.20	10.06	4.84	18.84	17.77	20.94	15.11
7/1/80	15.77	14.44	14.06	18.27	16.75	19.17	16.41
7/2/80	16.08	15.92	13.12	18.91	18.16	19.56	16.96
7/9/80	25.86	26.79	24.12	27.33	27.09	27.14	26.39
7/10/80	26.89	27.74	23.94	31.63	30.31	28.04	28.09
7/16/80	15.58	16.77	12.58	19.85	18.02	16.40	16.53
7/17/80	15.98	16.49	13.93	20.12	17.75	17.71	17.00
7/25/80	22.31	22.75	18.39	29.92	27.28	27.70	24.72
8/7/80	13.21	15.13	11.88	18.25	5.55	17.64	13.61
8/13/80	12.29	14.74	10.33	18.18	15.09	18.00	14.77

**Table A11**  
**Neutron Surface Measurements**  
**% Soil Moisture**

**Field: Soybean Plot 63**

Date	Station						Plot
	1	2.00	3.00	4.00	5.00	6.00	
7/16/80	12.35	3.36	13.06	9.33	20.02	5.33	10.57
7/24/80	22.86	22.94	21.57	21.74	22.74	21.45	22.21
8/7/80	9.50	9.11	7.84	7.63	10.53	7.29	8.65
8/7/80	26.67	28.86	31.97	26.24	25.87	28.80	28.07
8/13/80	11.97	11.63	10.04	8.33	11.12	9.85	10.49
8/21/80	16.32	17.26	19.27	15.07	18.48	17.57	17.33
8/22/80	16.26	15.68	17.13	14.24	16.42	14.84	15.76
9/16/80	7.18	6.88	11.19	4.62	4.90	6.30	6.84
9/24/80	6.41	6.08	3.83	5.79	6.80	6.92	5.97

**Table A 12**  
**Neutron Surface Measurements**  
**% Soil Moisture**

**Field: Corn Plot 31**

Date	Station						Plot
	1	2.00	3.00	4.00	5.00	6.00	
6/23/80	18.74	20.83	17.45	22.15	18.35	23.66	20.20
6/26/80	15.55	17.81	13.81	16.43	10.15	22.82	16.09
7/1/80	17.19	19.49	15.40	20.11	18.99	25.52	19.45
7/10/80	28.25	30.27	26.10	29.46	28.73	31.36	29.03
7/16/80	16.95	19.70	12.91	18.31	18.99	27.35	19.04
7/17/80	17.48	20.47	14.72	17.59	19.01	26.81	19.34
7/31/80	23.55	23.07	17.72	26.50	1.29	21.30	18.90
8/7/80	12.92	16.24	14.25	16.23	17.68	24.32	16.94
8/8/80	3.55	15.23	13.07	15.59	16.46	23.82	14.62
8/13/80	12.31	15.16	13.65	15.94	17.29	22.05	16.07
8/21/80	18.15	20.93	18.11	20.06	21.01	24.58	20.47
8/22/80	16.53	19.85	16.89	19.70	19.70	25.02	19.62
9/4/80	7.22	10.17	7.84	7.97	7.91	12.05	8.86

9/16/80	7.84	9.93	8.76	8.61	8.31	11.75	9.20
9/24/80	6.51	8.23	8.02	5.96	6.71	7.81	7.21

**Table A 13**  
**Neutron Surface Measurements**  
**% Soil Moisture**

**Field: Short Grass Plot 44**

Date	Station						Plot
	1	2.00	3.00	4.00	5.00	6.00	Avg.
7/9/80	20.53	19.79	19.87	21.29	22.02	-	20.70
9/16/80	2.40	2.81	3.62	2.70	4.11	-	3.13
9/24/80	3.87	6.60	5.13	7.23	6.70	-	5.91

**Table A14**  
**Neutron Surface Measurements**  
**% Soil Moisture**

**Field: Tall Grass Plot 54**

Date	Station						Plot
	1	2.00	3.00	4.00	5.00	6.00	Avg.
7/2/80	11.10	10.47	17.45	15.93	14.09	-	13.81
7/17/80	24.33	23.09	20.86	27.34	24.12	-	23.95
8/22/80	24.23	22.44	23.99	26.82	28.40	-	25.18
9/16/80	13.10	9.53	11.10	8.99	8.50	-	10.25
9/24/80	11.00	10.90	10.12	11.95	6.86	-	10.16

**Table A 15**  
**Dual Probe Soil Moisture Profile**

**Field: Bare Plot 21**

Date	Depth (cm)											
	1980	3.8	8.90	14.00	19.10	24.10	29.20	34.30	39.40	47.00	54.60	62.20
6/23 BSG	1.22	1.37	1.38	1.46	1.76	1.72	1.64	1.68	1.68	1.68	1.68	1.68
SM	13.79	18.15	19.68	16.83	-	25.11	18.29	17.89	18.18	14.04	13.33	
6/26 BSG	1.21	1.36	1.38	1.46	1.76	1.72	1.64	1.68	1.68	1.68	1.68	1.68
SM	12.86	17.17	19.32	10.69	18.00	8.34	15.54	12.73	9.90	12.34	11.67	
7/1 BSG	1.36	1.39	1.43	1.46	1.76	1.72	1.64	1.68	1.68	1.68	1.68	1.68
SM	14.80	18.01	19.20	13.03	17.18	8.51	16.11	12.15	10.13	10.09	9.87	
7/9 BSG	1.36	1.39	1.43	1.46	1.76	1.72	1.64	1.68	1.68	1.68	1.68	1.68
SM	19.10	22.18	22.86	27.43	23.70	13.61	20.30	13.52	12.06	11.13	11.53	
7/17 BSG	1.37	1.39	1.40	1.46	1.76	1.72	1.64	1.68	1.68	1.68	1.68	1.68
SM	15.10	17.31	20.04	14.54	20.83	11.44	17.72	14.54	10.80	11.52	14.65	
7/24 BSG	1.33	1.37	1.39	1.46	1.76	1.72	1.64	1.68	1.68	1.68	1.68	1.68
SM	20.27	23.10	23.32	17.50	22.56	13.45	19.37	11.64	13.64	12.18	13.28	
8/7 BSG	1.33	1.37	1.39	1.46	1.76	1.72	1.64	1.68	1.68	1.68	1.68	1.68
SM	14.60	17.73	19.77	14.41	20.82	11.35	18.06	10.80	10.26	9.54	12.46	
8/8 BSG	1.33	1.37	1.39	1.46	1.76	1.72	1.64	1.68	1.68	1.68	1.68	1.68
SM	14.56	16.84	20.34	14.27	19.93	9.24	17.63	11.12	10.92	11.67	12.15	
8/21 BSG	1.33	1.37	1.39	1.46	1.76	1.72	1.64	1.68	1.68	1.68	1.68	1.68
SM	16.24	19.03	22.43	14.44	20.25	10.99	18.32	11.64	10.89	10.02	11.79	
8/28 BSG	1.33	1.37	1.39	1.46	1.76	1.72	1.64	1.68	1.68	1.68	1.68	1.68
SM	14.03	16.15	20.15	13.63	20.30	11.15	16.08	9.92	9.29	8.45	8.97	
9/4 BSG	1.33	1.37	1.39	1.46	1.76	1.72	1.64	1.68	1.68	1.68	1.68	1.68
SM	11.75	14.15	17.81	11.23	17.77	7.31	15.45	7.41	10.10	7.64	12.10	
9/9 BSG	1.33	1.37	1.39	1.46	1.76	1.72	1.64	1.68	1.68	1.68	1.68	1.68
SM	11.99	13.20	16.94	11.18	16.01	5.69	14.82	8.12	8.41	7.38	7.23	
9/10 BSG	1.33	1.37	1.39	1.46	1.76	1.72	1.64	1.68	1.68	1.68	1.68	1.68

SM	14.52	15.04	17.56	11.89	19.29	8.30	13.80	5.86	5.56	5.54	6.24
9/11 BSG	1.33	1.37	1.39	1.46	1.76	1.72	1.64	1.68	1.68	1.68	1.68
SM	14.44	17.06	18.74	12.07	18.10	9.40	16.71	9.46	10.26	8.15	10.22
9/17 BSG	1.33	1.37	1.39	1.46	1.76	1.72	1.64	1.68	1.68	1.68	1.68
SM	12.71	15.34	18.30	11.90	18.22	21.32	15.76	8.25	8.10	7.71	9.25
9/24 BSG	1.33	1.37	1.39	1.46	1.76	1.72	1.64	1.68	1.68	1.68	1.68
SM	14.73	15.13	20.48	12.38	18.46	7.40	17.97	7.97	8.05	8.40	8.86

BSG = Bulk Specific Gravity

SM = Soil Moisture

**Table A 16**  
**Dual Probe Soil Moisture Profile**

**Field: Soybean Plot 61**

Date	Depth (cm)										
1980	3.8	8.90	14.00	19.10	24.10	29.20	34.30	39.40	47.00	54.60	62.20
6/26 BSG	1.28	1.31	1.34	1.65	1.70	1.77	1.66	1.60	1.51	1.51	1.58
SM	13.47	16.55	19.19	-	12.70	23.97	23.94	24.97	48.21	52.84	50.39
7/1 BSG	1.28	1.31	1.34	1.65	1.70	1.77	1.66	1.60	1.51	1.51	1.58
SM	16.37	15.70	16.43	-	10.62	23.77	23.81	26.83	48.41	50.97	46.85
7/2 BSG	1.31	1.31	1.29	1.65	1.70	1.77	1.66	1.60	1.51	1.51	1.58
SM	13.10	16.78	20.67	-	10.52	23.91	25.15	28.40	48.42	55.39	48.21
7/9 BSG	1.31	1.31	1.29	1.65	1.70	1.77	1.66	1.60	1.51	1.51	1.58
SM	16.59	21.14	27.19	-	10.61	26.30	22.11	27.11	47.97	52.68	53.67
7/10 BSG	1.24	1.27	1.29	1.65	1.70	1.77	1.66	1.60	1.51	1.51	1.58
SM	23.37	24.75	24.38	-	12.63	24.42	26.50	26.33	46.00	50.38	46.32
7/17 BSG	1.24	1.27	1.29	1.65	1.70	1.77	1.66	1.60	1.51	1.51	1.58
SM	17.66	19.16	21.00	-	10.00	24.35	24.43	26.50	47.98	53.45	48.86
7/25 BSG	1.23	1.26	1.29	1.65	1.70	1.77	1.66	1.60	1.51	1.51	1.58
SM	19.27	21.33	22.66	-	14.56	25.21	23.33	24.71	48.94	54.17	48.99
8/13 BSG	1.23	1.26	1.29	1.65	1.70	1.77	1.66	1.60	1.51	1.51	1.58
SM	12.10	9.14	16.66	-	3.17	17.51	19.82	21.35	42.27	45.88	41.72

BSG = Bulk Specific Gravity

SM = Soil Moisture

**Table A 17**  
**Dual Probe Soil Moisture Profile**  
**(Gamma Measurements)**

**Field: Soybean Plot 63**

Date	Depth (cm)										
1980	3.8	8.90	14.00	19.10	24.10	29.20	34.30	39.40	47.00	54.60	62.20
7/24 BSG	1.31	1.42	1.68	1.65	1.70	1.77	1.66	1.60	1.51	1.51	1.58
SM	17.14	22.41	27.29	24.83	21.25	18.12	20.27	20.86	16.77	8.03	9.09
8/13 BSG	1.31	1.42	1.68	1.65	1.70	1.77	1.66	1.60	1.51	1.51	1.58
SM	5.41	8.13	9.58	10.99	7.95	13.89	14.17	15.28	10.60	7.58	7.64
8/21 BSG	1.31	1.42	1.68	1.65	1.70	1.77	1.66	1.60	1.51	1.51	1.58
SM	7.21	14.19	15.08	16.12	10.95	16.36	14.16	16.68	13.29	6.24	7.78
8/28 BSG	1.31	1.42	1.68	1.65	1.70	1.77	1.66	1.60	1.51	1.51	1.58
SM	2.85	9.17	9.67	12.69	7.78	17.04	13.18	15.10	10.24	5.68	5.42
9/4 BSG	1.31	1.42	1.68	1.65	1.70	1.77	1.66	1.60	1.51	1.51	1.58
SM	2.10	7.53	10.91	10.00	5.47	13.40	11.72	15.32	11.78	4.97	5.00
9/9 BSG	1.31	1.42	1.68	1.65	1.70	1.77	1.66	1.60	1.51	1.51	1.58
SM	2.21	6.47	8.34	8.51	12.78	26.38	13.51	10.50	-	-	-
9/10 BSG	1.31	1.42	1.68	1.65	1.70	1.77	1.66	1.60	1.51	1.51	1.58
SM	6.73	7.02	7.68	8.37	4.52	13.14	11.83	14.46	9.70	2.67	4.28
9/11 BSG	1.31	1.42	1.68	1.65	1.70	1.77	1.66	1.60	1.51	1.51	1.58
SM	6.73	7.02	7.68	8.37	4.52	13.14	11.83	14.46	9.70	2.67	4.28

9/17 BSG	1.31	1.42	1.68	1.65	1.70	1.77	1.66	1.60	1.51	1.51	1.58
SM	-	5.95	8.11	10.24	5.39	11.88	12.04	15.18	10.52	3.67	4.71
9/24 BSG	1.31	1.42	1.68	1.65	1.70	1.77	1.66	1.60	1.51	1.51	1.58
SM	-	4.46	7.00	7.61	2.77	8.45	9.82	15.31	10.94	2.15	4.65

**BSG = Bulk Specific Gravity**

SM = Soil Moisture

**Table A 18**  
**Dual Probe Soil Moisture Profile**

Field: Corn Plot 31

Date	Depth (cm)										
	3.8	8.90	14.00	19.10	24.10	29.20	34.30	39.40	47.00	54.60	62.20
1980	3.8	8.90	14.00	19.10	24.10	29.20	34.30	39.40	47.00	54.60	62.20
6/20 BSG	1.51	1.69	1.70	1.65	1.70	1.77	1.66	1.60	1.51	1.51	1.58
SM	17.06	21.49	24.14	16.68	15.78	13.22	19.24	21.36	40.17	38.11	49.09
6/23 BSG	1.51	1.69	1.70	1.65	1.70	1.77	1.66	1.60	1.51	1.51	1.58
SM	15.19	20.38	22.67	16.30	15.45	12.14	17.24	19.82	34.60	37.61	40.14
6/26 BSG	1.51	1.69	1.71	1.65	1.70	1.77	1.66	1.60	1.51	1.51	1.58
SM	14.83	19.11	20.48	15.59	15.17	10.42	16.94	22.30	34.94	35.24	44.02
7/1 BSG	1.52	1.65	1.70	1.65	1.70	1.77	1.66	1.60	1.51	1.51	1.58
SM	12.84	17.14	18.73	11.23	10.97	8.47	16.12	19.83	34.29	34.43	43.09
7/10 BSG	1.52	1.65	1.69	1.65	1.70	1.77	1.66	1.60	1.51	1.51	1.58
SM	24.53	26.14	24.20	16.93	17.57	14.28	16.70	19.69	37.39	34.47	45.98
7/17 BSG	1.52	1.65	1.69	1.65	1.70	1.77	1.66	1.60	1.51	1.51	1.58
SM	12.25	16.56	16.64	9.13	9.76	6.11	15.23	19.23	35.99	34.71	44.20
7/25 BSG	1.49	1.63	1.68	1.65	1.70	1.77	1.66	1.60	1.51	1.51	1.58
SM	20.63	23.63	23.77	13.94	11.34	10.80	14.06	18.20	33.28	30.68	39.35

BSG = Bulk Specific Gravity

SM = Soil Moisture

**Table A21**  
**Weather Data**

Date	Time	Weather Data						Water		Average	Relative Humidity
		Rainfall (cm)	Evaporation (cm/day)	Max	Min	Dry	Wet	Temperature (C)	Max	Min	Wind (km/hr)
6/3/80	920	0.33	0.16	30.00	18.30	25.00	23.30	33.90	22.20	0.00	86.00
6/10/80	1000	0.00	1.30	32.90	5.60	14.40	13.60	35.00	11.30	22.20	100.00
6/11/80	900	0.00	0.35	21.70	7.10	15.60	12.50	24.70	13.00	2.00	55.00
6/12/80	900	0.00	0.57	22.20	6.10	17.20	13.90	27.90	13.90	2.00	64.00
6/13/80	900	0.00	0.47	23.30	6.80	18.30	15.80	28.10	13.70	1.30	76.00
6/16/80	900	0.04	0.01	32.80	7.80	20.00	19.40	33.30	15.40	1.90	100.00
6/17/80	900	0.00	0.17	20.80	8.90	15.60	12.80	22.90	13.50	2.40	56.00
6/18/80	900	0.00	0.56	25.40	7.40	16.40	15.80	29.60	15.60	1.80	83.00
6/19/80	900	0.00	0.42	25.30	7.70	18.60	17.20	28.40	16.10	1.80	81.00
6/20/80	900	0.00	0.59	25.60	13.90	17.80	13.80	29.20	17.10	3.50	55.00
6/23/80	900	0.00	0.64	30.60	9.40	20.80	18.30	33.30	14.70	2.10	74.00
6/24/80	900	0.00	0.94	31.30	16.60	21.40	20.80	34.90	19.90	1.40	89.00
6/25/80	900	0.00	0.47	30.00	16.10	21.90	21.40	29.90	20.60	1.70	82.00
6/26/80	900	0.00	0.61	29.40	16.10	22.80	20.80	31.70	20.30	2.90	96.00
6/27/80	900	0.00	0.36	26.90	15.00	26.10	21.70	28.00	19.40	2.80	70.00
6/30/80	900	0.04	0.20	34.40	15.70	23.30	18.90	35.40	21.60	2.10	69.00
7/1/80	900	0.00	0.67	26.20	12.10	22.20	18.10	30.40	17.80	2.70	64.00
7/2/80	940	0.00	0.57	29.40	14.70	26.10	21.70	32.50	20.30	1.50	70.00
7/3/80	930	0.20	-1.29	33.30	20.60	23.30	22.80	34.40	23.40	2.90	99.00
7/7/80	930	0.02	0.34	32.70	10.10	21.70	16.70	36.60	17.20	1.70	69.00
7/8/80	915	0.05	0.19	28.90	16.10	18.30	18.30	33.40	18.20	1.00	99.00
7/9/80	900	0.15	-0.96	24.00	15.90	23.60	20.80	20.40	17.70	2.70	82.00
7/10/80	915	0.40	-2.29	23.80	18.40	23.90	21.70	35.00	20.10	1.50	98.00

7/11/80	900	0.00	0.52	31.10	17.40	25.30	22.80	35.20	22.60	1.10	82.00
7/14/80	900	0.06	0.16	35.20	13.30	23.60	20.80	36.70	20.30	1.40	80.00
7/15/80	900	0.00	0.66	32.20	16.90	26.10	20.30	36.70	21.40	1.20	61.00
7/16/80	900	0.00	0.99	32.80	21.80	29.20	25.80	33.70	23.30	4.00	88.00
7/17/80	900	0.01	0.52	37.50	21.10	26.70	25.60	38.10	24.80	2.20	97.00
7/18/80	900	0.23	-1.10	35.70	18.90	26.70	23.10	37.90	22.70	1.50	76.00
7/21/80	900	0.00	0.62	37.30	18.80	28.90	26.40	39.70	24.20	1.30	84.00
7/22/80	1100	0.26	-1.76	36.80	20.40	24.20	23.00	40.00	23.80	1.90	90.00
7/23/80	900	0.22	-1.51	36.70	20.40	21.80	21.80	40.10	22.80	1.90	99.00
7/24/80	900	0.00	0.00	26.10	18.20	23.70	20.40	27.70	22.00	1.40	74.00
7/25/80	910	0.00	0.57	29.60	15.50	23.30	21.10	34.00	21.40	1.40	94.00
7/28/80	915	0.00	0.63	33.10	18.40	25.60	23.10	36.90	22.10	1.60	90.00
7/29/80	900	0.00	0.38	29.60	21.90	26.40	25.30	33.50	23.70	2.60	96.00
7/30/80	900	0.00	0.68	30.50	18.80	25.30	21.90	35.70	23.00	1.90	74.00
7/31/80	900	0.01	0.36	31.20	17.90	25.30	23.10	35.40	23.40	1.00	87.00
8/1/80	900	0.00	0.54	32.80	20.40	28.30	25.30	36.80	24.80	0.60	83.00
8/4/80	915	0.02	0.27	35.10	18.00	24.40	23.30	38.20	21.80	1.70	94.00
8/5/80	900	0.00	0.44	34.20	21.00	27.80	24.40	37.80	19.40	1.20	79.00
8/6/80	930	0.00	0.41	35.20	19.60	****	****	38.60	23.70	1.20	86.00
8/7/80	900	0.00	0.60	32.70	18.80	26.90	23.90	36.10	23.80	1.50	78.00
8/8/80	900	0.00	0.61	34.30	18.30	27.50	23.90	37.70	23.40	1.10	78.00
8/11/80	915	0.01	0.54	35.60	20.60	25.80	24.20	37.40	23.60	1.80	96.00
8/12/80	915	0.04	0.18	34.40	21.10	24.40	23.90	36.80	24.90	2.30	98.00
8/13/80	915	0.00	0.50	31.10	16.10	24.40	20.00	33.10	21.10	1.40	65.00
8/14/80	915	0.00	0.55	30.20	15.60	24.40	21.70	33.90	21.70	1.30	87.00
8/15/80	915	0.00	0.64	34.20	20.10	26.10	24.40	35.00	16.70	1.80	98.00
8/18/80	915	0.09	-0.60	28.30	17.80	18.30	17.50	31.10	17.20	1.60	99.00
8/19/80	915	0.00	0.06	22.30	17.80	22.20	20.80	23.30	20.00	1.50	98.00
8/20/80	915	0.00	0.16	28.80	16.70	23.20	21.00	29.90	20.90	0.60	98.00
8/21/80	915	0.00	0.33	29.30	16.70	25.10	18.60	30.60	20.00	1.60	96.00
8/22/80	915	0.00	0.28	23.90	13.60	22.30	18.60	26.70	17.80	1.50	87.00
8/25/80	920	0.00	0.49	31.10	15.00	26.10	19.20	34.40	19.40	1.00	68.00
8/26/80	930	0.00	0.58	32.10	15.40	25.00	21.70	35.20	21.00	0.80	80.00
8/27/80	940	0.00	0.56	33.40	15.20	24.40	20.80	34.60	21.30	0.60	80.00
8/28/80	930	0.00	0.35	33.90	17.40	25.90	22.60	35.10	22.40	0.90	80.00
9/2/80	1000	0.00	0.56	36.00	17.20	27.90	24.70	35.90	21.20	1.60	95.00
9/3/80	930	0.00	0.64	36.20	19.40	24.80	20.40	35.90	21.30	1.60	
9/4/80	915	0.00	0.67	34.40	14.40	20.90	18.80	34.00	19.60	1.30	
9/10/80	930	0.05	0.00	****	****	****	****	****	****	****	
9/22/80	930	0.00	0.00	33.90	23.30	****	****	****	****	0.00	80.00
9/23/80	930	0.00	0.00	28.30	19.40	****	****	****	****	0.00	87.00
9/24/80	930	0.00	0.00	20.60	15.00	****	****	****	****	0.00	53.00
9/25/80	930	0.17	0.00	20.00	15.60	****	****	****	****	0.00	98.00
9/26/80	930	0.00	0.00	21.10	16.70	****	****	****	****	0.00	62.00
9/29/80	930	0.00	0.00	22.80	10.60	****	****	****	****	0.00	90.00
9/30/80	930	0.00	0.00	20.60	9.40	****	****	****	****	0.00	98.00
10/1/80	930	0.00	0.58	24.40	10.40	17.20	15.60	26.00	13.00	1.40	100.00
10/2/80	930	0.00	0.26	26.50	13.60	18.90	18.20	26.10	16.00	1.60	100.00
10/3/80	930	0.09	-0.50	27.60	11.80	13.80	13.20	27.80	15.80	3.30	100.00
10/6/80	930	0.02	-0.01	19.00	4.60	11.50	7.90	21.10	9.80	1.70	57.00
10/7/80	930	0.00	0.33	18.80	3.00	8.20	7.40	22.20	9.10	1.40	100.00
10/8/80	930	0.00	0.31	19.80	3.60	11.20	10.20	21.00	9.10	1.70	100.00
10/9/80	930	0.00	0.31	23.60	7.40	15.70	14.90	23.20	10.20	1.50	100.00
10/10/80	930	0.00	0.39	27.30	11.00	12.70	9.30	24.10	12.40	3.10	61.00

#### APPENDIX B

**Table B1**  
**Agronomic Data on Corn**

Date	Height (cm)	Cover %	Biomass g/m^2		LAI cm^2/m^2	Remark
7/19/80	105	95.00				
7/17/80	145	93.00	3847.00	557.00	52198.00	
7/28/80	235	94.00	5485.00	946.00	61935.00	
8/6/80	214	98.00	5036.00	981.00	53124.00	
8/13/80	248	97.00	5774.00	1370.00	52378.00	
8/25/80	225	95.00	4435.00	1327.00	42781.00	
9/4/80	246	95.00	4172.00	2105.00	35617.00	
9/11/80	224	-	2647.00	1353.00	25109.00	
9/18/80	210	-	2675.00	1590.00	24853.00	
9/26/80	228	40.00	2323.00	1603.00	17305.00	
10/20/80	243	-	2057.00	1560.00	-	
10/20/80	243		971.00	831.00	-	Grain Only

LAI = Leaf Area Index.

**Table B2**  
**Agronomic Data on Soybeans**

Date	Height cm	Cover %	Biomass g/m^2		LAI cm^2/m^2	Remark
7/9/80	8	5.00	19.00	2.00		
7/17/80	17	8.00	32.00	-	716.00	
7/28/80	26	15.00	146.00	33.00	6055.00	
8/6/80	39	40.00	379.00	85.00	10952.00	
8/13/80	59	65.00	718.00	154.00	21631.00	
8/25/80	71	85.00	1172.00	257.00	32649.00	
9/4/80	89	90.00	2565.00	605.00	61380.00	
9/11/80	86	90.00	2112.00	515.00	40688.00	
9/18/80	84	85.00	2072.00	572.00	32327.00	
9/26/80	99	65.00	1442.00	413.00	20552.00	
10/20/80	99	-	451.00	337.00	-	Grain Only

LAI = Leaf Area Index.

**Table B3**  
**Agronomic Data on Short Grass**

Date	Height cm	Biomass g/m^2		LAI cm^2/m^2
		Wet	Dry	
7/17/80	15	534.00	180.00	15006.00
7/29/80	14	356.00	135.00	12136.00
8/6/80	18	529.00	123.00	13565.00
9/11/80	19	606.00	293.00	19056.00
9/26/80		458.00	180.00	15467.00

LAI = Leaf Area Index.

**Table B4**  
**Agronomic Data on Tall Grass**

Date	Height cm	Biomass g/m^2		LAI cm^2/m^2
		Wet	Dry	
7/17/80	25	616.00	291.00	19135.00
7/29/80	29	433.00	152.00	12474.00
8/6/80	36	565.00	185.00	16775.00
9/11/80	12	579.00	293.00	17130.00

9/26/80 467.00 223.00 16775.00

LAI = Leaf Area Index.

#### APPENDIX C

Date: 7/1/80

Plot No.: 21

Time: 0930-1012

Field: Bare

Freq.	Angle	Average A.T. (V)	Standard Dev. (V)	Average A.T.(H)	Standard Dev. (H)
C	0	-	-	-	-
C	10	-	-	-	-
C	20	-	-	-	-
C	30	-	-	-	-
C	40	-	-	-	-
C	50	-	-	-	-
C	60	-	-	-	-
C	70	-	-	-	-
L	0	269.80	3.32	270.40	4.73
L	10	265.70	2.90	267.10	4.51
L	20	265.80	2.55	258.80	3.33
L	30	267.10	3.04	253.90	3.47
L	40	271.50	0.76	245.70	1.68
L	50	270.40	0.53	232.60	1.22
L	60	266.30	1.06	204.80	1.42
L	70	248.30	1.12	168.90	1.01
Q	0	284.00	1.61	287.80	0.45
Q	10	282.70	1.79	286.80	1.55
Q	20	283.60	1.32	285.20	1.52
Q	30	285.30	1.71	282.10	1.49
Q	40	289.30	1.11	276.30	-
Q	50	284.50	1.80	262.30	0.60
Q	60	279.30	1.41	242.90	0.43
Q	70	270.80	1.38	224.00	0.16

#### Soil Moisture Data (%)

0-0.50 cm	0-2.5 cm	2.5-5 cm	5-10 cm
3.99	6.93	11.65	12.35

#### Soil Temperature Data (C)

Ambient	0-0.50 cm	1.25 cm	2.50 cm	7.50 cm	15.0 cm	18.8 cm
25		25.80	23.30	21.80	20.90	20.80

Date: 7/1/80

Plot No.: 23

Time: 124-1258

Field: Bare

Freq.	Angle	Average A.T. (V)	Standard Dev. (V)	Average A.T. (H)	Standard Dev. (H)
C	0	-	-	-	-
C	10	-	-	-	-
C	20	-	-	-	-
C	30	-	-	-	-
C	40	-	-	-	-
C	50	-	-	-	-
C	60	-	-	-	-
C	70	-	-	-	-

L	0	272.40	1.19	276.30	3.26
L	10	270.50	1.45	267.60	2.28
L	20	270.30	1.39	263.70	1.76
L	30	270.30	1.47	256.90	2.24
L	40	271.30	1.98	250.10	2.06
L	50	272.10	2.08	239.40	1.86
L	60	264.50	1.21	217.50	1.65
L	70	244.40	1.85	184.00	1.55
Q	0	306.70	2.07	300.50	0.79
Q	10	304.00	1.39	298.80	1.40
Q	20	307.00	1.31	298.90	1.37
Q	30	307.70	2.06	295.70	1.91
Q	40	310.00	1.49	291.50	0.97
Q	50	312.90	0.60	285.30	1.50
Q	60	312.60	1.67	273.50	1.37
Q	70	-	-	-	-

**Soil Moisture Data (%)**

0-0.50 cm	0-2.5 cm	2.5-5 cm	5-10 cm
1.21	6.53	11.12	11.96

**Soil Temperature Data (C)**

Ambient	6-0.50 cm	1.25 cm	2.50 cm	7.50 cm	15.0 cm	18.8 cm
28	44.4	32.50	29.10	25.80	23.70	22.30

Date: 7/9/80

Time: 1340-1400

Plot No.: 21

Field: Bare

Freq.	Angle	Average A.T. (V)	Standard Dev. (V)	Average A.T. (H)	Standard Dev. (H)
C	0	-	-	-	-
C	10	-	-	-	-
C	20	-	-	-	-
C	30	-	-	-	-
C	40	-	-	-	-
C	50	-	-	-	-
C	60	-	-	-	-
C	70	-	-	-	-
L	0	258.50	1.69	263.70	2.26
L	10	246.30	1.82	253.40	2.45
L	20	244.60	1.35	240.20	1.04
L	30	247.70	0.84	224.30	1.40
L	40	255.10	1.15	222.60	1.80
L	50	-	-	-	-
L	60	262.60	1.93	186.40	2.37
L	70	251.60	1.86	156.00	1.95
Q	0	294.80	2.15	291.60	0.88
Q	10	290.90	1.89	287.90	1.12
Q	20	291.30	2.09	287.00	1.60
Q	30	285.90	1.13	280.00	1.55
Q	40	287.10	1.98	275.10	1.78
Q	50	287.50	1.62	264.40	1.65
Q	60	287.50	2.17	255.40	1.41
Q	70	281.40	0.87	250.50	1.55

**Soil Moisture Data (%)**

0-0.50 cm	0-2.5 cm	2.5-5 cm	5-10 cm
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13.94      14.71      16.93      17.56

**Soil Temperature Data (C)**

Ambient	0-0.50 cm	1.25 cm	2.50 cm	7.50 cm	15.0 cm	18.8 cm
31.6	-	32.00	29.90	28.30	26.00	24.10

Date: 7/16/80

Time: 0950-1011

Plot No.: 23

Field: Bare

Freq.	Angle	Average	Standard	Average	Standard
		A.T. (V)	Dev. (V)	A.T. (H)	Dev. (H)
C	0	284.42	-	282.16	0.99
C	10	285.47	-	279.35	-
C	20	287.81	0.65	276.45	-
C	30	292.05	0.72	272.92	1.11
C	40	296.11	0.71	264.49	-
C	50	299.05	0.36	-	-
C	60	295.64	-	226.96	-
C	70	274.93	-	198.24	0.85
L	0	283.87	1.89	290.81	1.22
L	10	280.96	-	282.03	2.03
L	20	281.71	-	275.79	1.71
L	30	283.56	1.57	269.59	1.12
L	40	289.24	1.57	285.51	1.92
L	50	283.94	0.96	246.02	1.20
L	60	275.10	1.42	214.93	1.75
L	70	251.07	1.30	178.03	1.42
Q	0	298.98	1.89	295.60	1.22
Q	10	298.77	-	293.76	2.03
Q	20	300.22	-	291.21	1.71
Q	30	304.30	0.72	286.13	1.43
Q	40	307.04	2.08	281.17	1.46
Q	50	309.47	1.25	268.86	1.11
Q	60	307.44	-	252.66	1.34
Q	70	299.16	1.50	234.25	-

**Soil Moisture Data (%)**

0-0.50 cm	0-2.5 cm	2.5-5 cm	5-10 cm
3.14	5.37	9.62	9.69

**Soil Temperature Data (C)**

Ambient	0-0.50 cm	1.25 cm	2.50 cm	7.50 cm	15.0 cm	18.8 cm
32.3	41.5	33.70	30.30	27.80	26.40	25.50

Date: 7/17/80

Time: 0927-1005

Plot No.: 21

Field: Bare

Freq.	Angle	Average	Standard	Average	Standard
		A.T. (V)	Dev. (V)	A.T. (H)	Dev. (H)
C	0	258.56	-	260.81	1.29
C	10	245.12	-	240.26	-
C	20	249.66	0.84	236.51	-
C	30	257.75	1.17	232.43	0.99
C	40	271.98	0.28	237.89*	0.81
C	50	276.51	0.59	240.32*	-
C	60	286.54	-	193.67	-

C	70	279.86	0.23	179.03	0.57
L	0	266.42	1.18	268.04	1.58
L	10	243.43	1.18	243.41	1.62
L	20	244.90	1.46	236.23	1.70
L	30	258.72	1.19	227.86	1.64
L	40	278.81	1.70	-	-
L	50	286.25	1.25	-	-
L	60	265.88	1.46	177.78	1.41
L	70	252.32	1.73	143.41	1.41
Q	0	-	-	-	-
Q	10	-	-	-	-
Q	20	-	-	-	-
Q	30	-	-	-	-
Q	40	-	-	-	-
Q	50	-	-	-	-
Q	60	-	-	-	-
Q	70	-	-	-	-

**Soil Moisture Data (%)**

0-0.50 cm	0-2.5 cm	2.5-5 cm	5-10 cm
10.56	10.26	14.63	14.08

**Soil Temperature Data (C)**

Ambient	0-0.50 cm	1.25 cm	2.50 cm	7.50 cm	15.0 cm	18.8 cm
27.8	29.8	26.70	26.40	25.70	25.40	25.30

Date: 8/25/80

Time: 1109- 1140

Plot No.: 23

Field: Bare

Freq,	Angle	Average, A.T. (V)	Standard Dev. (V)	Average A.T. (H)	Standard Dev. (H)
C	0	292.02	-	290.72	1.12
C	10	290.85	-	287.47	-
C	20	292.87	0.80	286.24	-
C	30	296.50	-	281.49	0.95
C	40	299.62	-	274.88	-
C	50	300.75	0.93	261.36	0.48
C	60	295.10	0.57	246.06	1.32
C	70	276.06	-	218.74	0.90
L	0	291.00	1.16	291.51	1.75
L	10	284.77	1.55	283.52	1.34
L	20	283.91	1.35	278.60	2.01
L	30	283.27	1.76	268.58	1.14
L	40	283.45	1.47	258.40	1.29
L	50	281.49	1.51	239.17	2.08
L	60	274.68	1.27	212.72	1.71
L	70	252.21	1.30	174.03	1.56
Q	0	301.87	1.53	303.85	1.48
Q	10	301.18	2.16	301.71	1.68
Q	20	302.45	0.83	298.96	1.48
Q	30	307.95	1.24	294.88	-
Q	40	310.38	1.59	287.55	-
Q	50	312.83	1.26	275.31	-
Q	60	312.23	1.27	256.59	1.21
Q	70	302.03	1.18	238.68	1.32

**Soil Moisture Data (%)**

0-0.50 cm	0-2.5 cm	2.5-5 cm	5-10 cm
2.82	6.13	10.46	11.05

**Soil Temperature Data (C)**

Ambient	0-0.50 cm	1.25 cm	2.50 cm	7.50 cm	15.0 cm	18.8 cm
32.0	39.3	34.30	31.60	28.50	24.80	23.20

**Date: 8/28/80**
**Time: 1040-1120**
**Plot No.: 23**
**Field: Bare**

Freq.	Angle	Average A.T. (V)	Standard Dev. (V)	Average A.T. (H)	Standard Dev. (H)
C	0	291.22	0.54	290.90	0.32
C	10	291.06	-	288.74	0.39
C	20	292.58	0.15	286.42	-
C	30	295.55	1.35	283.33	-
C	40	298.24	-	283.49	-
C	50	299.48	0.83	267.75	-
C	60	293.28	-	259.04	-
C	70	273.61	1.01	224.19	-
L	0	284.94	1.28	284.85	1.51
L	10	278.08	1.25	275.93	0.94
L	20	278.03	1.33	271.24	1.22
L	30	278.68	1.65	264.24	1.65
L	40	278.97	1.71	255.19	1.65
L	50	277.87	1.13	239.49	1.98
L	60	271.38	0.82	213.17	1.40
L	70	249.77	1.32	176.95	1.44
Q	0	298.14	2.28	299.21	1.66
Q	10	297.84	1.03	295.79	0.97
Q	20	300.48	2.15	294.11	1.79
Q	30	302.53	1.19	289.83	1.47
Q	40	305.23	1.91	284.01	0.88
Q	50	309.19	2.70	274.73	1.36
Q	60	311.77	1.16	261.14	1.46
Q	70	303.06	1.99	245.31	1.49

**Soil Moisture Data (%)**

0-0.50 cm	0-2.5 cm	2.5-5 cm	5-10 cm
2.33	6.57	9.56	10.78

**Soil Temperature Data (C)**

Ambient	0-0.50 cm	1.25 cm	2.50 cm	7.50 cm	15.0 cm	18.8 cm
32.3	35.3	31.50	29.90	27.80	26.00	25.00

**Date: 8/29/80**
**Time: 1108-1140**
**Plot No.: 21**
**Field: Bare**

Freq.	Angle	Average A.T. (V)	Standard Dev. (V)	Average A.T. (H)	Standard Dev. (H)
C	0	284.22	0.48	283.29	-
C	10	285.64	-	281.20	-
C	20	287.73	-	178.51	-
C	30	292.11	-	281.67	-
C	40	296.42	0.74	270.18	-
C	50	299.39	1.58	257.12	0.11

C	60	295.93	-	236.48	-
C	70	277.49	-	210.66	1.00
L	0	273.94	1.58	276.96	2.16
L	10	270.49	0.59	269.12	1.53
L	20	271.50	1.79	264.03	1.52
L	30	272.88	1.69	257.00	2.67
L	40	275.54	1.39	246.03	1.56
L	50	275.80	1.52	227.49	-
L	60	272.42	1.56	201.90	2.10
L	70	251.75	1.46	164.47	1.75
Q	0	289.82	-	292.15	-
Q	10	290.30	1.17	290.77	-
Q	20	291.57	1.15	288.85	1.53
Q	30	295.90	-	286.68	0.29
Q	40	297.43	2.30	279.50	1.12
Q	50	298.99	1.78	268.93	1.30
Q	60	298.27	1.74	255.62	-
Q	70	289.26	2.17	244.34	1.53

**Soil Moisture Data (%)**

0-0.50 cm	0-2.5 cm	2.5-5 cm	5-10 cm
3.96	6.95	11.59	12.12

**Soil Temperature Data (C)**

Ambient	0-0.50 cm	1.25 cm	2.50 cm	7.50 cm	15.0 cm	18.8 cm
35.5	37.0	31.80	29.60	27.50	25.60	24.70

Date: 9/4/80

Plot No.: 21

Time: 1108-1140

Field: Bare

Freq.	Angle	Average A.T. (V)	Standard Dev. (V)	Average A.T. (H)	Standard Dev. (H)
C	0	295.93	-	294.38	-
C	10	293.76	0.81	290.69	1.47
C	20	294.28	0.62	287.72	1.34
C	30	296.74	-	283.04	1.21
C	40	299.27	0.94	275.52	0.65
C	50	300.64	-	261.94	-
C	60	295.83	-	240.75	-
C	70	275.71	1.41	208.83	0.75
L	0	285.46	1.30	287.49	1.82
L	10	279.34	0.76	278.56	2.47
L	20	277.42	1.72	272.54	0.23
L	30	278.68	1.57	264.81	1.66
L	40	278.87	1.02	253.78	1.15
L	50	278.59	2.38	235.39	1.67
L	60	273.86	0.86	208.52	1.78
L	70	253.06	1.46	168.43	1.29
Q	0	308.86	1.76	307.66	0.30
Q	10	307.46	1.42	304.45	0.54
Q	20	309.16	1.46	301.97	0.97
Q	30	311.28	2.02	298.63	1.50
Q	40	312.96	1.76	293.15	-
Q	50	313.43	1.88	283.09	-
Q	60	311.67	1.81	267.85	-
Q	70	299.48	-	245.31	-

**Soil Moisture Data (%)**

0-0.50 cm	0-2.5 cm	2.5-5 cm	5-10 cm
4.34	5.88	10.80	12.11

**Soil Temperature -Data (C)**

Ambient	0-0.50 cm	1.25 cm	2.50 cm	7.50 cm	15.0 cm	18.8 cm
35.0	40.5	33.40	30.80	28.00	27.40	25.00

Date: 9/9/80

Time: 1342-1415

Plot No.: 21

Field: Bare

Freq.	Angle	Average A.T. (V)	Standard Dev. (V)	Average A.T. (H)	Standard Dev. (H)
C	0	298.44	-	296.50	1.29
C	10	298.13	-	295.23	0.79
C	20	298.99	0.52	292.89	1.34
C	30	301.99	0.82	291.09	0.97
C	40	304.68	0.42	286.51	-
C	50	304.42	1.18	275.46	0.89
C	60	297.06	-	255.56	-
C	70	272.94	-	224.21	1.14
L	0	286.74	1.54	288.47	1.26
L	10	281.50	1.14	280.82	1.40
L	20	279.48	0.14	275.10	1.40
L	30	280.51	2.20	268.19	1.12
L	40	279.46	1.05	256.49	1.72
L	50	278.67	1.55	238.55	1.59
L	60	271.97	1.75	211.69	1.52
L	70	249.39	1.81	174.13	1.65
Q	0	308.31	1.81	305.98	-
Q	10	312.82	1.94	307.40	-
Q	20	313.66	2.42	305.47	0.53
Q	30	315.89	2.23	303.53	1.47
Q	40	318.64	1.16	300.80	-
Q	50	320.57	0.73	29.40	1.32
Q	60	319.63	1.40	281.82	1.00
Q	70	307.15	1.18	258.68	0.97

**Soil Moisture Data (%)**

0-0.50 cm	0-2.5 cm	2.5-5 cm	5-10 cm
3.58	6.92	10.55	12.15

**Soil Temperature Data (C)**

Ambient	0-0.50 cm	1.25 cm	50 cm	7.50 cm	15.0 cm	18.8 cm
34.0	41.0	35.70	33.20	30.80	27.90	

Date: 9/10/80

Time: 0932-1002

Plot No.: 23

Field: Bare

Freq.	Angle	Average A.T. (V)	Standard Dev. (V)	Average A.T. (H)	Standard Dev. (H)
C	0	207.86	0.45	208.22	-
C	10	200.86	0.31	196.27	0.50
C	20	207.15	0.59	190.62	0.61
C	30	213.08	0.24	185.61	-
C	40	226.66	0.76	179.72	0.40

C	50	246.62	0.75	170.70	-
C	60	263.63	0.44	158.85	0.67
C	70	269.42	-	152.47	-
L	0	227.92	0.91	228.52	1.23
L	10	220.69	1.04	219.22	1.67
L	20	215.95	1.81	201.49	1.37
L	30	223.62	1.37	194.21	1.77
L	40	232.90	1.25	186.36	1.48
L	50	245.64	1.24	169.82	1.29
L	60	252.87	1.85	141.32	1.42
L	70	244.93	1.60	111.88	1.53
Q	0	266.31	1.05	269.09	1.07
Q	10	254.57	1.17	254.41	-
Q	20	-	-	242.49	-
Q	30	261.63	1.29	248.70	0.99
Q	40	265.01	1.89	239.95	1.05
Q	50	263.04	1.32	220.65	1.24
Q	60	260.96	1.97	204.82	0.49
Q	70	254.82	1.54	197.66	1.09

**Soil Moisture Data (%)**

0-0.50 cm	0-2.5 cm	2.5-5 cm	5-10 cm
15.33	14.45	13.12	10.76

**Soil Temperature Data (C)**

Ambient	0-0.50 cm	1.25 cm	2.50 cm	7.50 cm	15.0 cm	18.8 cm
21.8	22.3	20.80	21.80	22.50	23.10	-

Date: 9/10/80

Time: 1422-1500

Plot No.: 21

Field: Bare

Freq.	Angle	Average A.T. (V)	Standard Dev. (V)	Average A.T. (H)	Standard Dev. (H)
C	0	264.03	0.83	269.18	-
C	10	257.47	-	251.55	1.01
C	20	260.05	0.66	246.82	-
C	30	266.54	0.55	239.81	-
C	40	273.85	-	229.63	-
C	50	284.04	-	213.46	-
C	60	290.21	-	192.47	0.87
C	70	280.89	0.78	166.69	0.50
L	0	269.95	1.94	269.31	1.53
L	10	257.26	1.30	254.34	1.57
L	20	259.03	0.68	248.82	1.65
L	30	262.01	0.50	240.32	1.83
L	40	265.65	1.82	227.80	1.80
L	50	270.36	-	208.57	1.58
L	60	268.65	1.42	179.83	1.72
L	70	249.92	1.26	143.86	1.25
Q	0	295.65	1.93	296.54	0.69
Q	10	295.50	1.21	293.80	1.28
Q	20	296.38	1.84	291.53	1.02
Q	30	297.86	2.12	287.52	-
Q	40	299.61	2.23	282.61	-
Q	50	301.23	1.46	272.36	0.31
Q	60	298.17	-	255.46	0.86
Q	70	285.30	1.22	229.96	0.68

**Soil Moisture Data (%)**

0-0.50 cm	0-2.5 cm	2.5-5 cm	5-10 cm
8.94	10.45	13.53	13.61

**Soil Temperature Data (C)**

Ambient	0-0.50 cm	1.25 cm	2.50 cm	7.50 cm	15.0 cm	18.8 cm
27.5	32.0	30.00	28.40	27.60	26.40	-

Date: 9/11/80

Time: 1118-1152

Plot No.: 21

Field: Bare

Freq.	Angle	Average A.T. (V)	Standard Dev. (V)	Average A.T. (H)	Standard Dev. (H)
C	0	275.95	-	273.50	0.51
C	10	274.06	0.50	270.61	0.86
C	20	276.55	-	268.29	1.11
C	30	282.25	1.51	262.38	1.73
C	40	287.67	-	255.48	0.71
C	50	292.80	1.09	242.39	1.01
C	60	291.77	-	223.18	1.25
C	70	254.05	1.08	194.92	0.53
L	0	270.92	1.71	269.39	1.50
L	10	263.81	-	261.61	1.22
L	20	266.18	1.15	256.60	1.63
L	30	267.96	0.43	247.20	0.37
L	40	271.94	-	236.33	1.09
L	50	272.55	0.72	215.86	1.09
L	60	268.88	1.50	186.07	0.91
L	70	247.12	1.29	147.74	1.71
Q	0	291.54	1.43	293.72	1.13
Q	10	291.60	1.20	291.77	1.47
Q	20	292.62	1.58	288.69	1.74
Q	30	295.89	1.75	284.47	0.85
Q	40	298.24	1.60	278.39	1.18
Q	50	302.49	2.09	265.58	-
Q	60	302.00	0.76	245.64	-
Q	70	292.16	0.98	220.43	0.81

**Soil Moisture Data (%)**

0-0.50 cm	0-2.5 cm	2.5-5 cm	5-10 cm
5.98	6.07	12.88	13.08

**Soil Temperature Data (C)**

Ambient	0-0.50 cm	1.25 cm	2.50 cm	7.50 cm	15.0 cm	18.8 cm
25.3	33.0	25.00	24.70	23.20	21.40	-

Date: 9/11/80

Time: 1500-1530

Plot No.: 23

Field: Bare

Freq.	Angle	Average A.T. (V)	Standard Dev. (V)	Average A.T. (H)	Standard Dev. (H)
C	0	297.98	1.26	296.26	0.41
C	10	295.38	1.03	291.67	-
C	20	296.11	1.43	289.43	0.76
C	30	299.16	0.33	287.97	0.58

c	40	301.79	-	283.89	1.32
C	50	302.60	-	274.20	0.35
C	60	295.83	0.26	256.67	-
C	70	270.27	0.34	224.53	0.68
L	0	283.68	1.47	281.48	1.48
L	10	279.94	1.65	276.16	1.78
L	20	280.54	1.49	271.50	1.89
L	30	280.34	1.53	263.96	2.13
L	40	280.33	1.67	253.37	1.38
L	50	278.27	0.54	233.48	1.92
L	60	269.12	1.48	204.86	1.33
L	70	242.55	0.81	162.28	1.35
Q	0	298.57	1.93	300.76	-
Q	10	295.79	1.93	296.47	0.69
Q	20	292.17	2.38	290.55	1.64
Q	30	295.40	2.30	287.95	-
Q	40	298.10	1.88	285.72	0.67
Q	50	300.46	0.68	277.54	-
Q	60	298.10	1.21	262.67	0.29
Q	70	289.82	1.37	240.36	0.95

**Soil Moisture Data (%)**

	0-0.50 cm	0-2.5 cm	2.5-5 cm	5-10 cm
	1.12	4.96	0.60	9.48

**Soil Temperature Data (C)**

Ambient	0-0.50 cm	1.25 cm	2.50 cm	7.50 cm	15.0 cm	18.8 cm
27.5	32.8	28.60	28.00	26.80	24.90	-

Date: 9/16/80

Time: 1320-1400

Plot No.: 21

Field: Bare

Freq.	Angle	Average	Standard	Average	Standard
		A.T. (V)	Dev. (V)	A.T. (H)	Dev. (H)
C	0	292.73	1.04	290.17	-
C	10	291.59	1.51	288.11	-
C	20	292.85	-	286.84	1.74
C	30	295.53	0.85	284.20	-
C	40	297.67	-	279.45	1.21
C	50	297.61	-	267.98	0.39
C	60	291.03	-	249.89	-
C	70	267.02	1.18	218.99	0.87
L	0	283.35	1.66	285.45	1.40
L	10	273.29	1.70	270.55	-
L	20	273.32	1.62	265.40	1.64
L	30	275.36	0.77	257.47	1.92
L	40	276.92	0.61	246.07	1.65
L	50	276.11	1.51	227.16	1.72
L	60	270.25	0.94	200.51	1.28
L	70	245.76	1.61	159.21	1.53
Q	0	289.36	2.83	288.91	1.47
Q	10	288.41	1.90	286.64	1.20
Q	20	289.91	1.11	285.03	-
Q	30	291.96	1.29	281.66	-
Q	40	295.48	1.48	276.87	-
Q	50	297.27	1.70	266.25	-
Q	60	295.56	0.38	251.03	1.74

Q	70	285.90	1.75	228.43	1.45
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**Soil Moisture Data (%)**

0-0.50 cm	0-2.5 cm	2.5-5 cm	5-10 cm
2.06	6.63	10.36	10.95

**Soil Temperature Data (C)**

Ambient	0-0.50 cm	1.25 cm	2.50 cm	7.50 cm	15.0 cm	18.8 cm
25.9	28.8	27.80	28.10	26.60	25.50	-

**Date: 9/17/80**
**Time: 1411-1440**
**Plot No.: 21**
**Field: Bare**

Freq.	Angle	Average A.T. (V)	Standard Dev. (V)	Average A.T. (H)	Standard Dev. (H)
C	0	296.66	-	295.35	1.12
C	10	296.95	0.56	294.59	0.73
C	20	298.78	0.45	292.64	-
C	30	300.84	-	290.66	-
C	40	302.79	-	285.39	-
C	50	302.85	0.69	274.48	-
C	60	296.78	1.30	258.07	-
C	70	271.84	0.39	222.47	-
L	0	276.84	0.92	277.14	0.95
L	10	273.26	0.73	269.44	-
L	20	274.86	1.17	263.66	1.83
L	30	275.90	0.68	258.09	1.85
L	40	277.38	2.23	246.83	1.30
L	50	277.33	1.35	228.53	1.62
L	60	271.18	0.96	202.27	1.50
L	70	247.27	1.33	160.05	1.44
Q	0	298.84	1.80	298.10	0.86
Q	10	294.53	1.62	291.14	0.78
Q	20	299.99	1.53	289.10	0.53
Q	30	302.45	1.67	285.07	1.01
Q	40	306.71	1.10	279.89	1.01
Q	50	309.72	2.37	266.41	1.29
Q	60	306.72	1.90	251.24	1.16
Q	70	295.30	1.35	234.88	1.67

**Soil Moisture Data (%)**

0-0.50 cm	0-2.5 cm	2.5-5 cm	5-10 cm
1.56	6.76	10.55	11.53

**Soil Temperature Data (C)**

Ambient	0-0.50 cm	1.25 cm	2.50 cm	7.50 cm	15.0 cm	18.8 cm
33.01	40.0	29.90	28.90	27.80	27.50	-

**Date: 9/18/80**
**Time: 1307-1345**
**Plot No.: 21**
**Field: Bare**

Freq.	Angle	Average A.T. (V)	Standard Dev. (V)	Average A.T. (H)	Standard Dev. (H)
C	0	284.10	1.57	281.35	0.19
C	10	284.56	-	279.38	1.62
C	20	285.60	-	276.27	0.54

C	30	288.83	0.21	271.37	1.39
C	40	292.08	-	263.82	1.20
C	50	293.93	0.46	251.14	1.27
C	60	290.39	-	231.61	0.73
C	70	270.65	0.72	201.83	0.97
L	0	266.18	1.29	267.37	1.92
L	10	263.76	0.46	260.60	1.72
L	20	264.62	-	254.25	1.10
L	30	266.39	1.87	244.65	1.45
L	40	268.91	1.16	233.04	1.56
L	50	271.10	1.63	214.61	1.68
L	60	267.89	1.71	188.33	1.41
L	70	246.89	1.36	149.68	1.37
Q	0	291.23	1.72	291.84	0.88
Q	10	290.97	1.51	288.97	0.86
Q	20	291.49	1.67	286.56	1.17
Q	30	292.50	2.49	282.45	0.63
Q	40	294.63	1.48	275.81	1.03
Q	50	295.08	2.08	266.61	0.60
Q	60	295.98	0.91	254.40	0.75
Q	70	285.23	1.55	231.26	1.41

**Soil Moisture Data (%)**

0-0.50 cm	0-2.5 cm	2.5-5 cm	5-10 cm
2.69	6.73	10.50	12.45

**Soil Temperature Data (C)**

Ambient	0-0.50 cm	1.25 cm	50 cm	7.50 cm	15.0 cm	18.8 cm
26.3	27.5	25.60	26.00	25.70	26.10	

Date: 9/23/80

Time: 1455-

Plot No.: 21

Field: Bare

Freq.	Angle	Average A.T. (V)	Standard Dev. (V)	Average A.T. (H)	Standard Dev. (H)
C	0	294.31	1.08	291.92	-
C	10	293.43	1.45	290.25	1.51
C	20	294.72	0.65	288.41	-
C	30	296.49	0.18	286.57	0.24
C	40	299.49	1.18	278.99	-
C	50	300.30	-	266.95	1.02
C	60	293.59	-	249.24	-
C	70	271.44	-	218.82	0.90
L	0	282.44	1.32	280.68	1.64
L	10	272.85	0.87	269.88	2.37
L	20	273.89	1.56	265.98	1.35
L	30	276.71	1.26	259.10	1.48
L	40	277.73	1.14	249.29	1.76
L	50	278.49	1.33	232.34	1.15
L	60	271.43	0.52	205.25	1.92
L	70	248.12	1.71	166.28	1.62
Q	0	293.43	1.34	294.92	1.30
Q	10	293.27	1.50	293.46	-
Q	20	293.32	0.86	291.22	-
Q	30	294.62	1.01	287.29	1.40
Q	40	296.50	1.74	282.01	1.68
Q	50	299.03	1.97	272.83	-

Q	60	297.29	1.85	259.00	-
Q	70	289.12	-	239.56	0.90

**Soil Moisture Data (%)**

0-0.50 cm	0-2.5 cm	2.5-5 cm	5-10 cm
1.72	3.52	11.29	11.44

**Soil Temperature Data (C)**

Ambient	0-0.50 cm	1.25 cm	2.50 cm	7.50 cm	15.0 cm	18.8 cm
30.8	33.0	29.90	29.50	28.70	29.00	-

Date: 7/1/80

Plot No.: 44

Time: 0844-0914

Field: Short Grass

Freq.	Angle	Average A.T. (V)	Standard Dev. (V)	Average A.T. (H)	Standard Dev. (H)
C	0	-	-	-	-
C	10	-	-	-	-
C	20	-	-	-	-
C	30	-	-	-	-
C	40	-	-	-	-
C	50	-	-	-	-
C	60	-	-	-	-
C	70	-	-	-	-
L	0	260.90	1.69	264.10	1.23
L	10	255.50	1.53	255.10	1.57
L	20	255.00	1.15	253.40	2.19
L	30	255.00	1.80	242.50	2.17
L	40	256.20	2.01	234.90	3.00
L	50	279.4*	0.68	271.5*	1.95
L	60	265.7*	1.26	244.1*	1.90
L	70	229.10	1.30	177.40	1.35
Q	0	285.50	1.06	289.90	1.09
Q	10	284.00	1.56	289.50	1.07
Q	20	282.60	1.46	289.50	1.19
Q	30	282.40	1.68	288.20	0.69
Q	40	282.90	1.66	286.60	1.29
Q	50	285.80	1.93	287.80	1.27
Q	60	283.00	2.01	283.20	0.77
Q	70	279.00	2.11	280.30	1.30

**Soil Moisture Data (%)**

0-0.50 cm	0-2.5 cm	2.5-5 cm	5-10 cm
8.88	8.26	8.81	

**Soil Temperature Data (C)**

Ambient	0-0.50 cm	1.25 cm	2.50 cm	7.50 cm	15.0 cm	18.8 cm
25.0	-	27.00	24.02	23.00	22.50	-

\*Radio-frequency interference

Date: 7/1/80

Plot No.: 31

Time: 1354-1418

Field: Corn (perp)

Freq.	Angle	Average A.T. (V)	Standard Dev. (V)	Average A.T. (H)	Standard Dev. (H)

C	0	-	-	-	-
C	10	-	-	-	-
C	20	-	-	-	-
C	30	-	-	-	-
C	40	-	-	-	-
C	50	-	-	-	-
C	60	-	-	-	-
C	70	-	-	-	-
L	0	287.00	10.04	276.10	2.19
L	10	278.30	1.50	275.10	1.45
L	20	277.30	1.83	268.70	1.45
L	30	276.90	1.75	265.60	0.84
L	40	275.90	1.18	258.20	1.55
L	50	272.50	0.88	248.20	1.49
L	60	269.90	2.29	239.70	1.47
L	70	257.20	1.02	231.10	1.13
Q	0	279.40	1.82	275.50	1.25
Q	10	278.40	1.92	274.90	0.93
Q	20	281.00	1.67	275.80	0.93
Q	30	277.70	1.66	271.00	1.57
Q	40	276.50	1.18	258.20	1.55
Q	50	275.80	1.84	266.10	1.30
Q	60	269.40	1.26	259.30	0.84
Q	70	-	-	-	-

**Soil Moisture Data (%)**

0-0.50 cm	0-2.5 cm	2.5-5 cm	5-10 cm
1.41	6.78	9.08	9.38

**Soil Temperature Data (C)**

Ambient	+2.5 cm	1.25 cm	2.50 cm	7.50 cm	15.0 cm	18.8 cm
30.0	28.0	29.10	27.60	26.60	25.00	23.30

Date: 7/2/80

Time: 0803-0840

Plot No.: 63

Field: Soybean (perp)

Freq.	Angle	Average A.T. (V)	Standard Dev. (V)	Average A.T. (H)	Standard Dev. (H)
C	0	-	-	-	-
C	10	-	-	-	-
C	20	-	-	-	-
C	30	-	-	-	-
C	40	-	-	-	-
C	50	-	-	-	-
C	60	-	-	-	-
C	70	-	-	-	-
L	0	275.70	2.76	277.30	2.60
L	10	272.60	1.08	271.20	1.45
L	20	273.40	2.33	265.40	2.70
L	30	274.00	2.88	259.00	1.97
L	40	274.30	2.19	248.10	2.49
L	50	274.10	1.54	231.80	2.26
L	60	270.20	1.74	204.90	2.62
L	70	250.10	1.82	170.10	3.14
Q	0	279.10	6.30	283.40	3.77
Q	10	278.40	2.57	283.90	1.85
Q	20	279.00	1.27	283.40	1.25

Q	30	279.70	3.14	281.90	1.16
Q	40	276.00	2.10	279.20	1.35
Q	50	274.50	1.52	273.30	1.21
Q	60	273.70	1.40	270.00	1.14
Q	70	271.10	0.70	263.30	0.88

**Soil Moisture Data (%)**

0-0.50 cm	0-2.5 cm	2.5-5 cm	5-10 cm
3.37	11.47	14.62	14.03

**Soil Temperature Data (C)**

Ambient	0-0.50 cm	1.25 cm	2.50 cm	7.50 cm	15.0 cm	18.8 cm
24.0		22.40	21.10	20.50	20.50	21.00

Date: 7/2/80

Time: 1010-

Plot No.: 63

Field: Soybean(||)

Freq.	Angle	Average A.T. (V)	Standard Dev. (V)	Average A.T. (H)	Standard Dev. (H)
C	0	-	-	-	-
C	10	-	-	-	-
C	20	-	-	-	-
C	30	-	-	-	-
C	40	-	-	-	-
C	50	-	-	-	-
C	60	-	-	-	-
C	70	-	-	-	-
L	0	273.30	1.73	277.80	2.14
L	10	270.30	1.44	271.00	2.16
L	20	272.00	2.25	265.60	0.69
L	30	274.30	1.10	257.20	2.05
L	40	276.10	0.26	244.00	1.43
L	50	277.40	2.07	229.00	2.47
L	60	275.10	1.65	207.20	2.70
L	70	266.50	2.07	182.20	2.29
Q	0	289.70	1.73	292.30	1.07
Q	10	289.20	1.20	192.00	1.05
Q	20	289.80	0.55	291.40	1.11
Q	30	288.70	1.32	289.00	1.10
Q	40	287.70	0.52	281.30	1.50
Q	50	287.90	1.73	276.40	2.40
Q	60	293.70	1.01	272.40	2.25
Q	70	281.50	1.16	271.40	2.32

**Soil Moisture Data (%)**

0-0.50 cm	0-2.5 cm	2.5-5 cm	5-10 cm
3.93	9.40	13.78	13.60

**Soil Temperature Data (C)**

Ambient	+2.5 cm	1.25 cm	2.50 cm	7.50 cm	15.0 cm	18.8 cm
27.3	27.3	28.30	24.70	22.90	21.80	21.30

Date: 7/2/80

Time: 1142-1158

Plot No.: 54

Field: Tall Grass

Freq.	Angle	Average	Standard	Average	Standard

		A.T. (V)	Dev. (V)	A.T. (H)	Dev. (H)
C	0	-	-	-	-
C	10	-	-	-	-
C	20	-	-	-	-
C	30	-	-	-	-
C	40	-	-	-	-
C	50	-	-	-	-
C	60	-	-	-	-
C	70	-	-	-	-
L	0	269.00	1.99	270.40	2.14
L	10	267.60	2.17	263.60	1.72
L	20	261.90	1.51	252.30	1.69
L	30	263.20	1.26	245.00	1.66
L	40	265.90	0.69	238.50	0.98
L	50	266.70	1.05	228.80	1.98
L	60	267.20	1.94	217.80	2.41
L	70	260.30	1.36	218.00	2.22
Q	0	295.30	1.83	295.00	0.39
Q	10	296.10	1.32	297.50	0.29
Q	20	293.80	2.47	295.20	0.80
Q	30	293.90	2.07	294.60	1.14
Q	40	291.70	2.13	292.20	1.09
Q	50	291.80	1.05	289.90	0.51
Q	60	289.40	1.82	287.10	0.30
Q	70	289.60	2.50	284.90	1.50

#### Soil Moisture Data (%)

0-0.50 cm	0-2.5 cm	2.5-5 cm	5-10 cm
10.16	9.69	8.92	

#### Soil Temperature Data (C)

Ambient	+ 2.5 cm	1.25 cm	2.50 cm	7.50 cm	15.0 cm	18.8 cm
32.0	32.0	31.00	24.90	23.00	21.80	20.50

Date: 7/9/80

Plot No.: 44

Time: 1426-1447

Field: Short Grass (~ 15 cm)

Freq.	Angle	Average A.T. (V)	Standard Dev. (V)	Average A.T. (H)	Standard Dev. (H)
C	0	-	-	-	-
C	10	-	-	-	-
C	20	-	-	-	-
C	30	-	-	-	-
C	40	-	-	-	-
C	50	-	-	-	-
C	60	-	-	-	-
C	70	-	-	-	-
L	0	254.50	1.83	253.30	1.69
L	10	236.80	1.50	235.00	1.78
L	20	235.10	0.98	229.10	1.18
L	30	240.20	1.48	223.20	1.58
L	40	244.30	0.94	217.50	2.22
L	50	247.30	1.41	210.80	1.77
L	60	244.60	1.69	198.10	2.00
L	70	230.40	1.58	181.90	1.92
Q	0	300.70	1.07	300.50	0.42
Q	10	297.10	0.62	297.40	1.55

Q	20	295.40	1.89	296.50	1.80
Q	30	300.90	2.33	300.10	0.52
Q	40	301.10	2.14	299.10	2.16
Q	50	298.00	1.66	295.30	1.90
Q	60	293.00	1.92	291.30	0.84
Q	70	287.40	1.62	283.90	1.27

**Soil Moisture Data (%)**

0-0.50 cm	0-2.5 cm	2.5-5 cm	5-10 cm
13.48	12.09	11.97	

**Soil Temperature Data (C)**

Ambient	0-0.50 cm	1.25 cm	2.50 cm	7.50 cm	15.0 cm	18.8 cm
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Date: 7/10/80

Time: 0822-0855

Plot No.: 31

Field: Corn (||)

Freq.	Angle	Average A.T. (V)	Standard Dev. (V)	Average A.T. (H)	Standard Dev. (H)
C	0	-	-	-	-
C	10	-	-	-	-
C	20	-	-	-	-
C	30	-	-	-	-
C	40	-	-	-	-
C	50	-	-	-	-
C	60	-	-	-	-
C	70	-	-	-	-
L	0	273.56	1.40	286.55	2.59
L	10	270.43	1.88	282.64	1.82
L	20	269.33	1.21	270.21	0.88
L	30	267.02	1.60	272.31	-
L	40	269.72	1.03	271.00	1.68
L	50	270.85	1.42	270.06	1.73
L	60	272.51	1.73	271.43	1.36
L	70	266.77	0.88	269.07	1.89
Q	0	259.63	2.70	261.87	0.28
Q	10	265.56	2.01	268.19	-
Q	20	264.08	1.45	265.49	0.60
Q	30	263.13	2.17	263.90	0.63
Q	40	259.46	1.68	257.36	0.83
Q	50	259.64	1.10	255.53	0.74
Q	60	255.24	-	247.16	0.58
Q	70	-	1.81	-	1.63

**Soil Moisture Data (%)**

0-0.50 cm	0-2.5 cm	2.5-5 cm	5-10 cm
17.35	16.39	15.77	15.14

**Soil Temperature Data (C)**

Ambient	0-0.50 cm	1.25 cm	2.50 cm	7.50 cm	15.0 cm	18.8 cm
23.0		21.20	21.40	21.30	21.40	21.70

Date: 7/10/80

Time: 0939-1015

Plot No.: 31

Field: Corn (perp)

Freq.	Angle	Average	Standard	Average	Standard
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		A.T. (V)	Dev. (V)	A.T. (H)	Dev. (H)
C	0	-	-	-	-
C	10	-	-	-	-
C	20	-	-	-	-
C	30	-	-	-	-
C	40	-	-	-	-
C	50	-	-	-	-
C	60	-	-	-	-
C	70	-	-	-	-
L	0	276.97	0.45	279.11	2.14
L	10	277.36	1.82	272.94	1.59
L	20	278.77	1.71	266.83	2.08
L	30	278.19	1.78	266.52	1.69
L	40	278.93	2.32	267.63	0.77
L	50	278.40	-	268.14	1.20
L	60	275.23	2.19	267.11	1.49
L	70	266.19	1.72	266.99	1.66
Q	0	269.46	0.97	271.06	0.98
Q	10	269.69	1.01	271.23	1.23
Q	20	265.90	2.16	267.28	1.52
Q	30	265.67	2.16	264.03	0.84
Q	40	266.07	2.04	262.16	1.23
Q	50	262.92	1.46	257.01	0.28
Q	60	-	-	-	-
Q	70	-	-	-	-

#### Soil Moisture Data (%)

0-0.50 cm	0-2.5 cm	2.5-5 cm	5-10 cm
19.59	19.57	17.45	14.93

#### Soil Temperature Data (C)

Ambient	+ 2.5 cm	1.25 cm	2.50 cm	7.50 cm	15.0 cm	18.8 cm
26.0	25.0	25.50	23.10	22.10	21.60	21.40

Date: 7/10/80

Time: 1054-1130

Plot No.: 63

Field: Soybean (perp)

Freq.	Angle	Average A.T. (V)	Standard Dev. (V)	Average A.T. (H)	Standard Dev. (H)
C	0	-	-	-	-
C	10	-	-	-	-
C	20	-	-	-	-
C	30	-	-	-	-
C	40	-	-	-	-
C	50	-	-	-	-
C	60	-	-	-	-
C	70	-	-	-	-
L	0	227.01	0.52	235.34	1.14
L	10	201.69	1.50	205.11	1.34
L	20	199.92	1.16	197.50	1.77
L	30	204.73	1.22	185.72	1.63
L	40	214.65	-	176.47	1.80
L	50	226.94	1.53	163.71	1.31
L	60	240.76	1.52	143.39	1.46
L	70	245.83	1.53	121.46	1.68
Q	0	252.41	1.97	250.24	-
Q	10	243.18	1.73	237.39	-

Q	20	244.85	1.28	233.67	0.97
Q	30	253.70	0.95	231.36	0.60
Q	40	261.88	1.62	223.51	-
Q	50	271.16	1.92	213.85	1.46
Q	60	279.55	1.43	207.84	0.74
Q	70	-	-	-	-

**Soil Moisture Data (%)**

0-0.50 cm	0-2.5 cm	2.5-5 cm	5-10 cm
19.17	17.71	19.04	19.28

**Soil Temperature Data (C)**

Ambient	0-0.50 cm	1.25 cm	2.50 cm	7.50 cm	15.0 cm	18.8 cm
28.8	36.0	27.90	27.20	24.40	22.80	22.10

Date: 7/16/80

Plot No.: 63

Time: 1023-1108

Field: Soybean (||)

Freq.	Angle	Average	Standard	Average	Standard
		A.T. (V)	Dev. (V)	A.T. (H)	Dev. (H)
C	0	278.99	-	278.77	-
C	10	278.34	1.15	270.01	0.46
C	20	278.87	-	271.00	-
C	30	283.80	0.76	265.58	0.31
C	40	288.04	-	256.55	-
C	50	291.89	-	243.04	-
C	60	291.12	-	-	-
C	70	277.12	1.55	204.39	-
L	0	277.21	1.14	282.10	1.92
L	10	271.29	0.68	273.85	1.81
L	20	271.37	0.58	265.38	1.69
L	30	272.59	-	255.00	1.61
L	40	273.96	2.07	243.02	1.42
L	50	276.34	1.55	226.96	1.39
L	60	265.66	1.97	186.77	1.61
L	70	242.56	2.09	141.54	2.18
Q	0	309.49	1.80	303.27	1.39
Q	10	305.65	1.33	300.15	1.86
Q	20	307.62	1.13	297.56	1.18
Q	30	310.45	1.73	294.63	1.24
Q	40	310.44	1.81	287.58	-
Q	50	312.93	0.88	275.99	0.84
Q	60	314.18	2.26	273.72	1.12
Q	70	309.20	2.39	257.80	1.18

**Soil Moisture Data (%)**

0-0.50 cm	0-2.5 cm	2.5-5 cm	5-10 cm
3.82	5.78	10.78	13.27

**Soil Temperature Data (C)**

Ambient	0-0.50 cm	1.25 cm	2.50 cm	7.50 cm	15.0 cm	18.8 cm
32.5	42.0	31.90	29.60	27.90	26.00	25.10

Date: 7/16/80

Plot No.: 31

Time: 1412-1450

Field: Corn (perp)

Freq.	Angle	Average A.T. (V)	Standard Dev. (V)	Average A.T. (H)	Standard Dev. (H)
C	0	-	-	-	-
C	10	-	-	-	-
C	20	-	-	-	-
C	30	-	-	-	-
C	40	-	-	-	-
C	50	-	-	-	-
C	60	-	-	-	-
C	70	-	-	-	-
L	0	285.70	2.63	284.92	2.38
L	10	284.82	2.95	282.02	2.03
L	20	286.18	1.70	278.13	0.95
L	30	284.90	1.86	275.89	1.63
L	40	282.48	2.66	274.22	2.70
L	50	278.43	2.35	271.17	2.43
L	60	275.37	2.57	269.00	2.53
L	70	267.91	1.09	266.63	0.92
Q	0	-	-	-	-
Q	10	-	-	-	-
Q	20	-	-	-	-
Q	30	-	-	-	-
Q	40	-	-	-	-
Q	50	-	-	-	-
Q	60	-	-	-	-
Q	70	-	-	-	-

#### Soil Moisture Data (%)

0-0.50 cm	0-2.5 cm	2.5-5 cm	5-10 cm
3.95	5.70	8.05	7.35

#### Soil Temperature Data (C)

Ambient	+2.5 cm	1.25 cm	2.50 cm	7.50 cm	15.0 cm	18.8 cm
37.3	36.0	36.20	34.40	32.20	29.90	27.40

Date: 7/16/80

Time: 1508-1530

Plot No.: 31

Field: Corn (II)

Freq.	Angle	Average A.T. (V)	Standard Dev. (V)	Average A.T. (H)	Standard Dev.(H)
C	0	-	-	-	-
C	10	-	-	-	-
C	20	-	-	-	-
C	30	-	-	-	-
C	40	-	-	-	-
C	50	-	-	-	-
C	60	-	-	-	-
C	70	-	-	-	-
L	0	286.64	1.75	287.89	2.47
L	10	284.02	1.52	284.31	1.57
L	20	284.98	0.42	282.89	0.85
L	30	284.51	1.85	283.12	1.95
L	40	282.47	2.10	277.08	0.80
L	50	279.41	1.72	274.57	0.34
L	60	278.69	1.66	273.70	1.46
L	70	272.09	2.24	270.11	1.77

Q	0	-	-	-	-
Q	10	-	-	-	-
Q	20	-	-	-	-
Q	30	-	-	-	-
Q	40	-	-	-	-
Q	50	-	-	-	-
Q	60	-	-	-	-
Q	70	-	-	-	-

**Soil Moisture Data (%)**

0-0.50 cm	0-2.5 cm	2.5-5 cm	5-10 cm
1.83	7.14	8.74	8.98

**Soil Temperature Data (C)**

Ambient	+ 2.5 cm	1.25 cm	2.50 cm	7.50 cm	15.0 cm	18.8 cm
38.3	36.0	34.00	32.20	31.00	29.50	26.90

Date: 7/17/80

Plot No.: 54

Time: 0847-0920

Field: Tall Grass

Freq.	Angle	Average	Standard	Average	Standard
		A.T. (V)	Dev. (V)	A.T. (H)	Dev. (H)
C	0	289.49	1.53	287.65	-
C	10	285.11	0.85	283.56	0.93
C	20	287.82	1.84	285.76	0.74
C	30	293.07	-	288.35	-
C	40	292.87	1.29	288.85	-
C	50	293.25	1.62	289.10	0.87
C	60	293.01	1.07	286.28	1.90
C	70	286.19	-	280.86	-
L	0	271.16	-	280.10	1.62
L	10	255.09	1.22	252.56	1.70
L	20	254.17	0.74	251.30	1.39
L	30	264.10	4.06	249.81	1.65
L	40	259.61	-	239.66	1.83
L	50	259.07	1.33	231.58	1.17
L	60	257.32	1.35	228.23	1.69
L	70	253.50	-	233.72	1.54
Q	-0	-	-	-	-
Q	10	-	-	-	-
Q	20	-	-	-	-
Q	30	-	-	-	-
Q	40	-	-	-	-
Q	50	-	-	-	-
Q	60	-	-	-	-
Q	70	-	-	-	-

**Soil Moisture Data (%)**

0-0.50 cm	0-2.5 cm	2.5-5 cm	5-10 cm
20.03	20.11	19.92	

**Soil Temperature Data (C)**

Ambient	+2.5 cm	1.25 cm	2.50 cm	7.50 cm	15.0 cm	18.8 cm
27.80	29.00	25.90	25.00	24.40	24.10	24.00

Date: 7/17/80

Time: 1049-1120

**Plot No.: 44****Field: Short Grass**

Freq.	Angle	Average	Standard	Average	Standard
		A.T. (V)	Dev. (V)	A.T. (H)	Dev. (H)
C	0	290.82	-	291.85	1.06
C	10	290.17	0.98	289.54	0.23
C	20	291.45	0.55	289.24	0.55
C	30	293.86	-	287.10	-
C	40	295.95	0.54	284.62	0.21
C	50	297.77	-	281.39	0.57
C	60	297.91	0.71	286.34	-
C	70	293.14	1.01	271.62	-
L	0	269.01	1.50	276.41	1.35
L	10	259.55	-	261.98	1.62
L	20	257.80	1.56	255.64	1.45
L	30	260.78	1.43	256.41	1.77
L	40	259.42	0.34	241.67	1.26
L	50	258.64	1.48	231.51	2.05
L	60	251.46	1.50	216.12	1.09
L	70	229.70	1.09	193.75	1.60
Q	0	-	-	-	-
Q	10	-	-	-	-
Q	20	-	-	-	-
Q	30	-	-	-	-
Q	40	-	-	-	-
Q	50	-	-	-	-
Q	60	-	-	-	-
Q	70	-	-	-	-

**Soil Moisture Data (%)**

0-0.50 cm	0-2.5 cm	2.5-5 cm	5-10 cm
11.79	9.85	10.08	

**Soil Temperature Data (C)**

Ambient	0-0.50 cm	1.25 cm	2.50 cm	7.50 cm	15.0 cm	18.8 cm
31.5	35.0	29.60	28.40	26.80	25.90	25.30

**Date: 8/22/80****Time: 0938-1020****Plot No.: 63****Field: Soybean (||)**

Freq.	Angle	Average	Standard	Average	Standard
		A.T. (V)	Dev. (V)	A.T. (H)	Dev. (H)
C	0	278.18	-	275.38	1.69
C	10	277.75	1.27	274.95	1.05
C	20	278.42	0.87	274.29	0.16
C	30	279.55	1.34	272.70	-
C	40	279.67	0.90	273.32	-
C	50	278.81	1.14	273.69	-
C	60	276.81	1.52	270.09	-
C	70	271.81	-	264.09	0.41
L	0	278.24	1.79	281.38	2.07
L	10	272.08	1.68	271.59	1.89
L	20	276.65	1.21	270.31	1.37
L	30	279.97	1.31	267.16	2.13
L	40	280.37	0.69	263.23	1.88
L	50	280.95	2.83	261.81	1.76
L	60	277.17	1.17	261.64	2.48

L	70	266.73	1.61	259.99	0.40
Q	0	271.76	1.84	275.72	2.19
Q	10	270.66	-	274.47	-
Q	20	271.55	1.25	274.55	1.19
Q	30	271.77	1.86	273.65	1.46
Q	40	271.44	1.77	271.47	0.35
Q	50	270.79	-	270.03	0.20
Q	60	271.17	1.86	266.50	0.72
Q	70	267.62	1.91	263.61	1.20

**Soil Moisture Data (%)**

0-0.50 cm	0-2.5 cm	2.5-5 cm	5-10 cm
7.80	9.72	9.82	9.74

**Soil Temperature Data (C)**

Ambient	0-0.50 cm	1.25 cm	2.50 cm	7.50 cm	15.0 cm	18.8 cm
21.8	23.5	19.50	19.40	19.00	19.00	19.50

Date: 8/22/80

Time: 1058-1132

Plot No.: 63

Field: Soybean (perp)

Freq.	Angle	Average	Standard	Average	Standard
		A.T. (V)	Dev. (V)	A.T. (H)	Dev. (H)
C	0	281.23	1.16	277.48	0.31
C	10	280.56	-	277.90	0.54
C	20	280.86	-	277.28	0.38
C	30	280.84	0.67	275.27	1.22
C	40	279.86	-	274.39	-
C	50	278.04	-	270.34	-
C	60	275.52	0.82	267.30	-
C	70	267.32	0.80	258.42	0.47
L	0	283.35	0.85	281.38	1.46
L	10	278.86	1.55	273.70	1.82
L	20	278.72	1.56	268.71	2.00
L	30	279.82	1.34	264.93	1.94
L	40	279.69	0.80	259.61	2.23
L	50	277.67	2.06	254.67	2.37
L	60	273.46	1.24	249.76	2.32
L	70	260.99	1.23	246.06	1.96
Q	0	278.65	2.01	280.48	1.67
Q	10	274.07	1.87	278.30	0.98
Q	20	272.94	0.17	276.38	0.89
Q	30	272.48	1.62	274.13	0.91
Q	40	269.91	1.88	270.91	0.74
Q	50	270.12	1.42	268.65	0.70
Q	60	270.22	1.86	268.09	0.62
Q	70	270.07	0.99	265.62	1.18

**Soil Moisture Data (%)**

0-0.50 cm	0-2.5 cm	2.5-5 cm	5-10 cm
8.82	8.95	9.15	9.10

**Soil Temperature Data (C)**

Ambient	0-0.50 cm	1.25 cm	2.50 cm	7.50 cm	15.0 cm	18.8 cm
22.30	23.00	20.40	20.50	20.20	20.00	20.10

Date: 8/22/80

Plot No.: 31

Time: 1312-1352

Field: Corn (perp)

Freq.	Angle	Average A.T. (V)	Standard Dev. (V)	Average A.T. (H)	Standard Dev. (H)
C	0	283.65	0.52	283.86	0.55
C	10	285.57	-	283.30	0.95
C	20	286.41	-	283.10	-
C	30	286.89	-	283.71	1.90
C	40	286.49	-	280.53	0.51
C	50	285.66	0.19	277.95	-
C	60	284.20	0.84	274.27	1.16
C	70	276.62	-	264.09	1.09
L	0	293.62	1.91	294.61	2.45
L	10	293.91	1.23	288.61	1.11
L	20	293.60	1.80	292.26	2.14
L	30	292.97	1.54	284.97	2.49
L	40	288.44	2.27	282.08	2.22
L	50	284.72	1.97	278.31	1.79
L	60	280.43	1.70	275.90	2.69
L	70	269.04	-	272.00	1.51
Q	0	276.73	1.65	280.18	1.49
Q	10	277.77	1.75	281.45	1.28
Q	20	275.85	1.28	277.98	-
Q	30	275.18	1.09	275.87	0.74
Q	40	274.08	1.38	272.77	-
Q	50	270.96	1.81	269.03	-
Q	60	275.40	1.41	269.75	-
Q	70	271.42	1.35	264.37	1.05

**Soil Moisture Data (%)**

0-0.50 cm	0-2.5 cm	2.5-5 cm	5-10 cm
5.49	7.51	8.76	8.38

**Soil Temperature Data (C)**

Ambient	+2.5 cm	1.25 cm	2.50 cm	7.50 cm	15.0 cm	18.8 cm
26.3	24.8	21.10	20.70	20.20	19.70	19.50

Date: 8/22/80

Plot No.: 54

Time: 1429-1504

Field: Tall Grass

Freq.	Angle	Average A.T. (V)	Standard Dev. (V)	Average A.T. (H)	Standard Dev. (H)
C	0	280.91	1.20	277.30	1.02
C	10	278.40	0.97	273.76	0.98
C	20	278.74	-	273.05	-
C	30	283.48	-	269.73	-
C	40	286.06	-	266.90	-
C	50	288.17	-	264.06	-
C	60	287.67	-	263.03	0.84
C	70	282.58	1.32	260.77	-
L	0	265.34	0.71	265.99	1.93
L	10	251.25	1.23	247.52	1.98
L	20	250.57	2.34	237.82	1.76
L	30	254.01	1.30	233.65	1.68
L	40	256.22	1.82	221.39	1.94
L	50	260.75	1.45	210.68	2.36

L	60	260.40	1.94	201.59	1.64
L	70	254.49	1.67	202.95	1.49
Q	0	290.13	1.70	293.78	-
Q	10	287.99	1.51	292.15	-
Q	20	287.32	1.94	290.31	1.00
Q	30	285.72	2.11	287.78	1.02
Q	40	285.65	1.37	285.46	1.53
Q	50	283.86	1.88	282.11	0.81
Q	60	279.01	2.21	276.96	0.67
Q	70	274.68	1.66	269.58	0.91

**Soil Moisture Data (%)**

0-0.50 cm	0-2.5 cm	2.5-5 cm	5-10 cm
		17.64	16.97

**Soil Temperature Data (C)**

Ambient	+2.5 cm	1.25 cm	2.50 cm	7.50 cm	15.0 cm	18.8 cm
25.3	26.0	23.30	22.80	22.30	21.80	21.30

Date: 8/22/80

Time: 1514-1545

Plot No.: 31

Field: Corn (||)

Freq.	Angle	Average	Standard	Average	Standard
		A.T. (V)	Dev. (V)	A.T. (H)	Dev. (H)
C	0	286.05	0.73	282.99	0.82
C	10	285.51	0.71	281.82	-
C	20	285.47	1.23	280.77	0.71
C	30	285.57	-	282.77	0.58
C	40	285.26	0.59	278.18	-
C	50	284.61	1.52	275.92	1.23
C	60	281.47	-	271.64	1.14
C	70	274.34	-	265.20	0.94
L	0	291.31	-	294.90	2.21
L	10	292.79	1.05	292.87	1.35
L	20	291.94	0.73	289.98	1.13
L	30	290.21	2.00	285.94	2.26
L	40	287.57	1.13	284.79	2.74
L	50	284.21	1.67	282.39	1.58
L	60	279.93	1.59	279.62	2.17
L	70	270.52	1.31	273.73	2.15
Q	0	281.55	0.96	285.02	1.37
Q	10	276.21	1.60	280.46	-
Q	20	276.93	1.82	280.51	-
Q	30	277.28	1.62	279.79	1.25
Q	40	276.09	1.42	276.85	0.46
Q	50	274.83	0.70	274.41	1.52
Q	60	272.82	2.24	271.63	1.22
Q	70	267.70	1.40	264.99	-

**Soil Moisture Data (%)**

0-0.50 cm	0-2.5 cm	2.5-5 cm	5-10 cm
7.13	8.16	10.25	10.96

**Soil Temperature Data (C)**

Ambient	+ 2.5 cm	1.25 cm	2.50 cm	7.50 cm	15.0 cm	18.8 cm
24.8	24.5	22.80	22.20	21.80	21.40	20.80

Date: 8/25/80

Plot No.: 63

Time: 1339-1420

Field: Soybean (||)

Freq.	Angle	Average	Standard	Average	Standard
		A.T. (V)	Dev. (V)	A.T. (H)	Dev. (H)
C	0	289.49	1.22	291.39	-
C	10	288.45	-	289.44	1.34
C	20	288.42	-	288.66	-
C	30	286.97	0.91	284.99	-
C	40	286.93	-	282.64	0.85
C	50	285.74	1.25	282.25	0.24
C	60	283.80	1.26	278.24	-
C	70	277.61	-	272.96	0.34
L	0	284.36	-	284.86	1.37
L	10	278.77	0.60	277.31	1.49
L	20	281.17	1.26	273.48	2.09
L	30	281.18	1.36	268.19	1.32
L	40	281.56	1.52	266.78	2.01
L	50	280.27	1.41	264.64	1.61
L	60	277.31	0.66	262.62	1.86
L	70	268.35	1.19	261.68	1.54
Q	0	322.60	1.79	309.28	1.22
Q	10	315.61	1.61	304.23	1.26
Q	20	315.23	2.38	301.63	1.73
Q	30	313.89	1.00	301.27	1.20
Q	40	313.34	1.64	298.37	1.76
Q	50	311.95	2.09	295.55	1.65
Q	60	309.60	2.24	292.41	-
Q	70	306.59	0.27	288.68	0.77

**Soil Moisture Data (%)**

0-0.50 cm	0-2.5 cm	2.5-5 cm	5-10 cm
5.19	5.58	6.07	6.83

**Soil Temperature Data (C)**

Ambient	0-0.50 cm	1.25 cm	2.50 cm	7.50 cm	15.0 cm	18.8 cm
36.5	36.0	29.90	26.40	24.10	23.10	22.10

Date: 8/28/80

Plot No.: 63

Time: 0940-1025

Field: Soybean (||)

Freq.	Angle	Average	Standard	Average	Standard
		A.T. (V)	Dev. (V)	A.T. (H)	Dev. (H)
C	0	287.34	1.34	287.70	1.41
C	10	287.41	1.07	287.71	-
C	20	288.70	1.70	288.18	0.44
C	30	288.88	-	287.82	-
C	40	288.71	0.82	287.18	0.56
C	50	287.43	-	284.28	-
C	60	284.63	1.71	281.92	1.14
C	70	281.37	-	278.41	-
L	0	293.78	1.20	296.00	1.78
L	10	291.80	0.13	291.94	1.19
L	20	293.94	0.94	289.46	1.68
L	30	293.57	1.49	285.34	1.13
L	40	292.46	2.18	283.93	1.63

L	50	290.09	2.08	279.80	1.32
L	60	286.00	1.32	275.17	2.46
L	70	277.14	1.16	273.04	1.62
Q	0	275.87	1.59	282.87	0.41
Q	10	277.33	1.07	282.55	0.74
Q	20	278.34	2.60	281.51	0.79
Q	30	279.88	1.17	280.51	-
Q	40	280.31	1.87	280.71	1.49
Q	50	278.49	1.93	279.03	1.98
Q	60	277.76	1.66	276.75	0.84
Q	70	276.70	1.34	272.49	1.87

**Soil Moisture Data (%)**

0-0.50 cm	0-2.5 cm	2.5-5 cm	5-10 cm
2.42	3.34	5.44	6.17

**Soil Temperature Data (C)**

Ambient	0-0.50 cm	1.25 cm	2.50 cm	7.50 cm	15.0 cm	18.8 cm
31.5	31.5	27.70	24.20	22.70	22.00	21.90

Date: 8/28/80

Plot No.: 63

Time: 1312-1346

Field: Soybean (perp)

Freq.	Angle	Average	Standard	Average	Standard
		A.T. (V)	Dev. (V)	A.T. (H)	Dev. (H)
C	0	291.21	1.19	290.30	-
C	10	290.32	-	289.52	0.54
C	20	290.15	-	289.02	0.48
C	30	289.42	1.30	288.14	1.20
C	40	288.55	-	286.58	-
C	50	287.91	-	285.33	1.50
C	60	286.66	-	282.77	-
C	70	277.92	0.84	275.68	-
L	0	288.67	1.94	286.03	2.45
L	10	285.07	2.00	281.33	1.71
L	20	284.55	1.40	278.25	1.64
L	30	283.34	1.09	274.79	1.36
L	40	283.20	1.04	270.49	2.36
L	50	279.78	1.55	264.09	2.10
L	60	275.29	1.36	258.04	14.00
L	70	265.55	1.05	253.59	2.18
Q	0	306.34	1.23	295.95	-
Q	10	304.63	2.21	296.07	0.75
Q	20	300.15	1.96	292.04	1.69
Q	30	300.49	1.72	289.35	1.13
Q	40	299.26	2.10	288.55	1.34
Q	50	296.97	1.33	287.31	-
Q	60	296.92	2.36	287.53	-
Q	70	290.57	1.55	281.30	0.83

**Soil Moisture Data (%)**

0-0.50 cm	0-2.5 cm	2.5-5 cm	5-10 cm
1.74	2.93	5.34	5.96

**Soil Temperature Data (C)**

Ambient	+2.5 cm	1.25 cm	2.50 cm	7.50 cm	15.0 cm	18.8 cm
34.0	36.5	29.60	27.40	24.70	23.30	22.60

Date: 8/28/80  
Plot No.: 31

Time: 1357-1435  
Field: Corn (perp)

Freq.	Angle	Average A.T. (V)	Standard Dev. (V)	Average A.T. (H)	Standard Dev. (H)
C	0	291.35	-	291.18	-
C	10	292.33	1.04	291.43	0.71
C	20	293.84	-	292.19	1.16
C	30	293.86	1.12	290.23	-
C	40	294.29	-	289.73	-
C	50	293.99	0.56	288.30	1.03
C	60	292.71	-	283.83	-
C	70	284.17	-	273.21	-
L	0	287.30	1.74	284.75	2.06
L	10	287.79	1.72	283.52	2.20
L	20	288.49	1.60	282.41	2.14
L	30	286.30	1.99	278.46	2.25
L	40	284.84	2.34	273.31	2.05
L	50	281.13	2.03	268.62	1.68
L	60	275.50	2.48	264.16	1.96
L	70	266.80	0.81	259.80	1.97
Q	0	-	-	-	-
Q	10	291.01	1.39	288.87	
Q	20	290.62	1.78	286.53	1.13
Q	30	294.20	1.75	288.88	1.48
Q	40	295.44	2.01	287.03	-
Q	50	294.58	1.78	284.57	0.63
Q	60	293.62	2.15	282.27	-
Q	70	292.87	2.84	280.06	-

**Soil Moisture Data (%)**

0-0.50 cm	0-2.5 cm	2.5-5 cm	5-10 cm
1.13	3.20	4.96	5.27

**Soil Temperature Data (C)**

Ambient	0-0.50 cm	1.25 cm	2.50 cm	7.50 cm	15.0 cm	18.8 cm
34.0	35.0	29.90	27.60	25.60	23.90	22.50

Date: 8/28/80  
Plot No.: 31

Time: 1519-1550  
Field: Corn (||)

Freq.	Angle	Average A. T. (V)	Standard Dev. (V)	Average A.T. (H)	Standard Dev. (H)
C	0	292.07	1.02	290.75	-
C	10	292.32	1.06	290.92	-
C	20	293.43	1.47	290.16	-
C	30	293.98	0.85	289.29	0.65
C	40	293.47	1.39	286.33	-
C	50	292.50	1.22	282.95	-
C	60	289.51	-	278.38	-
C	70	183.71	-	272.52	0.83
L	0	288.98	1.96	286.90	1.73
L	10	288.23	0.85	284.70	2.29
L	20	289.02	1.12	281.48	1.89
L	30	288.67	0.82	278.43	1.54

L	40	285.43	1.70	275.09	2.23
L	50	282.21	1.37	270.00	1.24
L	60	277.45	0.36	265.81	0.98
L	70	270.35	1.76	263.71	2.79
Q	0	292.95	1.82	288.85	0.89
Q	10	293.52	2.73	290.51	1.66
Q	20	290.40	1.41	286.53	1.30
Q	30	288.78	1.42	282.26	-
Q	40	286.29	2.35	278.06	-
Q	50	284.52	1.26	275.70	1.55
Q	60	284.27	1.84	274.85	1.33
Q	70	280.20	2.14	270.43	1.85

**Soil Moisture Data (%)**

0-0.50 cm	0-2.5 cm	2.5-5 cm	5-10 cm
1.42	2.58	4.57	4.89

**Soil Temperature Data (C)**

Ambient	+2.5 cm	1.25 cm	2.50 cm	7.50 cm	15.0 cm	18.8 cm
33.5	34.0	33.40	31.60	29.00	27.10	24.90

Date: 8/29/80

Time: 1026-1055

Plot No.: 54

Field: Tall Grass

Freq.	Angle	Average A. T. (V)	Standard Dev. (V)	Average A.T. (H)	Standard Dev. (H)
C	0	282.01	-	282.73	-
C	10	280.89	0.85	279.18	-
C	20	281.38	-	276.23	-
C	30	286.17	0.24	275.59	-
C	40	290.02	0.25	275.47	0.35
C	50	292.99	1.75	272.37	1.48
C	60	293.37	-	269.12	1.37
C	70	286.26	0.97	260.74	1.39
L	0	276.31	0.65	279.35	2.09
L	10	256.92	1.48	256.95	1.98
L	20	255.53	1.69	249.23	2.33
L	30	255.85	2.19	242.02	2.07
L	40	259.13	1.84	233.02	1.94
L	50	261.79	0.40	222.87	2.26
L	60	259.05	1.81	208.96	2.11
L	70	241.24	1.87	183.17	1.54
Q	0	289.13	2.50	289.97	-
Q	10	292.31	-	290.73	0.60
Q	20	289.71	1.68	289.31	1.18
Q	30	290.56	-	289.43	1.53
Q	40	288.70	1.87	287.24	1.43
Q	50	287.75	1.61	286.07	1.18
Q	60	284.63	0.95	282.18	1.42
Q	70	284.21	1.46	281.20	1.25

**Soil Moisture Data (%)**

0-0.50 cm	0-2.5 cm	2.5-5 cm	5-10 cm
14.51	14.94	14.71	

**Soil Temperature Data (C)**

Ambient	0-0.50 cm	1.25 cm	2.50 cm	7.50 cm	15.0 cm	18.8 cm
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35.5	34.8	27.10	24.50	23.30	22.70	22.60
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Date: 8/29/80

Plot No.: 44

Time: 1217-1246

Field: Short Grass

Freq.	Angle	Average A.T. (V)	Standard Dev. (V)	Average A.T. (H)	Standard Dev. (H)
C	0	291.25	0.79	289.78	-
C	10	291.85	0.50	289.21	1.39
C	20	292.66	-	288.70	1.51
C	30	293.62	0.80	287.59	-
C	40	293.70	0.92	284.23	0.59
C	50	293.44	1.10	281.27	0.67
C	60	290.90	1.05	280.40	0.65
C	70	278.80	-	271.54	1.13
L	0	285.73	1.31	289.89	1.13
L	10	279.79	1.63	282.37	1.70
L	20	280.54	1.46	279.05	2.30
L	30	279.39	1.85	274.21	1.85
L	40	277.87	1.93	267.21	1.45
L	50	274.91	1.53	256.39	1.53
L	60	268.44	0.05	236.79	2.01
L	70	244.73	1.91	207.53	1.88
Q	0	295.27	1.83	294.58	-
Q	10	295.83	1.97	294.85	1.19
Q	20	298.98	1.04	295.71	0.99
Q	30	300.02	0.63	295.13	-
Q	40	300.65	1.71	293.87	1.93
Q	50	298.92	1.63	291.97	-
Q	60	297.46	-	287.96	-
Q	70	293.10	1.90	284.87	1.23

**Soil Moisture Data (%)**

0-0.50 cm	0-2.5 cm	2.5-5 cm	5-10 cm
2.95	4.29	5.11	

**Soil Temperature Data (C)**

Ambient	+2.5 cm	1.25 cm	2.50 cm	7.50 cm	15.0 cm	18.8 cm
35.0	35.5	33.00	29.00	26.70	25.60	24.70

Date: 9/3/80

Plot No.: 63

Time: 0940-1100

Field: Soybean (||)

Freq.	Angle	Average A.T. (V)	Standard Dev. (V)	Average A.T. (H)	Standard Dev. (H)
C	0	282.37	1.32	283.12	1.09
C	10	283.48	0.23	283.95	-
C	20	282.95	-	283.30	-
C	30	284.38	-	283.76	0.53
C	40	283.88	0.53	282.45	0.19
C	50	281.26	1.24	279.07	-
C	60	280.00	-	277.22	-
C	70	276.10	1.26	272.78	1.11
L	0	294.66	1.27	296.57	2.10
L	10	292.06	0.98	290.16	2.64
L	20	292.75	1.46	286.41	2.10

L	30	292.29	1.71	283.21	1.72
L	40	290.48	-	281.68	-
L	50	288.31	1.14	277.05	2.07
L	60	284.20	1.14	271.79	1.16
L	70	274.17	0.99	267.54	1.94
Q	0	270.45	2.01	277.56	1.12
Q	10	289.21	1.61	296.12	0.67
Q	20	264.19	1.65	270.17	1.68
Q	30	279.05	1.74	282.32	-
Q	40	276.07	2.04	279.62	-
Q	50	273.26	1.77	274.31	-
Q	60	270.65	0.56	269.48	1.26
Q	70	267.36	2.16	266.92	-

**Soil Moisture Data (%)**

0-0.50 cm	0-2.5 cm	2.5-5 cm	5-10 cm
2.57	4.28	5.46	5.69

**Soil Temperature Data (C)**

Ambient	+2.5 cm	1.25 cm	2.50 cm	7.50 cm	15.0 cm	18.8 cm
30.5	29.9	27.00	25.30	23.70	23.30	23.40

Date: 9/3/80

Time: 1334-1421

Plot No.: 63

Field: Soybean (perp)

Freq.	Angle	Average	Standard	Average	Standard
		A.T. (V)	Dev. (V)	A.T. (H)	Dev. (H)
C	0	288.60	1.15	289.01	1.49
C	10	288.84	0.27	288.75	-
C	20	288.59	0.86	288.64	0.45
C	30	287.88	0.49	287.65	0.51
C	40	286.74	1.50	285.64	0.26
C	50	289.52	-	285.65	0.74
C	60	282.49	1.03	281.63	1.44
C	70	274.21	0.85	273.94	-
L	0	287.21	1.80	283.98	1.78
L	10	286.72	2.06	281.31	1.87
L	20	285.87	1.55	277.33	2.12
L	30	284.73	0.73	275.09	1.42
L	40	283.57	1.43	273.33	1.93
L	50	282.11	0.88	267.90	1.98
L	60	276.80	1.64	261.41	1.75
L	70	264.36	2.37	254.77	1.46
Q	0	289.33	1.62	292.57	-
Q	10	287.44	2.11	292.34	1.16
Q	20	286.36	1.77	292.53	0.67
Q	30	285.15	1.25	290.67	0.44
Q	40	280.75	2.33	286.89	1.97
Q	50	281.97	1.71	286.10	1.85
Q	60	277.82	2.46	280.18	-
Q	70	275.92	1.32	279.15	1.33

**Soil Moisture Data (%)**

0-0.50 cm	0-2.5 cm	2.5-5 cm	5-10 cm
1.66	2.26	3.72	4.82

**Soil Temperature Data (C)**

Ambient	+2.5 cm	1.25 cm	2.50 cm	7.50 cm	15.0 cm	18.8 cm
34.80	33.80	30.30	27.80	25.90	24.80	24.30

Date: 9/4/80

Plot No.: 31

Time: 0901-0945

Field: Corn (||)

Freq.	Angle	Average A.T. (V)	Standard Dev. (V)	Average A.T. (H)	Standard Dev. (H)
C	0	286.63	0.23	283.98	-
C	10	288.15	-	287.88	-
C	20	289.17	1.48	285.17	0.70
C	30	290.04	-	284.42	0.80
C	40	290.45	-	283.94	-
C	50	290.49	0.79	282.63	-
C	60	289.61	-	279.55	-
C	70	283.25	-	270.61	-
L	0	291.39	1.17	291.37	1.56
L	10	294.87	3.80	289.97	1.49
L	20	291.43	-	287.12	1.77
L	30	290.63	1.67	282.87	1.44
L	40	287.56	-	278.48	0.56
L	50	283.76	1.67	274.65	2.27
L	60	279.05	0.80	268.28	1.48
L	70	270.71	1.09	258.91	1.12
Q	0	280.83	2.71	283.93	-
Q	10	281.04	1.72	284.43	1.13
Q	20	282.92	1.23	285.64	1.85
Q	30	285.64	0.94	285.42	0.71
Q	40	286.13	1.68	285.54	-
Q	50	288.32	1.38	286.37	1.87
Q	60	287.85	1.46	282.63	-
Q	70	286.55	1.00	278.55	-

#### Soil Moisture Data (%)

0-0.50 cm	0-2.5 cm	2.5-5 cm	5-10 cm
1.39	2.01	2.83	4.01

#### Soil Temperature Data (C)

Ambient	+2.5 cm	1.25 cm	2.50 cm	7.50 cm	15.0 cm	18.8 cm
23.5	23.0	21.10	20.30	20.00	20.80	21.00

Date: 9/4/80

Plot No.: 31

Time: 1036-1106

Field: Corn (||)

Freq.	Angle	Average A.T. (V)	Standard Dev. (V)	Average A.T. (H)	Standard Dev. (H)
C	0	291.83	-	290.10	0.73
C	10	292.64	-	289.93	-
C	20	293.30	0.55	289.16	0.98
C	30	294.37	-	284.19	1.49
C	40	295.01	-	286.36	-
C	50	294.23	-	282.92	-
C	60	292.37	1.17	280.04	-
C	70	286.79	0.99	275.07	1.27
L	0	293.70	1.20	295.36	2.55
L	10	293.95	1.73	292.97	0.65

L	20	293.78	2.19	289.79	1.95
L	30	293.30	1.55	285.30	0.96
L	40	290.66	1.51	280.80	1.45
L	50	288.67	2.06	274.02	1.79
L	60	284.47	1.62	266.87	0.95
L	70	276.39	1.67	260.92	1.38
Q	0	290.40	1.05	287.95	1.45
Q	10	287.72	1.71	287.01	-
Q	20	287.67	0.53	286.47	0.40
Q	30	289.88	1.37	285.90	-
Q	40	290.80	2.24	284.61	1.51
Q	50	289.35	2.04	281.72	1.53
Q	60	290.45	-	281.70	-
Q	70	289.63	1.38	278.20	-

**Soil Moisture Data (%)**

0-0.50 cm	0-2.5 cm	2.5-5 cm	5-10 cm
1.15	2.39	3.93	4.34

**Soil Temperature Data (C)**

Ambient	2.5 cm	1.25 cm	2.50 cm	7.50 cm	15.0 cm	18.8 cm
33.5	32.0	32.20	29.30	25.20	24.60	22.90

Date: 9/14/80

Time: 1401-1435

Plot No.: 54

Field: Tall Grass

Freq.	Angle	Average	Standard	Average	Standard
		A.T. (V)	Dev. (V)	A.T. (H)	Dev. (H)
C	0	285.49	0.86	283.97	-
C	10	282.33	1.09	280.21	0.67
C	20	284.53	-	279.89	-
C	30	287.00	1.01	279.99	1.03
C	40	288.72	1.29	274.99	-
C	50	292.02	-	269.65	-
C	60	292.35	-	264.24	-
C	70	288.83	0.30	255.87	1.07
L	0	277.37	2.71	274.65	2.27
L	10	259.14	1.59	255.35	2.16
L	20	257.63	1.27	247.12	1.97
L	30	257.07	1.88	237.71	1.58
L	40	259.04	1.56	230.61	1.56
L	50	263.40	2.41	221.87	0.73
L	60	256.39	1.12	204.69	1.19
L	70	242.48	0.59	188.41	1.40
Q	0	300.49	1.87	300.78	-
Q	10	299.10	1.17	298.52	0.69
Q	20	301.09	0.98	299.43	-
Q	30	303.53	0.80	300.77	-
Q	40	303.26	1.08	298.98	1.12
Q	50	299.27	0.69	294.25	0.16
Q	60	294.48	-	290.05	1.05
Q	70	296.24	1.62	289.02	1.15

**Soil Moisture Data (%)**

0-0.50 cm	0-2.5 cm	2.5-5 cm	5-10 cm
14.16	13.44	13.05	

**Soil Temperature Data (C)**

Ambient	0-0.50 cm	1.25 cm	2.50 cm	7.50 cm	15.0 cm	18.8 cm
34.8	33.5	28.60	24.80	23.80	24.70	22.80

Date: 9/9/80

Time: 0758-0830

Plot No.: 63

Field: Soybean (||)

Freq	Angle	Average	Standard	Average	Standard
		A.T. (V)	Dev. (V)	A.T. (H)	Dev. (H)
C	0	276.70	0.97	273.45	1.15
C	10	276.59	0.69	273.42	-
C	20	276.12	-	272.71	0.61
C	30	275.25	-	271.57	0.79
C	40	273.78	1.20	269.48	0.84
C	50	271.89	-	266.15	0.70
C	60	269.56	-	263.15	-
C	70	263.65	1.10	257.19	1.23
L	0	285.97	1.54	288.88	2.09
L	10	285.32	1.81	285.33	1.67
L	20	284.87	-	281.10	1.38
L	30	284.27	1.58	278.16	1.33
L	40	283.14	1.74	274.61	1.36
L	50	279.73	0.77	270.44	2.05
L	60	274.69	0.95	264.64	2.11
L	70	263.59	1.95	257.45	2.01
Q	0	279.15	2.08	279.82	1.41
Q	10	277.61	1.60	278.14	1.38
Q	20	277.33	1.79	277.47	0.97
Q	30	278.36	1.63	276.35	1.04
Q	40	277.09	2.23	275.24	0.48
Q	50	275.13	1.29	272.05	-
Q	60	274.16	0.96	269.82	-
Q	70	271.10	1.62	256.47	1.15

**Soil Moisture Data (%)**

0-0.50 cm	0-2.5 cm	2.5-5 cm	5-10 cm
3.17	4.32	5.12	7.52

**Soil Temperature Data (C)**

Ambient	2.5 cm	1.25 cm	2.50 cm	7.50 cm	15.0 cm	18.8 cm
19.5	19.5	18.40	18.50	18.80	20.10	20.20

Date: 9/9/80

Time: 0901-0938

Plot No.: 63

Field: Soybean (perp)

Freq.	Angle	Average	Standard	Average	Standard
		A.T. (V)	Dev. (V)	A.T. (H)	Dev. (H)
C	0	281.99	-	278.84	-
C	10	282.35	1.08	279.59	0.35
C	20	283.02	-	279.66	-
C	30	283.13	-	279.40	-
C	40	283.00	0.60	279.32	1.48
C	50	281.32	-	276.80	-
C	60	279.85	-	275.73	0.93
C	70	271.61	-	268.27	0.93
L	0	286.93	0.79	287.79	1.63

L	10	286.38	1.27	284.35	2.07
L	20	286.41	3.35	280.24	1.49
L	30	286.13	0.97	277.75	1.66
L	40	284.98	1.55	274.22	1.63
L	50	281.86	1.64	267.40	1.65
L	60	277.26	1.09	261.74	0.77
L	70	265.63	1.35	254.46	1.56
Q	0	286.64	1.36	283.09	0.23
Q	10	285.48	2.00	283.19	1.31
Q	20	285.11	1.69	283.53	0.93
Q	30	289.88	1.60	281.40	1.29
Q	40	290.43	1.62	283.69	1.52
Q	50	287.91	0.99	281.40	1.29
Q	60	289.42	1.68	281.40	1.36
Q	70	287.79	2.02	276.82	0.92

**Soil Moisture Data (%)**

0-0.50 cm	0-2.5 cm	2.5-5 cm	5-10 cm
2.64	3.37	4.22	4.88

**Soil Temperature Data (C)**

Ambient	2.5 cm	1.25 cm	2.50 cm	7.50 cm	15.0 cm	18.8 cm
24.3	24.5	25.10	22.30	20.80	21.70	-

Date: 9/9/80

Plot No.: 31

Time: 1020-1056

Field: Corn (perp)

Freq.	Angle	Average A.T. (V)	Standard Dev. (V)	Average A.T. (H)	Standard Dev. (H)
C	0	289.88	-	287.87	1.90
C	10	291.22	-	287.90	-
C	20	292.92	1.06	287.95	-
C	30	294.11	0.74	287.29	-
C	40	295.18	-	286.55	0.78
C	50	295.31	1.41	285.95	1.39
C	60	293.79	-	283.58	-
C	70	286.49	-	276.21	-
L	0	287.65	1.21	285.73	1.36
L	10	286.17	0.67	283.33	1.82
L	20	287.36	1.27	280.99	1.78
L	30	285.05	1.91	275.17	1.37
L	40	284.04	1.70	269.55	1.67
L	50	280.81	0.77	259.85	2.48
L	60	276.08	1.50	250.85	2.06
L	70	267.28	1.43	243.41	1.83
Q	0	308.89	1.49	304.79	0.72
Q	10	309.04	2.33	304.84	0.32
Q	20	309.24	1.91	304.08	1.07
Q	30	307.01	1.42	301.23	1.10
Q	40	307.08	1.53	299.62	1.31
Q	50	303.72	1.93	295.31	1.22
Q	60	304.86	1.71	295.65	-
Q	70	302.22	0.46	292.13	-

**Soil Moisture Data (%)**

0-0.50 cm	0-2.5 cm	2.5-5 cm	5-10 cm
1.44	1.91	2.80	3.14

**Soil Temperature Data (C)**

Ambient	2.5 cm	1.25 cm	2.50 cm	7.50 cm	15.0 cm	18.8 cm
27.0	26.5	25.30	22.10	20.00	20.90	-

Date: 9/9/80

Time: 1131-1205

Plot No.: 31

Field: Corn (||)

Freq.	Angle	Average A.T. (V)	Standard Dev. (V)	Average A.T. (H)	Standard Dev. (H)
C	0	292.86	-	291.57	0.90
C	10	292.70	-	282.47	-
C	20	293.64	-	289.75	1.03
C	30	294.59	-	288.13	0.61
C	40	295.96	1.20	286.66	-
C	50	296.25	-	283.70	-
C	60	294.75	-	280.70	-
C	70	288.46	0.91	274.39	-
L	0	290.64	1.54	291.52	2.35
L	10	290.84	2.20	288.88	2.69
L	20	290.37	1.66	284.22	1.81
L	30	287.65	1.21	285.73	1.36
L	40	289.81	1.79	277.92	2.01
L	50	286.98	1.34	264.39	2.27
L	60	282.70	1.60	254.93	2.05
L	70	273.93	1.54	247.14	1.94
Q	0	297.76	1.66	293.70	1.40
Q	10	295.00	2.06	290.35	0.73
Q	20	297.77	1.13	292.02	-
Q	30	302.00	1.62	293.11	0.91
Q	40	304.38	2.05	293.53	1.14
Q	50	305.65	1.69	292.47	1.08
Q	60	305.73	1.28	291.60	-
Q	70	301.36	0.81	288.17	-

**Soil Moisture Data (%)**

0-0.50 cm	0-2.5 cm	2.5-5 cm	5-10 cm
1.49	2.46	3.58	3.99

**Soil Temperature Data (C)**

Ambient	0-0.50 cm	1.25 cm	2.50 cm	7.50 cm	15.0 cm	18.8 cm
33.3	35.8	32.10	28.40	25.40	22.70	-

Date: 9/9/80

Time: 1421-1456

Plot No.: 54

Field: Tall Grass

Freq.	Angle	Average A.T. (V)	Standard Dev. (V)	Average A.T. (H)	Standard Dev. (H)
C	0	286.34	-	285.25	-
C	10	283.90	0.96	282.58	-
C	20	286.46	1.02	281.43	0.61
C	30	289.79	-	280.58	-
C	40	291.85	1.44	278.29	0.95
C	50	293.72	0.79	272.83	0.63
C	60	294.55	-	267.37	-
C	70	289.45	0.42	259.17	-

L	0	275.97	1.88	278.82	1.99
L	10	263.65	1.89	261.52	0.99
L	20	263.67	0.78	255.59	1.69
L	30	265.91	1.97	248.05	2.03
L	40	264.80	1.32	238.85	1.19
L	50	264.72	2.27	228.38	1.49
L	60	260.96	1.44	211.37	1.81
L	70	244.63	1.28	189.32	1.55
Q	0	305.19	1.89	303.14	-
Q	10	305.38	1.32	302.74	1.29
Q	20	305.23	0.88	301.18	-
Q	30	305.64	1.47	300.94	-
Q	40	301.83	-	295.73	-
Q	50	303.79	1.33	296.62	1.12
Q	60	301.79	-	294.72	1.71
Q	70	300.46	1.84	292.88	1.04

**Soil Moisture Data (%)**

0-0.50 cm	0-2.5 cm	2.5-5 cm	5-10 cm
-	12.18	13.53	13.15

**Soil Temperature Data (C)**

Ambient	2.5 cm	1.25 cm	2.50 cm	7.50 cm	15.0 cm	18.8 cm
32.8	34.8	28.70	25.60	24.30	23.10	-

Date: 9/10/80

Time: 0854-0930

Plot No.: 63

Field: Soybean (|||)

Freq.	Angle	Average	Standard	Average	Standard
		A.T. (V)	Dev. (V)	A.T. (H)	Dev. (H)
C	0	278.53	-	276.21	0.53
C	10	278.41	0.84	275.69	-
C	20	278.66	0.61	275.47	-
C	30	279.28	-	275.13	1.62
C	40	279.21	0.92	274.36	1.15
C	50	277.97	1.69	271.98	0.10
C	60	275.67	1.06	270.24	1.08
C	70	271.26	-	265.05	-
L	0	273.51	1.47	275.39	1.65
L	10	266.37	1.86	266.93	2.25
L	20	270.41	1.46	265.84	1.55
L	30	273.42	1.30	260.54	1.82
L	40	275.04	1.41	258.23	1.30
L	50	275.02	0.60	256.13	1.85
L	60	272.66	0.94	256.94	0.85
L	70	264.64	1.18	255.51	1.69
Q	0	274.84	2.28	276.08	1.53
Q	10	275.15	-	275.49	1.13
Q	20	273.81	-	273.44	1.19
Q	30	272.57	1.82	270.67	0.80
Q	40	272.36	1.87	268.77	-
Q	50	273.31	1.64	265.80	1.11
Q	60	273.81	1.29	262.47	-
Q	70	273.35	2.04	259.74	1.32

**Soil Moisture Data (%)**

0-0.50 cm	0-2.5 cm	2.5-5 cm	5-10 cm
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14.01      13.49      9.01      4.85

**Soil Temperature Data (C)**

Ambient	2.5 cm	1.25 cm	2.50 cm	7.50 cm	15.0 cm	18.8 cm
21.0	21.0	20.80	21.10	21.20	21.40	-

Date: 9/10/80

Plot No.: 63

Time: 1037-1108

Field: Soybean (perp)

Freq.	Angle	Average	Standard	Average	Standard
		A.T. (V)	Dev. (V)	A.T. (H)	Dev. (H)
C	0	280.81	0.18	278.23	0.74
C	10	281.50	-	278.56	0.61
C	20	282.50	0.51	279.19	1.38
C	30	282.68	-	279.07	-
C	40	281.86	-	278.23	0.63
C	50	280.57	-	277.18	0.33
C	60	277.10	-	273.72	1.63
C	70	268.52	0.91	266.23	-
L	0	270.14	1.36	270.57	0.78
L	10	265.33	0.44	258.65	1.78
L	20	269.71	0.97	254.10	1.67
L	30	272.45	0.02	250.70	1.57
L	40	274.87	1.48	247.43	2.05
L	50	275.72	0.52	244.96	1.59
L	60	270.24	1.17	243.99	1.55
L	70	261.34	1.10	245.65	1.47
Q	0	271.99	1.75	273.55	1.74
Q	10	272.17	1.00	273.50	1.79
Q	20	272.29	1.62	274.25	1.37
Q	30	271.56	1.94	271.40	1.25
Q	40	269.79	1.87	269.04	-
Q	50	268.97	1.59	267.48	1.56
Q	60	268.26	3.01	264.27	1.26
Q	70	265.33	1.53	259.75	1.16

**Soil Moisture Data (%)**

0-0.50 cm	0-2.5 cm	2.5-5 cm	5-10 cm
12.35	12.96	8.95	5.16

**Soil Temperature Data (C)**

Ambient	2.5 cm	1.25 cm	2.50 cm	7.50 cm	15.0 cm	18.8 cm
26.0	25.0	21.80	21.90	22.00	22.20	-

Date: 9/10/80

Plot No.: 31

Time: 1118-1150

Field: Corn (perp)

Freq.	Angle	Average	Standard	Average	Standard
		A.T. (V)	Dev. (V)	A.T. (H)	Dev. (H)
C	0	277.95	-	276.96	-
C	10	279.81	0.23	274.79	1.23
C	20	281.61	1.53	273.53	2.03
C	30	284.13	-	274.15	1.28
C	40	287.06	1.30	276.05	1.01
C	50	289.51	0.71	277.18	-
C	60	288.87	-	277.02	-

C	70	282.00	-	272.67	-
L	0	275.07	1.27	271.76	0.95
L	10	275.09	1.42	266.95	1.45
L	20	274.42	0.85	261.93	-
L	30	276.34	1.37	255.76	1.95
L	40	277.74	1.76	248.53	1.84
L	50	276.26	1.44	241.68	1.66
L	60	272.22	1.29	236.89	2.21
L	70	263.34	1.20	233.15	1.25
Q	0	284.49	1.24	284.68	1.03
Q	10	283.60	1.70	284.84	0.74
Q	20	286.94	2.05	286.39	1.19
Q	30	287.02	1.07	285.23	1.31
Q	40	288.85	2.10	286.92	-
Q	50	287.91	1.63	285.55	0.97
Q	60	287.91	1.75	284.99	1.14
Q	70	287.79	2.22	282.99	1.36

**Soil Moisture Data (%)**

0-0.50 cm	0-2.5 cm	2.5-5 cm	5-10 cm
10.36	10.27	9.25	7.67

**Soil Temperature Data (C)**

Ambient	0-0.50 cm	1.25 cm	2.50 cm	7.50 cm	15.0 cm	18.8 cm
24.0	23.8	21.40	20.60	20.70	20.90	-

Date: 9/10/80

Time: 1345-1416

Plot No.: 31

Field: Corn (II)

Freq.	Angle	Average A.T. (V)	Standard Dev. (V)	Average A.T. (H)	Standard Dev. (H)
C	0	281.52	-	279.79	-
C	10	279.84	0.85	276.52	0.99
C	20	285.89	0.83	274.55	1.22
C	30	284.81	1.06	275.30	-
C	40	288.74	-	273.42	0.63
C	50	291.68	0.54	271.33	1.51
C	60	291.97	-	268.02	-
C	70	285.99	-	265.99	0.37
L	0	277.99	-	279.15	2.24
L	10	279.77	1.97	276.50	1.92
L	20	282.64	1.75	269.75	1.57
L	30	282.34	1.44	262.38	1.34
L	40	282.51	1.14	256.56	1.09
L	50	281.91	1.31	245.87	-
L	60	280.02	1.33	241.02	1.70
L	70	270.64	1.10	236.18	1.54
Q	0	268.97	1.59	267.48	1.56
Q	10	279.72	0.56	280.27	1.12
Q	20	279.92	1.43	280.07	1.75
Q	30	284.16	1.55	281.70	-
Q	40	284.29	1.85	279.35	-
Q	50	283.34	2.04	275.66	1.58
Q	60	277.16	2.27	269.44	-
Q	70	277.53	2.02	270.65	1.45

**Soil Moisture Data (%)**

0-0.50 cm	0-2.5 cm	2.5-5 cm	5-10 cm
8.85	10.16	10.86	9.28

**Soil Temperature Data (C)**

Ambient	0-0.50 cm	1.25 cm	2.50 cm	7.50 cm	15.0 cm	18.8 cm
27.3	28.0	24.70	23.60	23.20	23.10	-

**Date: 9/11/80**
**Time: 0743-0815**
**Plot No.: 63**
**Field: Soybean (||)**

Freq.	Angle	Average A.T. (V)	Standard Dev. (V)	Average A.T. (H)	Standard Dev. (H)
C	0	270.53	-	264.87	1.45
C	10	270.44	1.21	264.86	0.19
C	20	270.40	0.13	263.86	1.40
C	30	270.15	1.17	263.15	-
C	40	269.93	0.81	261.84	-
C	50	268.74	0.86	260.26	1.57
C	60	266.18	-	257.74	-
C	70	261.73	0.68	252.90	1.05
L	0	274.41	1.77	275.35	1.88
L	10	269.22	1.10	270.09	1.72
L	20	274.76	4.03	267.10	1.61
L	30	272.57	1.51	261.82	1.62
L	40	272.56	1.16	260.13	1.81
L	50	271.80	0.71	254.99	1.09
L	60	267.56	0.73	253.07	1.69
L	70	257.14	1.44	247.53	1.62
Q	0	254.66	1.02	261.13	0.56
Q	10	251.70	0.70	259.29	0.92
Q	20	253.56	1.28	260.20	-
Q	30	249.23	2.06	254.37	0.88
Q	40	250.59	2.16	254.30	-
Q	50	246.79	1.40	247.26	1.19
Q	60	246.39	1.61	246.47	0.50
Q	70	247.17	2.00	245.05	1.58

**Soil Moisture Data (%)**

0-0.50 cm	0-2.5 cm	2.5-5 cm	5-10 cm
8.21	9.33	8.63	6.38

**Soil Temperature Data (C)**

Ambient	0-0.50 cm	1.25 cm	2.50 cm	7.50 cm	15.0 cm	18.8 cm
13.1	13.8	13.30	14.50	15.70	17.80	-

**Date: 9/11/80**
**Time: 0849-0923**
**Plot No.: 63**
**Field: Soybean (perp)**

Freq.	Angle	Average A.T. (V)	Standard Dev. (V)	Average A.T. (H)	Standard Dev. (H)
C	0	280.62	-	277.08	0.19
C	10	280.23	1.75	276.85	-
C	20	279.71	-	276.44	0.90
C	30	279.26	-	275.92	-
C	40	277.73	0.62	274.31	1.15
C	50	275.16	0.47	270.89	0.40

C	60	270.92	0.79	265.87	1.73
C	70	261.57	0.63	256.30	0.61
L	0	277.43	1.07	275.13	1.52
L	10	273.57	0.95	267.17	1.27
L	20	274.83	0.17	262.94	1.54
L	30	278.25	3.11	259.51	2.57
L	40	276.52	0.90	253.75	1.30
L	50	274.54	0.90	248.29	1.18
L	60	268.75	1.51	245.19	1.48
L	70	257.19	1.99	241.56	1.74
Q	0	268.74	2.37	274.27	-
Q	10	268.05	1.72	272.45	1.22
Q	20	267.04	1.40	271.17	0.03
Q	30	267.94	1.50	269.90	1.75
Q	40	265.07	1.69	267.17	1.48
Q	50	261.71	1.61	262.19	0.20
Q	60	257.49	1.56	256.38	1.70
Q	70	254.59	1.15	250.09	1.07

**Soil Moisture Data (%)**

0-0.50 cm	0-2.5 cm	2.5-5 cm	5-10 cm
6.52	7.80	8.59	5.67

**Soil Temperature Data (C)**

Ambient	2.5 cm	1.25 cm	2.50 cm	7.50 cm	15.0 cm	18.8 cm
17.0	18.0	15.70	16.20	16.80	19.30	-

Date: 9/11/80

Time: 0926-1005

Plot No.: 31

Field: Corn (perp)

Freq.	Angle	Average A.T. (V)	Standard Dev. (V)	Average A.T. (H)	Standard Dev. (H)
C	0	277.43	-	274.36	-
C	10	277.94	0.70	273.71	-
C	20	280.09	-	273.92	0.74
C	30	282.91	0.49	272.96	0.46
C	40	286.07	-	275.08	-
C	50	286.82	1.12	274.18	-
C	60	286.50	-	273.90	0.53
C	70	279.05	1.34	267.34	-
L	0	281.08	1.45	276.83	1.59
L	10	277.69	2.05	268.91	1.68
L	20	276.95	2.16	262.83	1.67
L	30	276.70	0.95	253.92	1.37
L	40	277.28	1.42	247.42	1.32
L	50	274.62	1.15	244.45	1.37
L	60	269.28	1.07	235.94	1.81
L	70	258.32	1.61	222.38	1.47
Q	0	278.72	1.34	283.60	1.02
Q	10	280.58	2.04	285.03	-
Q	20	280.74	1.37	284.89	-
Q	30	280.44	1.47	283.55	1.63
Q	40	282.01	0.99	282.80	-
Q	50	282.68	2.22	282.79	0.65
Q	60	282.78	1.89	282.50	1.56
Q	70	278.15	1.60	278.05	1.17

**Soil Moisture Data (%)**

0-0.50 cm	0-2.5 cm	2.5-5 cm	5-10 cm
5.41	7.05	7.63	6.35

**Soil Temperature Data (C)**

Ambient	2.5 cm	1.25 cm	2.50 cm	7.50 cm	15.0 cm	18.8 cm
18.8	19.5	15.60	15.40	15.70	18.30	-

Date: 9/11/80

Time: 1044-1115

Plot No.: 31

Field: Corn (|||)

Freq.	Angle	Average A.T. (V)	Standard Dev. (V)	Average A.T. (H)	Standard Dev. (H)
C	0	279.65	-	267.81	1.18
C	10	279.26	0.72	278.00	-
C	20	280.36	0.68	277.44	0.71
C	30	283.06	-	275.80	-
C	40	285.23	1.49	273.81	1.15
C	50	287.37	-	270.54	-
C	60	287.03	-	268.03	1.38
C	70	281.21	0.69	264.90	-
L	0	279.83	1.52	281.48	1.44
L	10	279.14	-	276.78	1.55
L	20	281.78	0.44	272.52	1.84
L	30	281.62	-	265.48	1.98
L	40	280.96	0.79	258.06	1.48
L	50	279.73	1.45	246.86	1.49
L	60	277.25	1.92	238.17	1.41
L	70	266.56	0.43	232.21	1.10
Q	0	277.50	0.80	279.55	0.52
Q	10	277.04	-	279.11	-
Q	20	280.66	0.69	280.77	-
Q	30	281.52	1.97	280.01	1.14
Q	40	279.94	-	276.42	-
Q	50	278.77	1.41	273.83	-
Q	60	279.08	1.60	272.72	1.02
Q	70	277.75	1.94	269.75	0.73

**Soil Moisture Data (%)**

0-0.50 cm	0-2.5 cm	2.5-5 cm	5-10 cm
6.70	7.64	8.52	6.58

**Soil Temperature Data (C)**

Ambient	2.5 cm	1.25 cm	2.50 cm	7.50 cm	15.0 cm	18.8 cm
27.4	28.0	24.70	23.20	20.60	19.00	-

Date: 9/11/80

Time: 1339-1410

Plot No.: 54

Field: Tall Grass

Freq.	Angle	Average A.T. (V)	Standard Dev. (V)	Average A.T. (H)	Standard Dev. (H)
C	0	274.12	0.39	273.75	-
C	10	272.22	1.32	270.15	0.58
C	20	276.23	1.21	271.19	-
C	30	281.11	-	267.63	1.17
C	40	284.31	1.29	265.00	1.12

C	50	287.25	1.24	260.49	-
C	60	288.77	1.11	256.36	0.41
C	70	285.05	-	248.01	1.22
L	0	258.50	1.92	258.15	2.37
L	10	255.38	0.73	250.46	1.88
L	20	253.79	1.95	241.94	1.76
L	30	258.92	1.54	232.71	1.63
L	40	257.51	1.25	222.33	1.73
L	50	261.47	-	212.19	1.90
L	60	258.50	2.03	194.31	1.67
L	70	238.03	1.62	171.51	1.32
Q	0	292.74	1.90	293.59	-
Q	10	-	-	-	-
Q	20	294.10	0.99	294.17	-
Q	30	293.13	1.52	292.18	-
Q	40	290.62	0.79	287.85	-
Q	50	290.83	1.69	287.05	0.95
Q	60	289.09	0.67	284.45	1.78
Q	70	286.56	1.51	280.61	1.09

**Soil Moisture Data (%)**

0-0.50 cm	0-2.5 cm	2.5-5 cm	5-10 cm
-	14.27	14.39	13.33

**Soil Temperature Data (C)**

Ambient	0-0.50 cm	1.25 cm	2.50 cm	7.50 cm	15.0 cm	18.8 cm
27.3	27.0	24.80	24.10	23.30	23.40	-

Date: 9/11/80

Time: 1425-1458

Plot No.: 44

Field: Short Grass

Freq.	Angle	Average A.T. (V)	Standard Dev. (V)	Average A.T. (H)	Standard Dev. (H)
C	0	290.28	1.00	289.21	1.32
C	10	288.42	-	285.66	-
C	20	289.08	-	284.84	-
C	30	290.20	1.37	283.66	-
C	40	291.17	-	281.92	-
C	50	291.06	1.30	277.98	1.30
C	60	288.78	1.10	274.80	0.67
C	70	277.77	-	269.32	-
L	0	273.61	1.40	274.22	1.70
L	10	267.94	0.42	266.20	1.35
L	20	268.96	1.41	262.93	2.07
L	30	269.37	1.24	256.34	2.15
L	40	268.32	1.75	247.86	2.27
L	50	266.27	1.16	232.59	1.53
L	60	258.72	1.58	207.61	1.96
L	70	235.00	0.91	169.74	1.53
1	0	294.72	-	297.90	-
Q	10	294.52	2.14	296.53	1.14
Q	20	293.00	0.95	295.66	1.68
Q	30	294.52	1.24	295.72	0.74
Q	40	293.29	1.38	293.37	-
Q	50	292.19	1.44	290.92	-
Q	60	289.82	1.87	287.95	0.37
Q	70	285.69	0.87	282.74	1.65

**Soil Moisture Data (%)**

0-0.50 cm	0-2.5 cm	2.5-5 cm	5-10 cm
-	7.45	6.91	6.39

**Soil Temperature Data (C)**

Ambient	2.5 cm	1.25 cm	2.50 cm	7.50 cm	15.0 cm	18.8 cm
28.0	29.3	26.20	25.10	24.20	23.10	-

Date: 9/16/80

Time: 0801-0833

Plot No.: 63

Field: Soybean (||)

Freq.	Angle	Average A.T. (V)	Standard Dev. (V)	Average A.T. (H)	Standard Dev. (H)
C	0	270.91	-	270.31	1.65
C	10	274.26	-	270.54	-
C	20	274.15	1.13	270.04	-
C	30	274.14	0.68	269.72	0.43
C	40	272.52	-	267.64	-
C	50	275.16	1.83	266.60	1.07
C	60	269.03	1.41	262.70	1.28
C	70	264.34	-	257.85	-
L	0	283.47	1.54	284.27	1.66
L	10	282.55	1.45	282.19	2.21
L	20	282.89	1.57	279.92	1.64
L	30	282.09	1.48	276.05	1.30
L	40	281.11	0.81	272.80	1.69
L	50	277.61	1.50	269.20	1.47
L	60	272.82	1.24	264.47	1.55
L	70	262.09	0.84	256.44	1.66
Q	0	254.44	-	259.66	-
Q	10	253.78	1.11	257.55	1.73
Q	20	253.88	1.96	257.47	1.97
Q	30	253.01	1.44	255.91	1.19
Q	40	253.37	1.91	253.57	1.25
Q	50	252.42	1.47	250.08	0.21
Q	60	252.77	1.43	248.11	-
Q	70	251.60	1.59	244.54	0.33

**Soil Moisture Data (%)**

0-0.50 cm	0-2.5 cm	2.5-5 cm	5-10 cm
2.41	4.20	5.49	5.69

**Soil Temperature Data (C)**

Ambient	0-0.50 cm	1.25 cm	2.50 cm	7.50 cm	15.0 cm	18.8 cm
15.0	15.8	14.80	15.90	17.10	18.90	-

Date: 9/16/80

Time: 0955-1025

Plot No.: 63

Field: Soybean (perp)

Freq.	Angle	Average A.T. (V)	Standard Dev. (V)	Average A.T. (H)	Standard Dev. (H)
C	0	284.69	0.90	281.34	0.32
C	10	284.86	1.39	281.45	1.32
C	20	284.62	1.05	280.77	0.42
C	30	284.18	0.82	280.99	-

C	40	283.52	-	280.11	0.28
C	50	281.83	0.41	278.86	-
C	60	278.90	0.80	275.87	0.54
C	70	270.37	1.54	267.59	0.83
L	0	288.80	1.32	287.66	1.97
L	10	287.75	2.23	285.21	1.60
L	20	287.06	2.02	282.56	1.80
L	30	287.30	1.65	280.08	0.63
L	40	285.27	1.34	276.63	2.07
L	50	281.77	-	269.27	1.15
L	60	276.02	-	262.20	1.63
L	70	265.10	2.22	254.69	2.14
Q	0	278.63	1.79	280.50	-
Q	10	278.16	1.43	279.54	1.18
Q	20	277.77	1.92	277.70	-
Q	30	278.77	2.06	278.52	1.32
Q	40	277.82	1.60	276.27	0.72
Q	50	275.19	1.89	273.17	0.90
Q	60	275.34	1.64	273.25	-
Q	70	272.50	1.26	268.47	1.53

**Soil Moisture Data (%)**

0-0.50 cm	0-2.5 cm	2.5-5 cm	5-10 cm
1.70	2.97	4.86	4.80

**Soil Temperature Data (C)**

Ambient	0-0.50 cm	1.25 cm	2.50 cm	7.50 cm	15.0 cm	18.8 cm
22.9	26.5	20.90	19.90	19.40	20.80	-

Date: 9/16/80

Time: 1026-1100

Plot No.: 31

Field: Corn (perp)

Freq.	Angle	Average	Standard	Average	Standard
		A.T. (V)	Dev. (V)	A.T. (H)	Dev. (H)
C	0	283.96	-	279.25	1.09
C	10	285.15	0.83	280.88	-
C	20	287.06	-	281.00	-
C	30	289.22	0.46	280.89	1.65
C	40	291.42	2.81	281.24	2.04
C	50	290.59	-	278.67	0.25
C	60	288.17	-	275.75	-
C	70	280.97	0.37	270.70	1.40
L	0	286.89	1.96	284.36	1.40
L	10	285.84	1.02	281.79	1.81
L	20	286.10	1.63	278.37	2.17
L	30	284.50	1.66	272.89	2.18
L	40	280.99	0.87	265.90	1.30
L	50	277.06	0.89	256.60	1.69
L	60	268.19	1.43	242.49	1.32
L	70	259.87	1.84	229.33	1.71
Q	0	280.25	1.68	280.57	1.25
Q	10	279.78	1.77	279.80	-
Q	20	280.64	1.91	279.60	0.84
Q	30	282.93	1.20	279.68	1.01
Q	40	284.40	1.81	279.05	1.46
Q	50	286.13	1.09	279.39	-
Q	60	284.25	1.75	278.43	1.13

Q	70	280.95	1.99	275.31	1.06
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**Soil Moisture Data (%)**

0-0.50 cm	0-2.5 cm	2.5-5 cm	5-10 cm
1.17	3.01	4.55	4.61

**Soil Temperature Data (C)**

Ambient	0-0.50 cm	1.25 cm	2.50 cm	7.50 cm	15.0 cm	18.8 cm
21.5	23.8	20.50	19.10	18.30	19.20	-

**Date: 9/16/80**
**Time: 1122-1155**
**Plot No.: 31**
**Field: Corn (II)**

Freq.	Angle	Average A.T. (V)	Standard Dev. (V)	Average A.T. (H)	Standard Dev. (H)
C	0	287.27	-	285.73	0.75
C	10	286.91	0.90	284.77	1.38
C	20	288.04	-	284.21	-
C	30	289.80	-	282.91	-
C	40	290.46	-	280.47	0.75
C	50	290.96	0.67	277.07	0.58
C	60	288.75	1.18	273.24	0.71
C	70	281.66	-	268.13	-
L	0	288.31	0.43	289.18	1.76
L	10	287.22	1.62	284.71	1.95
L	20	288.03	0.27	280.15	1.83
L	30	286.83	2.10	275.23	1.77
L	40	285.14	0.60	269.83	1.85
L	50	282.15	1.51	260.58	1.27
L	60	277.83	1.33	250.51	1.64
L	70	270.44	4.15	238.49	1.09
Q	0	287.70	1.84	287.92	0.84
Q	10	288.88	1.24	288.14	0.93
Q	20	289.81	1.72	287.79	1.81
Q	30	289.50	1.77	284.50	0.89
Q	40	290.98	-	282.39	1.56
Q	50	287.27	1.21	278.63	1.12
Q	60	287.27	1.70	278.63	1.28
Q	70	283.18	-	271.10	0.84

**Soil Moisture Data (%)**

0-0.50 cm	0-2.5 cm	2.5-5 cm	5-10 cm
1.36	3.13	5.63	5.85

**Soil Temperature Data (C)**

Ambient	0-0.50 cm	1.25 cm	2.50 cm	7.50 cm	15.0 cm	18.8 cm
24.5	27.3	23.90	21.80	20.40	21.00	-

**Date: 9/16/80**
**Time: 1405-1435**
**Plot No.: 54**
**Field: Tall Grass**

Freq.	Angle	Average A.T. (V)	Standard Dev. (V)	Average A.T. (H)	Standard Dev. (H)
C	0	284.74	1.39	283.98	0.71
C	10	285.96	-	283.80	0.60
C	20	286.66	1.67	281.79	-

C	30	289.24	-	280.37	-
C	40	291.05	1.00	277.48	0.71
C	50	292.88	1.16	273.77	-
C	60	291.70	-	267.65	0.57
C	70	284.26	1.38	258.30	0.52
L	0	272.24	1.93	271.25	1.84
L	10	273.10	1.51	271.01	1.68
L	20	270.03	1.34	261.92	1.48
L	30	268.72	0.94	250.41	1.46
L	40	270.56	1.75	244.87	2.00
L	50	269.56	1.84	228.99	1.71
L	60	263.37	0.78	214.24	1.56
L	70	243.99	1.54	190.30	1.43
Q	0	290.17	-	290.35	1.08
Q	10	291.31	1.86	291.13	1.41
Q	20	289.43	0.91	289.31	-
Q	30	289.17	2.18	287.46	1.28
Q	40	291.76	1.76	286.13	0.17
Q	50	291.60	1.41	286.65	1.26
Q	60	287.93	1.91	283.01	1.26
Q	70	282.79	1.51	276.76	1.14

**Soil Moisture Data (%)**

0-0.50 cm	0-2.5 cm	2.5-5 cm	5-10 cm
-	10.20	10.68	11.49

**Soil Temperature Data (C)**

Ambient	2.5 cm	1.25 cm	2.50 cm	7.50 cm	15.0 cm	18.8 cm
32.0	35.0	25.60	23.30	22.20	22.50	-

Date: 9/16/80

Time: 1446-1525

Plot No.: 44

Field: Short Grass

Freq.	Angle	Average A.T. (V)	Standard Dev. (V)	Average A.T. (H)	Standard Dev. (H)
C	0	290.68	1.45	287.54	0.47
C	10	289.95	0.66	286.70	0.93
C	20	290.00	-	286.13	0.93
C	30	294.95	-	284.91	-
C	40	291.53	1.33	284.60	1.63
C	50	290.98	0.71	282.47	1.09
C	60	288.69	-	279.79	1.49
C	70	278.60	-	270.43	0.62
L	0	291.18	1.48	292.44	1.88
L	10	286.81	1.69	286.33	1.95
L	20	285.29	1.42	282.06	1.47
L	30	284.69	2.10	276.45	1.95
L	40	282.83	1.11	269.79	1.87
L	50	279.62	1.23	258.15	1.65
L	60	269.86	1.14	237.56	1.77
L	70	245.48	1.04	202.11	1.68
Q	0	287.95	0.88	287.22	1.34
Q	10	288.51	1.68	287.51	1.49
Q	20	287.25	1.08	286.82	1.40
Q	30	286.87	2.32	285.59	-
Q	40	285.36	2.23	282.98	0.20
Q	50	286.62	1.53	282.14	0.49

Q	60	283.97	1.87	278.16	1.42
Q	70	277.17	1.75	271.72	1.54

**Soil Moisture Data (%)**

0-0.50 cm	0-2.5 cm	2.5-5 cm	5-10 cm
3.98	4.80	4.70	

**Soil Temperature Data (C)**

Ambient	+2.5 cm	1.25 cm	2.50 cm	7.50 cm	15.0 cm	18.8 cm
26.8	26.5	26.10	24.90	23.80	24.10	-

Date: 9/17/80

Plot No.: 63

Time: 0749-0835

Field: Soybean (||)

Freq.	Angle	Average A.T. (V)	Standard Dev. (V)	Average A.T. (H)	Standard Dev. (H)
C	0	283.63	0.99	281.07	-
C	10	283.17	1.37	280.61	1.31
C	20	282.94	1.67	279.86	0.71
C	30	282.44	-	278.43	-
C	40	281.34	-	276.90	-
C	50	280.06	-	275.19	-
C	60	277.38	0.97	272.23	1.21
C	70	0.27	-	267.10	0.63
L	0	290.10	1.62	291.65	1.68
L	10	287.05	1.17	287.78	2.12
L	20	289.07	1.90	284.60	1.88
L	30	287.96	-	284.46	-
L	40	286.07	1.22	278.04	1.91
L	50	283.96	1.26	274.25	1.67
L	60	279.78	0.89	270.17	1.87
L	70	269.96	1.37	264.59	1.56
Q	0	278.24	1.25	278.22	-
Q	10	277.33	1.18	277.46	1.28
Q	20	273.54	2.05	272.89	0.98
Q	30	272.34	1.69	270.15	1.79
Q	40	272.29	1.83	267.20	-
Q	50	273.78	1.69	266.73	1.15
Q	60	270.52	1.75	261.27	1.38
Q	70	270.89	1.47	257.76	-

**Soil Moisture Data (%)**

0-0.50 cm	0-2.5 cm	2.5-5 cm	5-10 cm
2.76	3.80	5.06	5.60

**Soil Temperature Data (C)**

Ambient	+ 2.5 cm	1.25 cm	2.50 cm	7.50 cm	15.0 cm	18.8 cm
21.4	22.0	20.50	20.30	20.10	19.90	-

Date: 9/17/80

Plot No.: 63

Time: 0956-1030

Field: Soybean (perp)

Freq.	Angle	Average A.T. (V)	Standard Dev. (V)	Average A.T. (H)	Standard Dev. (H)
C	0	288.34	0.53	285.51	-
C	10	-	-	-	-

C	20	286.02	1.37	283.34	0.73
C	30	284.76	-	281.90	0.61
C	40	282.25	-	280.38	-
C	50	281.46	2.04	277.29	-
C	60	278.50	1.52	274.39	-
C	70	271.60	0.77	267.58	-
L	0	295.24	0.45	294.20	1.08
L	10	294.40	2.16	290.70	2.09
L	20	292.23	1.90	287.93	1.62
L	30	290.19	0.92	283.93	1.02
L	40	286.49	-	281.14	-
L	50	284.08	1.52	272.40	0.76
L	60	279.08	1.07	266.49	2.05
L	70	268.45	-	262.15	1.63
Q	0	281.37	1.46	281.42	0.46
Q	10	278.22	2.27	278.62	-
Q	20	276.13	1.48	274.86	-
Q	30	272.68	1.58	270.32	0.82
Q	40	270.31	-	268.18	-
Q	50	272.82	0.70	267.77	1.03
Q	60	273.98	1.77	267.63	1.15
Q	70	273.15	1.83	265.61	1.54

**Soil Moisture Data (%)**

0-0.50 cm	0-2.5 cm	2.5-5 cm	5-10 cm
1.52	3.28	4.81	4.82

**Soil Temperature Data (C)**

Ambient	+ 2.5 cm	1.25 cm	2.50 cm	7.50 cm	15.0 cm	18.8 cm
26.5	27.3	23.10	21.90	21.20	21.60	-

Date: 9/17/80

Plot No.: 31

Time: 1034-1110

Field: Corn (perp)

Freq.	Angle,	Average A.T. (V)	Standard Dev. (V)	Average A.T. (H)	Standard Dev. (H)
C	0	288.48	-	286.69	-
C	10	290.23	-	286.56	1.67
C	20	292.28	0.91	286.54	1.03
C	30	293.91	0.67	285.28	-
C	40	295.38	-	284.07	-
C	50	295.62	0.59	282.39	-
C	60	295.30	-	282.00	0.83
C	70	288.63	-	277.61	0.78
L	0	290.80	1.56	289.39	2.18
L	10	288.98	1.76	285.39	1.54
L	20	289.48	0.83	282.23	1.50
L	30	287.98	1.91	276.79	1.57
L	40	285.87	1.43	268.88	1.45
L	50	285.43	2.96	260.45	2.16
L	60	277.14	1.49	248.01	1.44
L	70	268.56	1.63	235.52	1.58
Q	0	293.98	2.04	293.57	-
Q	10	296.37	1.81	295.24	1.87
Q	20	295.72	1.55	293.91	-
Q	30	297.90	2.11	293.36	1.15
Q	40	296.61	-	291.23	1.45

Q	50	296.25	2.00	289.31	0.53
Q	60	294.69	-	287.32	1.33
Q	70	292.82	-	286.57	1.30

**Soil Moisture Data (%)**

0-0.50 cm	0-2.5 cm	2.5-5 cm	5-10 cm
1.38	2.30	4.39	3.99

**Soil Temperature Data (C)**

Ambient	0-0.50 cm	1.25 cm	2.50 cm	7.50 cm	15.0 cm	18.8 cm
28.3	29.3	26.40	23.20	21.50	21.60	-

Date: 9/17/80

Time: 1127-1100

Plot No.: 31

Field: Corn (||)

Freq.	Angle	Average	Standard	Average	Standard
		A.T. (V)	Dev. (V)	A.T. (H)	Dev. (H)
C	0	290.62	-	290.25	-
C	10	290.49	0.11	288.53	-
C	20	291.60	-	288.26	-
C	30	293.09	0.55	286.09	-
C	40	294.07	-	283.25	1.32
C	50	295.03	0.41	279.51	-
C	60	292.62	-	274.59	1.12
C	70	285.95	0.82	268.87	0.85
L	0	292.15	0.97	292.81	2.24
L	10	291.34	1.92	289.44	2.29
L	20	292.18	1.64	285.73	1.71
L	30	290.14	1.75	279.41	1.22
L	40	288.86	2.28	274.81	2.74
L	50	286.16	0.82	265.80	2.18
L	60	281.95	1.17	254.98	1.68
L	70	271.37	1.80	244.51	1.61
Q	0	293.60	1.65	292.75	1.89
Q	10	295.12	0.68	292.85	1.42
Q	20	297.89	-	293.29	1.34
Q	30	297.99	1.63	292.70	-
Q	40	296.01	0.89	288.40	1.00
Q	50	291.23	1.38	279.68	1.63
Q	60	288.85	1.62	276.72	1.03
Q	70	289.24	2.33	277.35	1.42

**Soil Moisture Data (%)**

0-0.50 cm	0-2.5 cm	2.5-5 cm	5-10 cm
1.51	2.20	5.18	5.66

**Soil Temperature Data (C)**

Ambient	+ 2.5 cm	1.25 cm	2.50 cm	7.50 cm	15.0 cm	18.8 cm
29.8	30.5	27.60	25.40	22.80	22.50	-

Date: 9/17/80

Time: 1459-1528

Plot No.: 54

Field: Tall Grass

Freq.	Angle	Average	Standard	Average	Standard
		A.T. (V)	Dev. (V)	A.T. (H)	Dev. (H)
C	0	290.01	-	287.14	0.35

C	10	289.17	-	287.81	-
C	20	288.63	-	285.47	-
C	30	291.16	0.86	283.53	-
C	40	293.12	0.94	284.13	1.29
C	50	295.52	1.06	274.95	-
C	60	296.30	0.86	270.79	0.43
C	70	291.72	-	260.68	1.27
L	0	283.72	-	281.44	2.01
L	10	274.18	1.47	269.67	1.40
L	20	276.03	1.55	268.17	1.74
L	30	271.30	1.35	254.28	1.97
L	40	272.02	1.03	246.96	1.31
L	50	268.42	-	228.86	1.89
L	60	264.03	1.06	214.24	1.42
L	70	244.44	1.49	189.77	1.52
Q	0	293.03	2.19	294.43	1.71
Q	10	300.03	1.66	297.15	0.69
Q	20	301.87	2.21	297.39	-
Q	30	302.26	0.37	296.22	-
Q	40	300.77	1.47	292.81	-
Q	50	299.95	1.03	292.13	-
Q	60	297.60	1.77	289.88	-
Q	70	295.71	1.72	286.39	0.50

**Soil Moisture Data (%)**

0-0.50 cm	0-2.5 cm	2.5-5 cm	5-10 cm
		9.32	11.21

**Soil Temperature Data (C)**

Ambient	+2.5 cm	1.25 cm	2.50 cm	7.50 cm	15.0 cm	18.8 cm
32.5	34.5	31.20	27.10	25.10	24.80	-

Date: 9/18/80

Time: 0744-0818

Plot No.: 63

Field: Soybean (II)

Freq.	Angle	Average A.T. (V)	Standard Dev. (V)	Average A.T. (H)	Standard Dev. (H)
C	0	282.41	-	277.82	-
C	10	281.69	1.11	277.41	0.29
C	20	281.72	1.37	276.92	-
C	30	281.24	1.64	275.79	-
C	40	280.36	1.11	274.83	0.84
C	50	278.23	0.66	272.33	-
C	60	275.29	0.91	268.38	-
C	70	270.36	-	263.56	1.48
L	0	287.37	1.84	288.68	2.20
L	10	286.39	1.22	285.62	1.76
L	20	288.68	2.47	283.80	1.69
L	30	288.02	1.23	281.16	1.91
L	40	286.15	0.67	278.44	2.15
L	50	282.66	1.60	274.54	2.39
L	60	278.68	1.11	269.38	1.77
L	70	267.40	1.93	265.34	1.40
Q	0	275.95	1.48	274.56	0.78
Q	10	273.59	2.28	272.95	0.79
Q	20	273.01	1.49	270.78	-
Q	30	274.26	1.59	268.87	1.09

Q	40	274.03	1.32	266.65	-
Q	50	275.01	2.14	265.82	1.62
Q	60	273.51	1.80	261.59	-
Q	70	271.02	2.12	256.05	-

**Soil Moisture Data (%)**

0-0.50 cm	0-2.5 cm	2.5-5 cm	5-10 cm
5.19	5.46	5.85	6.21

**Soil Temperature Data (C)**

Ambient	0-0.50 cm	1.25 cm	2.50 cm	7.50 cm	15.0 cm	18.8 cm
20.3	20.5	19.80	20.60	21.00	20.90	-

Date: 9/18/80

Time: 0934-1008

Plot No.: 63

Field: Soybean (perp)

Freq.	Angle	Average	Standard	Average	Standard
		A.T. (V)	Dev. (V)	A.T. (H)	Dev. (H)
C	0	283.62	0.75	280.11	1.12
C	10	283.42	-	279.87	1.23
C	20	283.11	1.26	279.25	-
C	30	282.74	0.11	278.60	0.47
C	40	281.07	1.14	277.21	0.46
C	50	279.64	0.58	275.24	0.80
C	60	276.69	0.80	271.82	1.14
C	70	267.67	1.00	263.09	-
L	0	288.73	1.32	288.63	1.72
L	10	287.37	1.31	285.24	1.54
L	20	287.98	2.05	282.89	1.90
L	30	286.93	1.73	280.57	1.34
L	40	284.92	0.96	277.88	1.96
L	50	281.25	2.07	270.30	1.53
L	60	275.53	1.75	263.60	1.77
L	70	265.24	0.98	257.78	1.63
Q	0	274.68	1.95	272.37	1.26
Q	10	272.74	1.99	271.44	0.90
Q	20	272.14	1.52	270.53	1.61
Q	30	270.32	2.62	267.76	1.04
Q	40	271.79	1.10	267.73	0.69
Q	50	270.86	0.79	264.67	-
Q	60	270.14	1.48	262.14	1.09
Q	70	268.70	1.50	258.85	1.70

**Soil Moisture Data (%)**

0-0.50 cm	0-2.5 cm	2.5-5 cm	5-10 cm
3.37	5.16	5.25	5.52

**Soil Temperature Data (C)**

Ambient	0-0.50 cm	1.25 cm	2.50 cm	7.50 cm	15.0 cm	18.8 cm
22.5	23.5	21.60	21.60	21.70	22.10	-

Date: 9/18/80

Time: 1010-1640

Plot No.: 31

Field: Corn (perp)

Freq.	Angle	Average	Standard	Average	Standard

		A.T. (V)	Dev. (V)	A.T. (H)	Dev. (H)
C	0	282.25	-	278.83	-
C	10	284.10	1.40	279.45	0.93
C	20	286.24	1.21	279.33	0.86
C	30	288.81	-	278.82	-
C	40	290.83	0.95	277.66	1.53
C	50	291.80	-	276.30	-
C	60	290.91	0.50	276.76	0.97
C	70	283.73	-	271.90	0.75
L	0	285.67	1.79	285.61	1.02
L	10	285.69	1.57	282.45	1.94
L	20	286.15	1.35	279.64	1.69
L	30	285.28	-	273.82	0.70
L	40	283.40	1.47	266.73	2.31
L	50	278.89	1.23	256.01	1.85
L	60	273.54	1.66	246.90	1.76
L	70	262.69	-	234.25	1.88
Q	0	293.58	2.07	293.83	1.67
Q	10	292.82	1.72	292.63	-
Q	20	292.68	1.37	292.00	0.67
Q	30	296.43	1.82	292.21	0.70
Q	40	296.59	0.99	292.58	1.62
Q	50	295.79	1.45	290.96	1.77
Q	60	295.46	1.85	290.22	1.87
Q	70	294.05	1.26	290.44	1.45

#### Soil Moisture Data (%)

0-0.50 cm	0-2.5 cm	2.5-5 cm	5-10 cm
4.34	3.94	4.59	5.26

#### Soil Temperature Data (C)

Ambient	+2.5 cm	1.25 cm	2.50 cm	7.50 cm	15.0 cm	18.8 cm
23.50	25.00	22.30	21.50	21.10	21.70	-

Date: 9/18/80

Time: 1101-1135

Plot No.: 31

Field: Corn

Freq.	Angle	Average A.T. (V)	Standard Dev. (V)	Average A.T. (H)	Standard Dev. (H)
C	0	285.06	2.04	283.67	2.05
C	10	285.07	-	282.92	-
C	20	286.33	0.97	281.13	-
C	30	288.62	-	280.04	1.51
C	40	290.72	0.27	276.96	0.38
C	50	292.34	-	273.60	0.30
C	60	291.47	-	270.15	0.97
C	70	286.22	0.42	267.23	-
L	0	288.63	1.86	289.95	1.28
L	10	287.19	1.37	286.87	1.39
L	20	288.03	1.60	283.34	3.14
L	30	287.31	1.38	276.75	2.22
L	40	286.26	-	271.94	1.87
L	50	284.32	0.78	263.52	1.22
L	60	280.10	0.40	254.33	2.12
L	70	270.88	1.72	243.68	1.80
Q	0	291.77	1.51	289.83	1.66
Q	10	294.15	1.61	291.09	0.70

Q	20	297.18	-	293.43	1.19
Q	30	298.11	-	292.23	1.37
Q	40	295.86	1.57	288.11	1.45
Q	50	296.65	2.13	284.68	-
Q	60	295.46	2.09	282.61	-
Q	70	291.24	-	279.79	1.07

**Soil Moisture Data (%)**

0-0.50 cm	0-2.5 cm	2.5-5 cm	5-10cm
4.02	4.44	4.83	4.72

**Soil Temperature Data (C)**

Ambient	0-0.50 cm	1.25 cm	2.50 cm	7.50 cm	10 cm	18.8 cm
28.0	28.0	25.90	24.40	22.50	23.10	-

Date: 9/18/80

Plot No.: 54

Time: 1350-1440

Field: Tall Grass

Freq.	Angle	Average	Standard	Average	Standard
		A.T. (V)	Dev. (V)	A.T. (H)	Dev. (H)
C	0	282.87	-	280.95	0.56
C	10	283.18	-	279.80	-
C	20	285.94	0.34	280.09	-
C	30	287.47	1.35	276.56	0.88
C	40	289.35	-	274.24	-
C	50	290.85	-	270.21	1.00
C	60	291.11	1.81	267.45	-
C	70	284.90	1.45	257.42	0.86
L	0	272.20	1.14	271.58	1.12
L	10	270.75	-	268.65	1.84
L	20	274.76	1.09	269.25	1.46
L	30	272.07	1.84	258.96	1.95
L	40	272.03	1.43	250.23	1.97
L	50	270.05	1.23	236.10	1.86
L	60	262.74	1.27	216.23	1.78
L	70	244.32	1.85	192.58	1.78
Q	0	289.17	-	290.21	1.58
Q	10	290.01	1.31	290.91	-
Q	20	289.55	1.73	290.22	0.55
Q	30	288.10	1.27	287.51	1.25
Q	40	290.01	1.98	286.10	0.85
Q	50	289.62	1.24	284.74	1.29
Q	60	287.96	1.90	283.85	1.03
Q	70	282.83	2.09	278.48	1.59

**Soil Moisture Data (%)**

0-0.50 cm	0-2.5 cm	2.5-5 cm	5-10 cm
8.71	11.70	11.71	

**Soil Temperature Data (C)**

Ambient	0-0.50 cm	1.25 cm	2.50 cm	7.50 cm	15.0 cm	18.8 cm
27.0	28.8	24.40	23.60	23.20	24.10	-

Date: 9/23/80

Plot No.: 63

Time: 0858-0927

Field: Soybean(||)

Freq.	Angle	Average A.T. (V)	Standard Dev. (V)	Average A.T. (H)	Standard Dev. (H)
C	0	285.14	-	282.01	1.36
C	10	284.79	1.01	281.44	-
C	20	284.50	-	280.70	1.09
C	30	283.87	0.18	279.71	-
C	40	283.03	-	278.74	0.20
C	50	281.20	-	276.52	-
C	60	279.19	-	273.04	-
C	70	274.04	-	268.09	-
L	0	294.99	0.81	296.56	2.74
L	10	294.23	1.13	298.77	12.31
L	20	294.57	1.69	291.89	1.59
L	30	292.38	1.10	287.10	1.98
L	40	290.65	1.23	284.75	1.79
L	50	287.88	1.41	279.78	1.64
L	60	283.45	1.98	274.65	1.93
L	70	274.68	1.86	270.56	2.29
Q	0	287.40	1.64	287.64	-
Q	10	286.43	2.02	286.68	1.42
Q	20	287.55	1.05	287.05	1.36
Q	30	286.06	1.70	285.27	1.46
Q	40	285.19	1.11	282.62	-
Q	50	282.33	1.50	277.48	1.84
Q	60	281.13	1.39	274.93	1.46
Q	70	279.98	0.97	269.89	1.50

**Soil Moisture Data (%)**

0-0.50 cm	0-2.5 cm	2.5-5 cm	5-10 cm
2.10	2.34	3.65	4.83

**Soil Temperature Data (C)**

Ambient	+2.5 cm	1.25 cm	2.50 cm	7.50 cm	15.0 cm	18.8 cm
25.5	26.0	23.70	23.40	24.30	24.20	-

Date: 9/23/80

Time: 1031-1105

Plot No.: 63

Field: Soybean (perp)

Freq.	Angle	Average A.T. (V)	Standard Dev. (V)	Average A.T. (H)	Standard Dev. (H)
C	0	290.01	0.74	288.21	0.83
C	10	290.45	0.53	288.28	0.68
C	20	291.25	-	288.41	-
C	30	290.36	-	288.16	1.49
C	40	290.16	1.56	288.04	-
C	50	287.68	1.75	285.44	0.87
C	60	283.85	-	281.06	0.28
C	70	273.95	0.71	271.33	0.77
L	0	293.83	0.55	293.24	2.27
L	10	291.99	1.20	289.85	2.62
L	20	292.16	2.00	288.34	-
L	30	291.64	1.90	286.22	1.38
L	40	290.07	1.30	283.48	2.41
L	50	286.28	1.57	276.13	1.69
L	60	281.91	1.92	269.92	1.46
L	70	271.39	1.82	262.51	1.40
Q	0	279.27	1.79	278.96	0.47

Q	10	278.95	2.04	278.08	0.72
Q	20	284.58	2.00	282.76	-
Q	30	281.36	1.95	278.04	-
Q	40	282.68	1.56	277.76	1.11
Q	50	283.32	1.46	276.79	-
Q	60	282.04	-	273.71	-
Q	70	278.03	2.09	268.56	1.42

**Soil Moisture Data (%)**

0-0.50 cm	0-2.5 cm	2.5-5 cm	5-10 cm
1.38	2.67	4.05	4.80

**Soil Temperature Data (C)**

Ambient	+ 2.5 cm	1.25 cm	2.50 cm	7.50 cm	15.0 cm	18.8 cm
29.5	30.0	26.90	25.00	23.70	24.40	-

Date: 9/23/80

Plot No.: 31

Time: 1108-1440

Field: Corn (perp)

Freq.	Angle	Average	Standard	Average	Standard
		A.T. (V)	Dev. (V)	A.T. (H)	Dev. (H)
C	0	290.74	0.74	288.55	1.04
C	10	291.80	1.30	288.00	1.33
C	20	293.11	0.96	286.17	0.88
C	30	294.53	-	283.66	0.63
C	40	295.32	0.32	281.16	-
C	50	295.63	0.98	278.41	0.67
C	60	293.93	-	275.82	-
C	70	286.19	-	270.57	0.56
L	0	293.03	2.14	289.84	1.21
L	10	290.38	0.80	289.40	2.04
L	20	289.81	1.58	283.77	1.49
L	30	288.03	0.82	277.01	1.08
L	40	284.30	1.19	269.15	0.89
L	50	279.96	1.84	256.70	1.40
L	60	272.39	1.51	244.83	1.81
L	70	260.29	0.85	226.44	1.82
Q	0	297.20	1.44	297.16	1.79
Q	10	295.18	0.97	295.63	1.67
Q	20	295.61	1.34	294.93	0.82
Q	30	297.21	0.80	294.38	1.95
Q	40	297.63	1.85	293.27	-
Q	50	296.64	1.33	290.99	1.64
Q	60	295.73	-	290.13	-
Q	70	277.55	-	276.40	-

**Soil Moisture Data (%)**

0-0.50 cm	0-2.5 cm	2.5-5 cm	5-10 cm
1.01	2.25	3.42	4.74

**Soil Temperature Data (C)**

Ambient	+ 2.5 cm	1.25 cm	2.50 cm	7.50 cm	15.0 cm	18.8 cm
28.5	28.5	26.80	25.30	23.60	24.00	-

Date: 9/23/80

Plot No.: 31

Time: 1422-1453

Field: Corn (||)

Freq.	Angle	Average	Standard	Average	Standard
		A.T. (V)	Dev. (V)	A.T. (H)	Dev. (H)
C	0	292.17	-	291.02	-
C	10	292.16	-	289.91	0.42
C	20	293.00	0.30	288.51	1.54
C	30	294.71	-	286.33	0.61
C	40	296.23	1.36	286.34	-
C	50	297.43	0.99	280.40	0.60
C	60	297.97	0.67	275.62	1.37
C	70	290.19	-	269.19	0.83
L	0	292.79	1.18	292.08	1.47
L	10	291.51	1.83	290.66	2.23
L	20	291.85	1.16	286.04	1.91
L	30	289.61	1.66	280.40	1.31
L	40	287.51	1.60	275.41	2.38
L	50	284.35	0.80	265.87	1.87
L	60	281.09	1.32	254.69	2.14
L	70	271.28	0.56	242.62	1.82
Q	0	293.36	1.92	294.70	1.21
Q	10	295.11	1.86	295.24	0.81
Q	20	295.91	1.49	294.96	1.07
Q	30	297.32	1.46	293.14	1.58
Q	40	298.56	1.07	291.18	1.31
Q	50	299.73	2.02	289.08	-
Q	60	298.26	1.49	283.48	0.96
Q	70	294.88	1.73	280.83	0.31

#### Soil Moisture Data (%)

0-0.50 cm	0-2.5 cm	2.5-5 cm	5-10 cm
1.14	1.55	3.62	5.20

#### Soil Temperature Data (C)

Ambient	+ 2.5 cm	1.25 cm	2.50 cm	7.50 cm	15.0 cm	18.8 cm
30.0	30.8	29.30	28.60	27.50	27.50	-



















































































































































