EVAPORATION FROM BARE SOIL SURFACES AND WATER-USE EFFICIENCY OF GRAIN SORGHUM AS AFFECTED BY PLANTING DATES AND SOIL TYPES

by

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B.Sc. (Agriculture), Louisiana State University, 1975

A MASTER'S THESIS

submitted in partial fulfillment of the

requirements for the degree

MASTER OF SCIENCE

Department of Agronomy

KANSAS STATE UNIVERSITY
Manhattan, Kansas

1977

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Sincere appreciation is extended to Dr. Edward T. Kanemasu, major professor, and Dr. W. L. Powers for their guidance in planning and conducting the investigation, interpreting the data, and preparing the manuscript. Thanks are also expressed to Dr. R. L. Vanderlip, a member of the supervisory committee, for his constructive criticism and suggestions in the preparation of the thesis.

Appreciation is extended to George TenEyck for helping in the experiment at St. John. Special gratitude is extended to Letty Hammerle and to all the other personnel associated with the Evapotranspiration Laboratory who helped in one way or another in preparation of the thesis.

I also wish to thank MARDI (Malaysian Agriculture Research and Development Institute) for financing my studies.

And finally, my most sincere thanks to my parents who wait silently.

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INTRODUCTION

Accurate estimates of soil-water storage capacity, evaporation and transpiration during the growing season are crucial to the solution of improving efficiency of soil-water-crop management practices. The problem of water management is fundamentally one of matching water supply with water requirements of the crop.

During the early stages of the growing season and incomplete cover, water loss to the atmosphere is primarily through evaporation from the soil surface. Evaporation rates can be estimated by knowing the characteristic drying pattern of the specific soil. When the soil surface is wet, evaporation is primarily controlled by the evaporative demand and when the surface is dry, evaporation is limited by the transmitting properties of the soil. Transpiration is dependent upon the energy absorbed and the availability of water. Water stress causes stomatal closure and transpiration rates are reduced. The seasonal amount of energy that is intercepted by the canopy is dependent upon the leaf area index or crop cover.

An evapotranspiration (ET) model, which provides separate estimates of evaporation and transpiration, was developed by the Evapotranspiration Laboratory for use on several crops on a silt loam soil (Kanemasu et al., 1976). To extend the utility of the ET model to other soils in Kansas, the characteristics of their drying curves must be known.

The major purpose of this study is to measure the value of U (the upper limit of the energy-limiting evaporation) and c (the slope of the least square evaporation rate versus time$^{\frac{1}{2}}$ during the soil-limiting stage of evaporation) for 9 Kansas soils; and to estimate the ET of sorghum [Sorghum bicolor (L.) Moench] grown at 3 different planting dates on Muir silty clay loam and a single planting date on Carwile sand using the ET model.

CHAPTER I

EVAPORATION FROM BARE SOIL SURFACES

(A Literature Review)

LITERATURE REVIEW

Evaporation from Soil Surface

The process of evaporation from a water surface takes place when certain molecules moving at a higher velocity than the average leave the active range of the neighboring molecule and form vapor over the water. Mechanism of soil-water evaporation is similar to evaporation from free water since the relative humidity of the soil (relatively free from salts) remains within about 2% of that from free water surface until the soil becomes drier than the wilting percentage (Hide, 1954). Since evaporation is the transfer of matter through space, it is dependent on a driving force and a resistance.

Various procedures have been proposed to calculate evaporative demand. Semi-empirical energy balance and aerodynamic methods have been used with various degrees of success (Penman, 1948; van Bavel, 1966; Tanner and Fuchs, 1968; Slatyer and McElroy, 1961).

Recently, Priestley and Taylor (1972) proposed

$$E_p = \alpha\ (Rn - G)\ [s/(s + \gamma)] \qquad [1]$$

where E_p is the potential evaporation; Rn is the net radiation; G is the soil heat flux, s is the slope of the saturated vapor pressure curve, and γ is psychrometric constant. When daily fluxes are used, G is usually assumed to be negligible. Priestley and Taylor (1972) found an average overall value of $\alpha = 1.28$ for several surfaces.

Atmometers also have been used to measure field evaporation (Arkin and Adams, 1974 and Skidmore and Hagen, 1970); precise measurements of bare soil-water evaporation in the field have been made mainly by using precision weighing lysimeters.

Kolyaser and Mel'mikovo (1949) and Malyagin (1957) show that the drying rate of different soils does not decline smoothly but has inflection

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points separating one type of soil moisture movement from another. Classical and present-day concepts, based on laboratory and field studies, divided soil evaporation process into three stages (Kolasew, 1941; Hanks, 1965; Idso et al., 1974).

The first stage is the energy-limiting stage which is characterized by a rapid steady rate of evaporation; second stage is the soil-limiting stage where the rate of evaporation is falling; and the third stage is a vapor transmission stage in which the rate of vapor flux is extremely slow.

Energy-limiting stage

In the energy-limiting stage the rate of water loss (E_{s1}) is dependent upon the net effect of water transmission rate through the soil and the above ground boundary conditions: wind speed, temperature, relative humidity and radiant energy.

Under constant external conditions the gradient of vapor pressure between the soil surface and the air remain constant; hence, the evaporation rate is constant. Therefore, the evaporation rate in the first stage is independent of soil moisture content and is entirely determined by external conditions.

The pores between the soil aggregates are essentially full of water and the loss of moisture results in the thinning of the water film separating the aggregates. In this stage moisture tension is low and the moisture flow is primarily in the liquid state. Evaporation proceeds until a critical point (threshold value) when the initial formation of a dry surface layer begins to impede evaporation and the rate is reduced. The cumulative amount of water evaporated to this critical point (end of stage 1) has been referred to as $U = \Sigma E_{s1}$ (Ritchie, 1972; Kanemasu et al., 1976).

The U value can be estimated by plotting cumulative evaporation versus time (days or hours). During the first stage, daily evaporation approximately equals E_p. When the second stage begins, E_s and E_p diverge, and the U value is approximately equal to the corresponding cumulative evaporation at that point.

The soil-limiting evaporation

The soil-limiting stage starts when there is a dry diffusion barrier at the evaporating surface; hence, there is a marked decline in the rate of water loss as the soil-water reservoir is depleted. The atmospheric factors are no longer as important but the intristic soil factor assumes the dominant role in governing the rate of moisture flow to the surface.

As the moisture content of the evaporating layer is reduced, the soil surface forms a dry layer; thus, evaporation occurs below the soil surface and vapor must diffuse through the dry soil layer. At this stage the evaporation rate declines abruptly.

Second stage of evaporation has usually been modeled with a square root of time relationship. Black et al. (1969), Gardner and Gardner (1969), Ritchie (1972) have shown by the solution of the water flow equation that in this stage the evaporation can be expressed by

$$\Sigma E_{s2} = ct^{\frac{1}{2}} \qquad [2]$$

and the daily evaporation

$$E = ct^{\frac{1}{2}} - C(t-1)^{\frac{1}{2}} \qquad [3]$$

where c is a soil parameter dependent on the hydraulic properties of the soil and t = time (days). The value c can be estimated by calculating the slope of [2] by least squares during the soil-limiting phase of evaporation.

The magnitude of the c values is approximately proportional to the magnitude of the measured values of the hydraulic conductivities of the

soil at -0.1 bar soil matric potential (Ritchie, 1972).

The factor c is dependent on soil type and season. The seasonal effect is a result of a temperature dependency; c varying by about a factor of 2 from winter to summer (Jackson et al., 1976).

Kinje (1973) reported that cumulative evaporation could not be described by a simple square root of time relationship. He suggested that when a simple relationship is desired, the cumulative evaporation during the first 4 days can be approximated by a linear function of $t^{0.67}$ and during the subsequent 15 to 20 days by a linear function of $t^{0.4}$. The soil-limiting stage ceases at an approximate volumetric water content of 0.06 (Idso et al., 1974), and then evaporation proceeds to the third stage.

The third stage of evaporation

The third stage of evaporation has usually been typified by a slow and relatively constant evaporation rate controlled by adsorptive forces acting over molecular distances at the solid-liquid interfaces in the soil (Lemon, 1956). This stage appears to be initiated at a surface water content that corresponds to a retention of two molecular layers of water about the soil particles. The drying rate is less than 0.05 times that of soil-limiting stage (Idso, et al., 1974). This final stage terminates at air-dryness.

Variation of evaporation rate

In general, the energy- and soil-limiting stages are of greatest concern in agriculture. Several methods have been used to delineate the two stages.

The critical moisture content at the transition from the energy-limiting stage to the soil-limiting stage depends on the mechanical composition of the soil, its surface structure and constituents. Thus,

it is anticipated that different soils will have different U and c values as shown in Table 1.

Abramora, Bol'shakor, and Rode (1959) studied the relationship between evaporation and the texture and structure of soil under field and laboratory conditions. In sandy soils the water is held by capillary forces at the contact points between particles and is incapable of moving as free liquid. In loamy soils, the movement of liquid water ceases at the disappearance of water from the contact point between the micro-aggregates, corresponding to 60-70% of field capacity. In loamy and clayey soils with aggregated structure, moisture from the contact points between macroaggregates move to the evaporating surface by capillarity through a system of intraaggregates pores corresponding to 90-95% of field capacity. In loamy and clayey soils with under-developed structure, the moisture is adsorptively bound. Most of the water is able to move to the evaporating surface in the liquid form but the rate of movement is slow and generally declines with diminishing soil moisture content.

Soil with mulch or other surface residue will alter the rate of evaporation. Bond and Willis (1970) found that the evaporation rate during the energy-limiting stage decreased with either increasing residue rates or decreasing evaporation potentials. Total water loss (U) during the first stage of drying decreased as the rate of the first stage evaporation increased.

The transition from the energy-limiting to the soil-limiting phase may extend from 1-5 or more days depending on the time of the year and the weather conditions. Jackson et al. (1976) proposed a method that utilized albedo measurements to partition the fractional soil surface area exhibiting energy-limiting evaporation and the fractional area

Table 1 . Cumulative evaporation during energy-limiting stage (U) and soil-limiting evaporation coefficient (c) for five soils.

Soil	U mm	c mm day$^{-\frac{1}{2}}$	Reference
Adelanto clay loam	12	5.08	van Bavel et al (1968)
Yolo loam	9	4.04	LaRue et al (1968)
Houston black clay	6	3.50	Ritchie et al (1972)
Plainfield sand	6	3.34	Black et al (1969)
Muir silt loam	10	3.50	Kanemasu et al (1976)

exhibiting soil-limiting evaporation to calculate the actual evaporation rates during the transition phase. By denoting the partitioning factor as β and the slope of least square value of the evaporation rate versus time$^{\frac{1}{2}}$ (c), for the soil-limiting phase, the evaporation rate E_t for day n after the soil was wet is

$$(E_t)n = \beta\ N\ E_p + c \sum_{i=1}^{n} (\beta_{i-1} - \beta_i)\ (n - i + 1)^{-\frac{1}{2}} \qquad [4]$$

where E_p is the energy-limiting rate. The Priestley-Taylor formula was used to calculate E_p. The partitioning factor varies from 1 for a wet surface to zero for a dry surface.

Kanemasu et al. (1976) and Ritchie (1972) assumed a one day transitional stage where evaporation at this stage is $0.6E_{s1}$.

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CHAPTER II

ESTIMATING SOIL FACTORS FOR NINE KANSAS SOILS USED IN AN EVAPOTRANSPIRATION MODEL

ESTIMATING SOIL FACTORS FOR NINE KANSAS SOILS USED IN AN EVAPOTRANSPIRATION MODEL

ABSTRACT

Soil factors (U and c) which quantify the drying rate of soil, are among the inputs required in modeling evapotranspiration. U is the cumulative evaporation during the energy-limiting stage and c is the least squares slope of evaporation rate versus time$^{\frac{1}{2}}$ during the soil-limiting stage of soil surface evaporation.

Laboratory and greenhouse experiments were performed for 9 Kansas soil types to determine percentage sand, silt and clay, moisture content percentage by weight (θ_m) at -1/3 bar and -15 bar water potential, U and c. Hydrometer method for mechanical analysis was used to determine the particle size distribution, and pressure plate method was used to determine θ_m. U and c were obtained from weight losses from soil columns in a greenhouse experiment.

Results of the experiment indicated that particle size composition and percentage water-holding capacity (WHC) influenced the values of U and c obtained. U and c were relatively lower for sandy soil and soil with lower WHC and higher for soil with greater WHC and percentage silt. The values of U ranged from 5 to 18.7 mm and c from 1.68 to 3.73 mm day$^{-\frac{1}{2}}$.

INTRODUCTION

In a Kansas watershed, evapotranspiration may dominate the water balance. As much as 80 to 90% of the precipitation is returned to the atmosphere by evaporation directly from the soil surface or by transpiration from the plant (Nielsen et al., 1972). To date, evapotranspiration can be estimated by several evapotranspiration models (Kanemasu et al., 1976; Tanner and Jury, 1976; and Ritchie, 1972) which require, among other inputs, soil parameters to describe the evaporation rate from the soil surface.

Evaporation from soil surface can generally be distinguished into energy-limiting stage (E_{s1}) and soil-limiting stage (E_{s2}). When the soil is relatively wet the rate of evaporation is controlled by the energy available for evaporation; thus, the cumulative water loss is linearly related to time and the rate of loss is constant provided a uniform energy supply is imposed. The soil-limiting stage begins as the soil surface dries beyond a certain cumulative threshold value (U). Then, the cumulative evaporation is approximately proportional to an exponential (0.40 to 0.67) function of time (Kinje, 1973); the slope of the curve is defined as c. For most purposes the evaporation during the limiting stage can be related to the square root of time ($t^{.5}$) (Rose, 1969; Black et al., 1969; Ritchie, 1972).

Provided that values for U and c are available, the evapotranspiration model given by Kanemasu et al. (1976) can be applied to a variety of crops at various locations in Kansas.

The purpose of this study is to determine the soil factors, U and c, for 9 Kansas soils and relate these to soil texture.

MATERIALS AND METHODS

Representative samples of the surface 30 cm of soil for 9 soil types were taken at various locations in Kansas in September, 1975 and brought to the Evapotranspiration Laboratory, Manhattan, Kansas for the experiments (Table 1).

The soils were dry-sieved through 3.3-mm wire mesh. Percentage moisture by weight at -1/3 bar and -15 bar were determined using conventional pressure membrane and pressure plate methods. Percentages clay, silt and sand were estimated by hydrometer method of particle size analysis.

Soil columns were constructed by packing the air-dried soil into 15.8-cm dia. cylinderical metal containers (30-cm height) to bulk density of approximately 1.1-1.5 gm cm^{-3}. The columns were placed in a greenhouse maintained at $25 \pm 5^{o}C$. Temperature and relative humidity were continuously recorded by hygrothermographs. The soils were wet to field capacity and the surfaces were covered to prevent evaporation for the first 24 hrs. The soil columns were then reweighed at frequent time intervals using a heavy-duty solution balance.

The first trial was carried out from February 4 to 28, 1976. The columns were weighed each day. Each soil type contained two replications (rep. I and rep. II). The second trial was performed during May 14 to June 5, 1976. During this experiment, rep I was initiated 1 day before rep. II. During the first 4 days the soil columns were weighed twice daily, from the 5th to 9th day the soil was weighed daily and thereafter the soil columns were weighed every other day.

The cumulative amount of water loss from each soil column was calculated. Cumulative water loss versus time (t = days) were plotted using

Table 1. Soil types and location of sample for the surface 30 cm of nine Kansas soils.

SOIL TYPE	LOCATION	COUNTY
Colby Silt Loam (Fine-silty, mixed (calcareous) mesic, ustic terriorthents)	Colby Expt. Sta.	Thomas
Carwile Sand (Fine, mixed, thermic, typic Agriguolls)	St. John Expt. Sta.	Stafford
Mansic Sandy Loam (Fine-loamy, mixed thermic, Aridic calciustolls)	South of Minneola	Clark
Harney Silt Loam (Fine, montmorillonitic, mesic, typic Argiustolls)	Hays Expt. Sta.	Ellis
Manter Fine Sandy Loam (Coarse-loamy, mixed, mesic Aridic Argiustolls)	Garden City	Finney
Lancaster Clay Loam (Fine-loamy, mixed, mesic udic Argiustolls)	Ellsworth	Ellsworth
Muir Silty Clay Loam (Fine-silty, mixed, mesic, Pachic Haplustoll)	S. Manhattan Expt. Sta.	Riley
Harney Silt Loam Fine, montmorillonic, mesic, typic Agriustolls)	Minneola Expt. Sta.	Ford
Florence Stony Loam (Clayey-skeletal, montmorrillinitic, mesic, udic Argiudolls)	5 miles south of Manhattan	Riley

an average from rep. I and II. At a point where the curves deviated markedly from constant water loss (usually coincided with the day the surface of soil column visually appeared dry), the cumulative evaporation was determined. This critical value is equal to U (i.e. $\Sigma E_{s1} = U$).

The values of soil parameter c were calculated from the least square slope of evaporation rate vs time$^{\frac{1}{2}}$ during the soil-limiting stage (i.e. $\Sigma E_{s2} = ct^{\frac{1}{2}}$). Day 0 was taken to be the day after the end of energy-limiting stage.

RESULTS AND DISCUSSION

Table 2 shows the results of the mechanical analysis of the soils and the value of the soil parameters U and c. The soil textures included sand, silt loam, sandy loam and clay loams. Table 3 shows the percentage (%) water content by weight (θ_m) at -1/3 bar and -15 bar and % water-holding capacity (%WHC) by weight. The %WHC by weight is the difference between θ_m at -1/3 bar and -15 bar.

The values of U and c were closely related with % particles size distribution. For loamy soils, U and c may be obtained from the regression equations:

$$U = 5.515(\%clay) + 6.236(\%silt) + 5.890(\%sand) - 584.8 \qquad [1]$$

with $R^2 = 0.84$; and

$$c = 0.374(\%clay) + 0.424(\%silt) + 0.386(\%sand) - 36.8 \qquad [2]$$

with $R^2 = 0.81$.

It is difficult to assess separately the effect of sand, silt and clay on the values of U and c. Theoretically the U value is primarily influenced by the %WHC of the wet soil (water content at -1/3 bar) while the value of c is largely dependent on the hydraulic conductivity of the soil when it is relatively dry (at the soil-limiting stage), as reported

Table 2. Percentages of clay, silt, and sand and values of U and c for the surface 30 cm of 9 Kansas soils.

SOIL TYPE	% CLAY	% SILT	% SAND	U mm	c mm day$^{-\frac{1}{2}}$
CARWILE SAND	4.0	8.7	87.3	5.0	1.68
FLORENCE STONY LOAM	17.0	31.8	51.2	5.7	2.89
MANTER FINE SANDY LOAM	12.9	19.3	67.8	9.0	2.41
MANSIC SILTY CLAY LOAM	14.3	31.6	54.1	9.2	3.53
MUIR SILTY CLAY LOAM	31.8	52.6	15.6	10.2	3.27
HARNEY SILT LOAM 1/	27.8	46.6	25.6	11.2	3.36
HARNEY SILT LOAM 2/	26.8	58.0	15.2	12.6	3.53
LANCASTER CLAY LOAM	27.8	48.8	24.4	16.5	3.73
COLBY SILT LOAM	20.6	59.4	20.0	18.7	3.73

1/ Sampled from Hays Expt. Station.

2/ Sampled from Minneola Expt. Station.

Table 3. Percentage water content (by weight) at -1/3 bar and -15 bar and percentage water holding capacity (WHC).

SOIL TYPE	Soil water content @ -1/3 bar	Soil water content @ -15 bar	WHC
	% by weight		
Carwile sand	4.2	2.3	1.8
Florence stony loam	26.7	17.5	9.3
Manter fine sandy loam	11.8	5.9	6.0
Mansic sandy loam	17.1	8.1	9.0
Muir silty clay loam	28.0	14.8	13.2
Harney silt loam 1/	24.0	13.4	10.6
Harney silt loam 2/	28.7	12.3	16.4
Lancaster clay loam	27.9	13.5	14.4
Colby silt loam	27.9	14.2	13.7

1/ Sampled from Hays Expt. Station.

2/ Sampled from Minneola Expt. Station.

by Ritchie (1972). Sand generally has a relatively low %WHC and hydraulic conductivity (at low moisture contents). Carwile sand with 87% sand had the lowest %WHC, U and c values (1.8%, 5mm and 1.68 mm day$^{-\frac{1}{2}}$, respectively) as anticipated. Colby silt loam with the highest %silt (59.4) and 20% clay had the highest U (18.7mm) and c (3.73 mm day$^{-\frac{1}{2}}$). Muir silty clay loam with the highest % clay (31.8%) and 52.6% silt had a medium value of U (10.2 mm) and c (3.27 mm day$^{-\frac{1}{2}}$) which could be attributed to the higher water retention property of clay.

Ritchie (1972), in comparing the U and c values obtained by other workers, reported U ranges from 12 to 6 mm and c values of 5.08 to 3.34 mm day$^{-\frac{1}{2}}$. A high c was consistently associated with a high U value. Those observations are consistent with this study except the c values were generally lower (range 3.73 to 1.68). These inconsistencies may be associated with a laboratory versus field study; however, when we compare with the previous estimates of U and c on Muir silty clay loam obtained in the field by precision lysimetry, there is excellent agreement. The U and c are 10 mm and 3.5 mm day$^{-\frac{1}{2}}$ from the lysimeter and 10.2 mm and 3.3 mm day$^{-\frac{1}{2}}$ from the soil column.

Mechanical analysis of the surface 30 cm of Crete silt loam from Scandia, Kansas resulted in 32% clay, 54% silt and 14% sand composition. Using the equations [1] and [2], U and c were estimated at 10.9 mm and 3.53 mm day$^{-\frac{1}{2}}$, respectively. Using laboratory soil columns, Rosenthal, Kanemasu, Raney, and Stone (1977) reported U and c values of 11 mm and 3.6 mm day$^{-\frac{1}{2}}$, respectively for the same soil.

The laboratory method described for estimating U and c has some disadvantages. The precise end of the energy-limiting stage is not well defined; therefore, the U value can only be estimated graphically. U can be affected by several factors, noteably atmospheric demand, surface

residue, and tillage conditions (Bond and Willis, 1970). The value of c is dependent on soil type and season. The seasonal effect is a result of temperature dependency; c varying by about a factor of 2 from winter to summer (Jackson et al., 1976).

The rate of drying during the soil-limiting stage is not precisely a square root of time relationship (Kinje, 1973). During the transitional stage between E_{s1} to E_{s2}, which can vary from 1 to 5 days, (Jackson et al., 1976) the rate of water loss is faster than predicted by the soil-limiting stage. Fig. 1 shows typical results for Carwile sand, Manter fine sandy loam, and Lancaster clay loam. These soils have a short transitional period (one day) and the soil-limiting stage evaporation followed the square root of time relationship (Fig. 2).

SUMMARY

The laboratory method described for estimating U and c provides reasonable values when compared to those reported in the literature. Good agreement was observed between the laboratory- and lysimeter-obtained values. When U and c values are not available, mechanical analysis of the soil can provide estimates.

THIS BOOK CONTAINS NUMEROUS PAGES WITH DIAGRAMS THAT ARE CROOKED COMPARED TO THE REST OF THE INFORMATION ON THE PAGE.

THIS IS AS RECEIVED FROM CUSTOMER.

Fig. 1. Cumulative evaporation from three different textured soils after wetting to near field capacity. Asterik on the curve denotes the end of the energy-limiting stage (U).

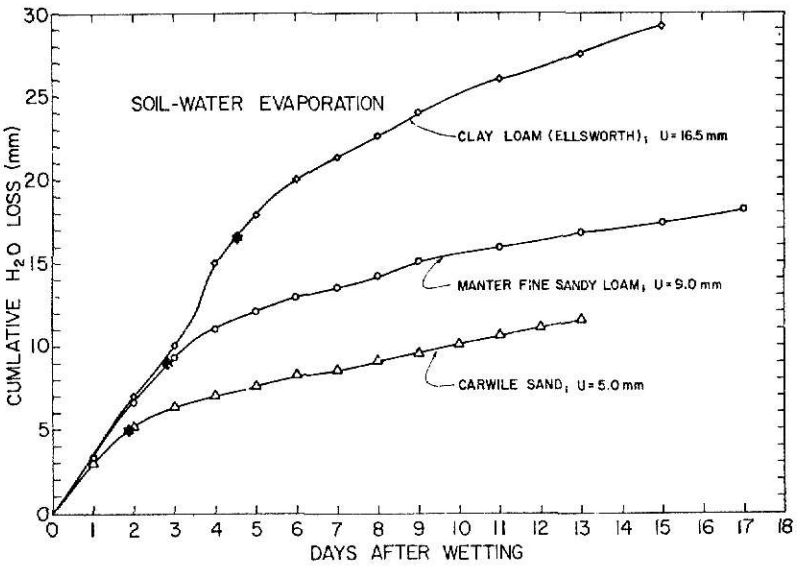
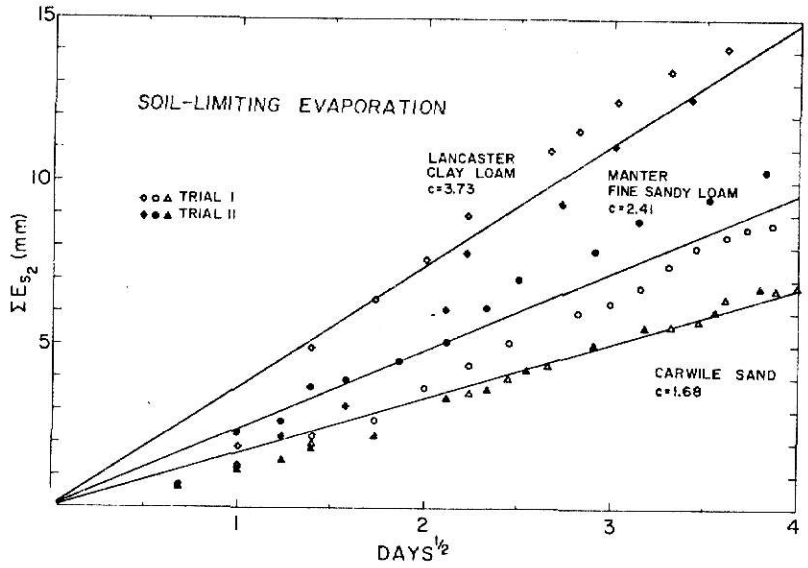


Fig. 2. Cumulative evaporation during the soil-limiting stage (ΣE_{s2}) as related to the square root of time for three soils.



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CHAPTER III

WATER-USE EFFICIENCY OF GRAIN SORGHUM CROP AS AFFECTED BY PLANTING DATES AND SOIL TYPES

WATER-USE EFFICIENCY OF GRAIN SORGHUM AS AFFECTED BY PLANTING DATES AND SOIL TYPES

ABSTRACT

Different planting dates and soil types may affect the water-use efficiency (WUE) of crops by affecting yield and/or evapotranspiration (ET).

Experiments were conducted to determine the WUE of sorghum [Sorghum bicolor (L.) Moench] as affected by 3 different planting dates (May 13, May 29, and June 9) on Muir silty clay loam at Manhattan and a single planting date (June 10) on Carwile sand at St. John, Kansas. Rate of dry matter accumulation and grain yield were obtained at Manhattan and only grain yield was obtained at St. John. Daily ET was estimated using an ET model.

The data suggest that WUE of sorghum was affected by date of planting and soil types. At Manhattan the early planted sorghum had the lowest grain yield and medium planted sorghum had the highest grain yield (17% more than the mean of treatments) and dry matter yield. Sorghum grown on Carwile sand had the highest grain WUE of 0.176 mg mm^{-1} (17% more than the mean of treatments).

INTRODUCTION

Water use efficiency (WUE) is defined as the amount of dry matter produced per unit of water used. Various management factors may influence the efficiency of water-use of crops. To increase the WUE the entire crop environment must be considered since both soil and crop management affect the photosynthesis and evapotranspiration (ET).

In order to match water supply with water required by the crop, the crop growth pattern should coincide with the available soil moisture pattern; therefore, planting date, choice of crop species or varieties and crop management practices should be manipulated to maximize WUE.

There are substantial interactions among soil moisture supply capacity, planting dates and crops. Stewart et al. (1975) found that differences in yield of nonirrigated grain sorghum depends primarily on the soil characteristics and soil water content at planting times. Total water-use by a sorghum crop depends on climatic conditions as well as on plant factors. Planting date may affect the water use of crops either through the direct effect on the plant or through the indirect effect on seasonal climates prevailing during the plant growth. Cadell and Weibel (1971) reported that the effect of planting dates on growth and development of sorghum [Sorghum bicolor (L.) Moench] was associated with response to photoperiod and temperature. In the U. S. late planting of most common temperate genotypes caused a reduction in the number of days to floral initiation, heading and physiological maturity. Early planting in the Midwest increased grain sorghum yield through increased tillering and number of heads per unit area (Stickler and Pauli, 1969).

In order to calculate WUE, both dry matter (and/or grain yield) and ET must be estimated. While dry matter is relatively easy to obtain,

ET data throughout the season can present difficulties. However, recently Kanemasu et al. (1976) reported an evapotranspiration model for sorghum which can provide daily estimates of water loss.

The objective of this study was to estimate the ET and evaluate the WUE of sorghum grown at 3 different planting dates on Muir silt loam and a single planting date on Carwile sand using the model developed by Kanemasu et al. (1976).

METHODS AND MATERIALS

The study was conducted at the Evapotranspiration Research Farm 14 km southwest of Manhattan, Kansas and at the Sandyland Experiment Station, St. John, Kansas.

Manhattan experiment.

At Manhattan sorghum (ACCO 1090) was planted on three dates; May 13 (sorghum I), May 29 (sorghum II) and June 9, 1976 (sorghum III). These were done under cultural practices favorable for high yield (135.6 kg N/ha and 3.36 kg Milogard[1]/ha). The seeds were planted in N-S rows at 76.2-cm row spacing on 10 m X 140 m plots. Uniform stand was obtained by hand thinning at 3 leaf-stage (approximately 240,000 plants/ha) and irrigating (1.9 cm) on June 16 (sorghum II and III).

The soil was a Muir silt loam (fine-silty, mixed mesic, Pachic Haplustoll) which was developed from alluvial deposits. The surface silt loam extends to the 14-cm depth; silty clay loam from 14 cm through 50 cm; silty clay from 50 cm through 81 cm; and silt loam below 81 cm. The maximum water-holding capacity of the soil was 33.0 cm.

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[1] Tradename: Milogard 80W, common name: propazine and chemical name: 2-chloro-4, 6 bis (isopropylamin)-s-triazine.

Two neutron tubes were placed in each treatment. Soil moisture was determined weekly by the neutron attenuation method in the 15 to 150-cm layer and surface 15-cm by gravimetric sampling.

Physiological stages were estimated as described by Vanderlip and Reeves (1972). Above ground dry matter (DM) and leaf area index (LAI) were determined from 6 plant samples on each treatment taken every 7-10 days. Stalks, leaves and panicles were dried at 70°C and the dry weights were measured. Leaf area (LA) was determined by an optical area meter[2/].

Solar radiation, maximum and minimum temperature, and rainfall were obtained at the research field.

St. John experiment.

At St. John the same variety of sorghum (ACCO 1090) was planted on June 10 in Carwile sand (fine, mixed, Thermic, Typic, Agriquolls). Treatment corresponded to Manhattan sorghum III treatment. The maximum water-holding capacity for 150-cm profile was 267 mm, as estimated from the moisture-release curve. The surface 100 cm was predominantly sand to sandy loam and the remaining 50 cm was sandy clay. The plot size was 18 x 64 m. Planting rate and row spacing were similar to sorghum grown at Manhattan, except 146 kg N/ha and 51.65 kg P_2O_5/ha were applied.

Soil moisture for 150-cm profile was gravimetrically measured at 15-cm increments on June 3, July 15, and August 20, 1976. Two samples were taken each time, in the middle row about 30 m and 60 m from the south border.

LAI during the growing season was determined every 7-10 days from 15 randomly selected plants within the plot. Because an area meter was not available at this location, leaf area was estimated by measuring maximum

[2/] Lambda Instr. Corp., Lincoln, Nebraska.

length (L_i) and width (W_i) of each leaf and computed as

$$LA = 0.73 \sum_{i=1}^{n} (L_i \times W_i) \qquad [1]$$

where LA is the total plant leaf area and n is the total number of leaves on each plant. LAI was determined from equation [1] and plant population. Although the seeding rate was similar to the Manhattan study, plant density was 150,700 plants/ha.

Solar radiation was recorded by a pryanometer[3/] with printing integrator[4/]. Maximum-minimum temperature and relative humidity were recorded by hygrothermograph.

Because of the low water-holding capacity of the sandy soil, the crop was irrigated by sprinkler on July 26, August 9, 17, and 31, 1976.

The amount of water use and soil moisture content for each treatment was determined from the ET model. A detailed description of the model was given by Kanemasu et al. (1976).

RESULTS AND DISCUSSION

Soil moisture.

At the 95% confidence interval, the soil moisture content in the 150-cm profile as estimated by the ET model was within -11.0 mm to +14.5 mm of neutron attenuation measurement. The favorable agreement between the model and neutron measurement is consistent with results reported by Rosenthal et al. (1977)[5/].

Fig. 1 shows the soil moisture content estimated by the model and rainfall during the season for sorghum I, II and III at Manhattan. The

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[3/] Model 645-48, Eppley Laboratory, Newport, R. I., U.S.A.

[4/] Science associates, Box 230, Princeton, N. J. 08540

[5/] Rosenthal, W. D., E. T. Kanemasu, R. J. Raney, and L. R. Stone. 1977. An evaluation of an evapotranspiration model for corn. Agron. J. (in press)

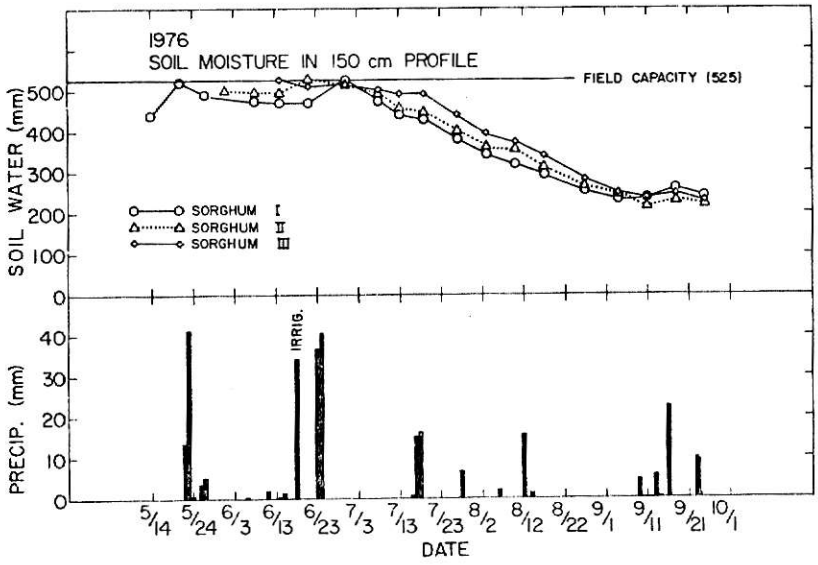

Fig. 1. Model's estimate of soil moisture depletion in 150 cm profiles for sorghum I, II and III and amount of rainfall during the growing season; 1976.

medium planted sorghum depleted more water from the soil. The depletion percentage at physiological maturity for sorghum I, II and III was 87%, 94% and 71%, respectively.

Total seasonal (planting to physiological maturity) rainfall and irrigation received by sorghum I, II and III and St. John sorghum were 282 mm, 265 mm, 358 mm and 459 mm, respectively. About 73% to 83% of the water received by sorghum I, II and III came between planting time to stage 3; amounts received after stage 3 to physiological maturity were 47 mm, 65.7 mm and 60 mm.

Evapotranspiration.

Figs. 2 and 3 show the estimated cumulative evapotranspiration (ET) and transpiration (T) for the 4 treatments during the growing season. Gradual decline in ET and T may have been partially caused by moisture depletion and senescence of the lower leaves which resulted in a decline in LAI during the later part of the growing season (Fig. 4). The cumulative ET and T for sorghum I and II were parallel to each other. The ET and T of sorghum III was greater than St. John except at maturity because of the greater LAI (Fig. 4).

Table 1 shows potential evapotranspiration (Ep) and the partitioning of ET into evaporation from the soil surface (E), T and advection (A). In Manhattan sorghum III had the highest Ep of 618 mm and sorghum II had the lowest Ep of 603 mm. The difference in Ep was due to the longer growing season for sorghum III. Total ET from planting to physiological maturity was greatest for sorghum I (460 mm) while St. John sorghum had the lowest ET (422 mm) and the highest Ep of 630 mm. Sorghum III and St. John, which were planted at about the same time, have approximately the same seasonal ET. Percentage (%) T from all treatments were about 77% of total ET except in sorghum III which had 69%. Approximately 19 to 28% of ET was directly

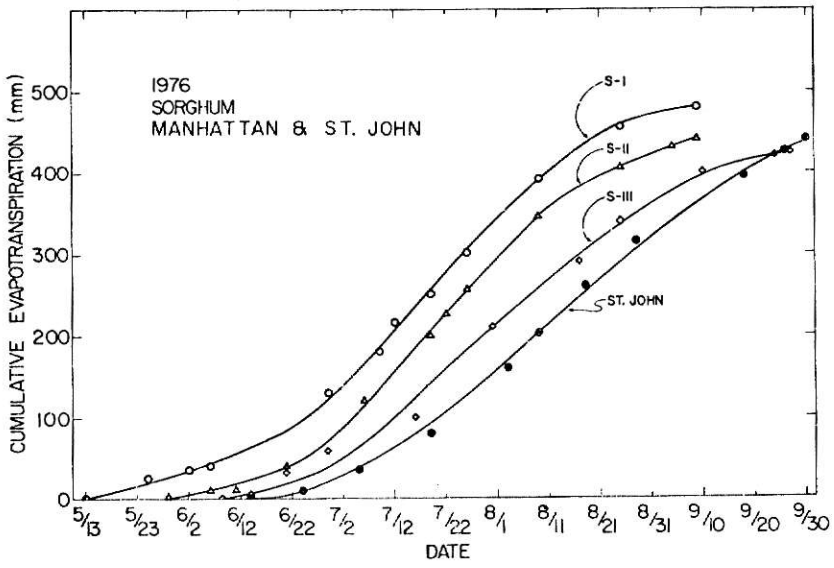

Fig. 2. Cumulative evapotranspiration versus days after planting for sorghum I, II and III at Manhattan and St. John sorghum; 1976.

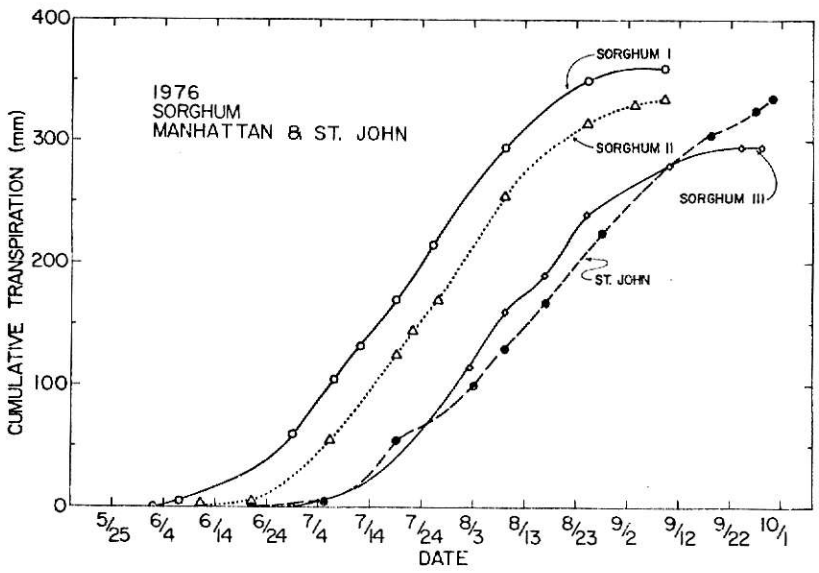

Fig. 3. Cumulative transpiration versus days after planting for sorghum I, II and III at Manhattan and St. John sorghum; 1976.

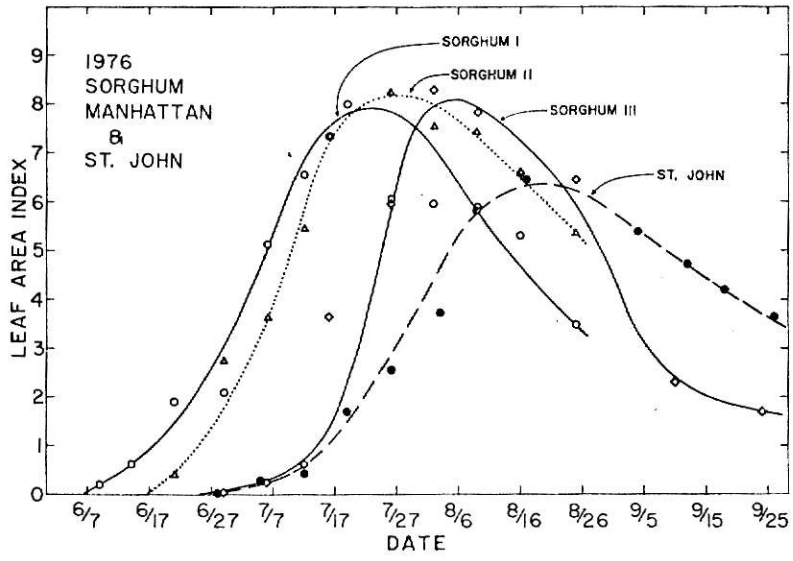

Fig. 4. Leaf area index versus date after planting for sorghum at Manhattan and St. John; 1976.

Table 1. Potential evapotranspiration (Ep) and percentage (%) distribution of water-use (ET) partitioned into: Total evaporation (E), transpiration (T) and advection (A) from planting to physiological maturity of sorghum; 1976.

Location and Date	Sorghum Treatment	Evaporation (mm)	%	Transpiration (mm)	%	Advection (mm)	%	ET (mm)	Ep (mm)
Manhattan (5/13)	I	98	21.3	352	76.5	10	2.3	460	611
Manhattan (5/29)	II	90	20.9	330	76.6	11	2.5	431	603
Manhattan (6/9)	III	120	28.2	294	69.2	11	2.6	425	618
St. John (6/10)	St. John	82	19.4	325	77.1	15	3.5	422	630

evaporated from the soil surface. Sorghum III had the highest %E (120 mm). This was due to the wet soil condition during planting and less ground cover during the early stages of growth. The sandy soil (St. John) had the lowest evaporation due to lower water-holding capacity and a slower water transmission property when the surface is dry. A higher advection (3.5%) at St. John was associated with the high potential evapotranspiration of 630 mm during the season.

Growth and development.

Fig. 5 shows the above ground dry matter accumulation and the growth stages during the growing season for sorghum I, II and III. Sorghum I and II had approximately the same rate of dry matter accumulation up to physiological maturity. Rate of dry matter accumulation for sorghum III was parallel to sorghum I and II until soft dough stage. At this stage dry matter accumulation in sorghum III leveled off, probably due to lower temperature during the later part of the growing season.

The mean crop growth rate (CGR) from growing point differentiation (stage 3) to physiological maturity are shown in Table 2. The CGR was calculated using the formula suggested by Radford (1967):

$$CGR = \frac{W_2 - W_1}{t_2 - t_1} \qquad [2]$$

W_1 and W_2 were above ground dry matter weight and times t_1 and t_2 correspond to when W_1 and W_2 were measured. Sorghum II had the highest dry matter accumulation of 312 mg cm^{-2} with a CGR of 4.91 mg cm^{-2} day^{-1}. Sorghum I and III had CGR of 4.36 mg cm^{-2} day^{-1} and 3.13 mg cm^{-2} day^{-1}, respectively.

Grain yield.

The mean grain yield for different treatments show that grain yield of sorghum II was significantly higher than other treatments (Table 2). Yield differences among sorghum I, sorghum III and St. John sorghum were

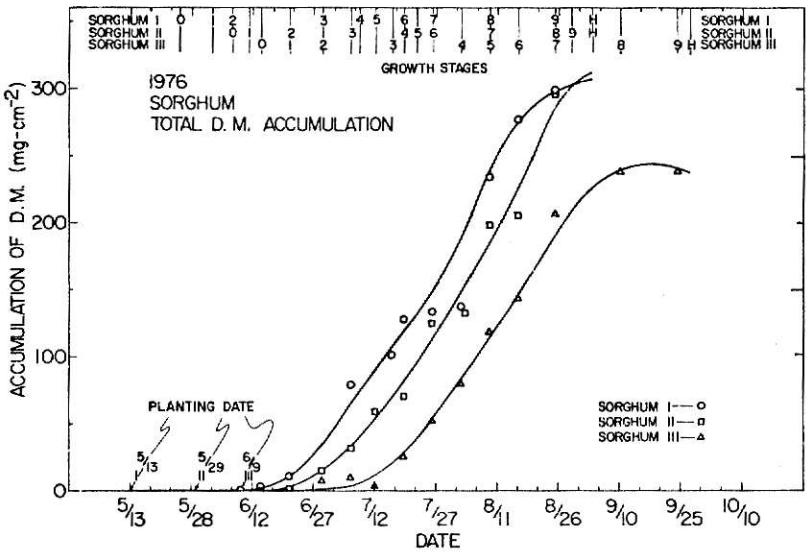

Fig. 5 . The cumulative dry matter accumulation (mg cm^{-2}) for sorghum I, II and III during the growing season; 1976.

Table 2. Grain yield, weight of 1000 seeds, and mean crop growth rate (CGR) from stage 3 to physiological maturity; and total above ground dry matter at physiological maturity.

Sorghum Treatment	Yield kg/ha	Weight of 1000 seeds (gm)	CGR ($mg\ cm^{-2}\ day^{-1}$)	Total DM ($mg\ cm^{-2}$)
I	5641[b*]	17.62	4.36	298
II	7483[a]	25.84	4.91	312
III	6486[b]	20.00	3.13	240
St. John	5922[b]	28.16	----	---

*Means within a column followed by a common letter does not differ at 5% level of significance by Duncan's multiple range test.

not significant. Differences in yield among sorghum I, II and III could be associated with different grain weight (Table 2). High grain weight for sorghum II may be due to high LAI during the grain-filling period, while high grain weight for St. John sorghum may be due to lower plant population (150,700 plants/ha). Low grain yield for sorghum I was probably due to lack of available water during the grain-filling period.

Water-use efficiency (WUE).

Fig. 6 shows the dry matter and grain WUE (yield/ET). Low grain WUE in sorghum I (0.100 mg cm^{-2} mm^{-1}) was attributed to low grain yield and high ET. A relatively high grain WUE for sorghum II of 0.174 mg cm^{-2} mm^{-1} was the result of high grain yield (74.8 mg cm^{-2}). A high WUE for St. John sorghum (0.176 mg cm^{-2} mm^{-1}) was due to relatively low ET (422 mm). WUE for sorghum III was 0.151 mg cm^{-2} mm^{-1}. WUE at various growth stages reflects the dry matter accumulation and ET up to that stage of growth. Generally WUE increased consistently from stage 3 to physiological maturity. Low WUE during the earlier growth stages was partially due to high evaporation and lower LAI. There was no increase in WUE at boot stage for sorghum I because of slow growth probably due to lack of water at that period.

Summary.

In summary it appears from this study that different planting dates, soil types and different water management practices affect the ET of sorghum crop during the growing season. Where rainfall and soil water storage is limited, the distribution of rain, especially during the critical growth stages, will significantly determine the yield and WUE. In this particular year, the later plantings were able to take advantage of the rainfall and cooler temperatures in the latter part of the season. However, it must be realized that the growth of sorghum crop and its WUE may change with nutrient status of the soil, soil aeration, soil temperature, sorghum varieties, climatic factors and cultural practices.

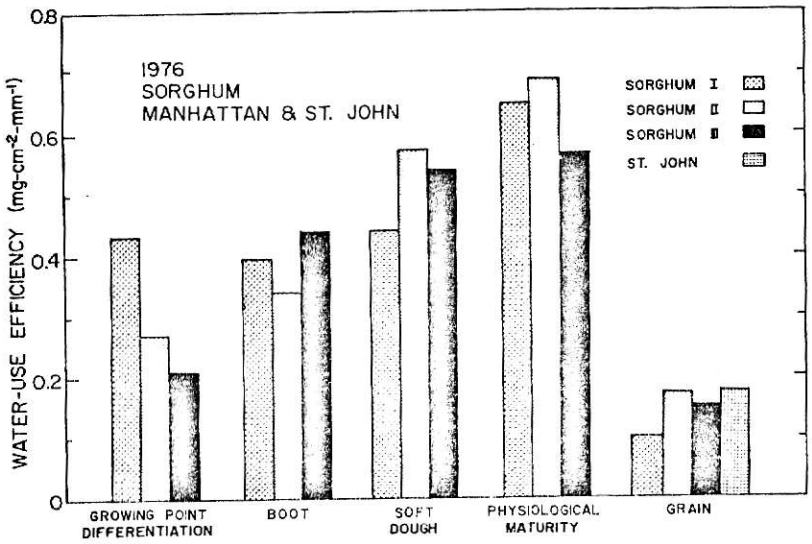

Fig. 6. Histogram of WUE at stage 3, 5, 7 and at physiological maturity and grain WUE for sorghum; 1976.

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APPENDIX A

SUMMARY OF DATA ON SOIL EVAPORATION

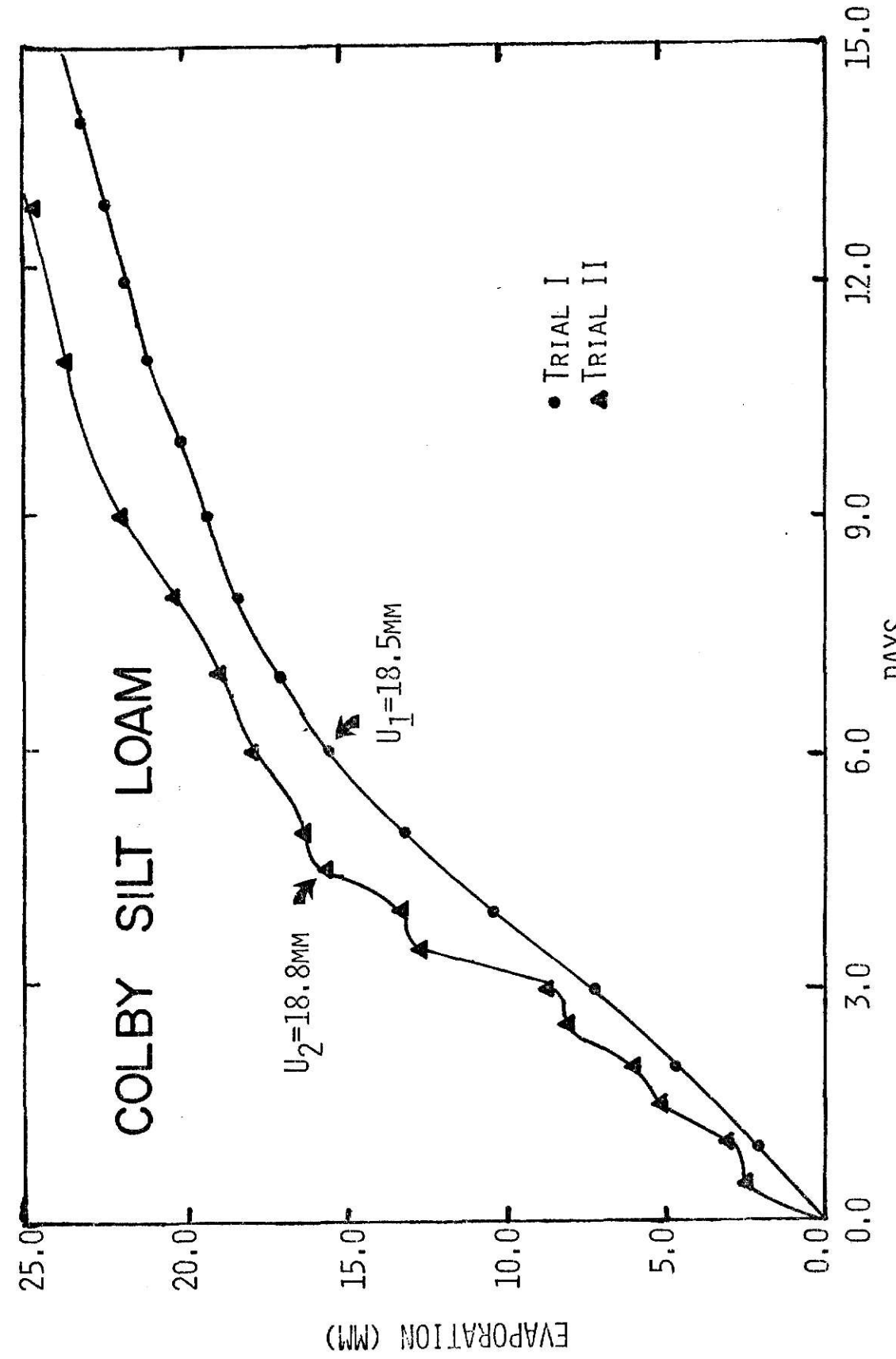

Fig. A1a. Evaporation during the energy-limiting stage for the surface 30 cm for Colby silt loam.

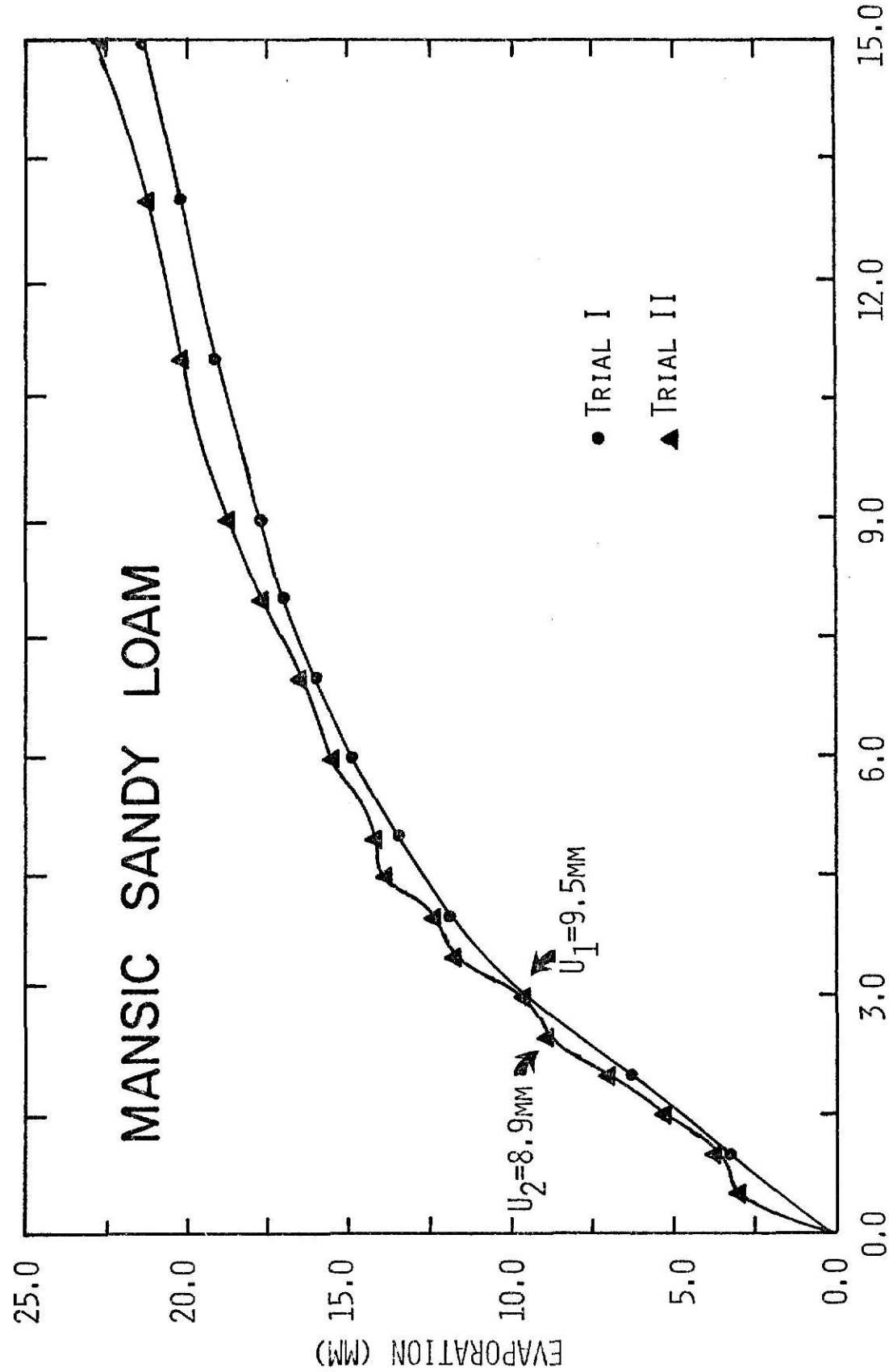

Fig. A1b. Evaporation during the energy-limiting stage for the surface 30 cm for Mansic sandy loam.

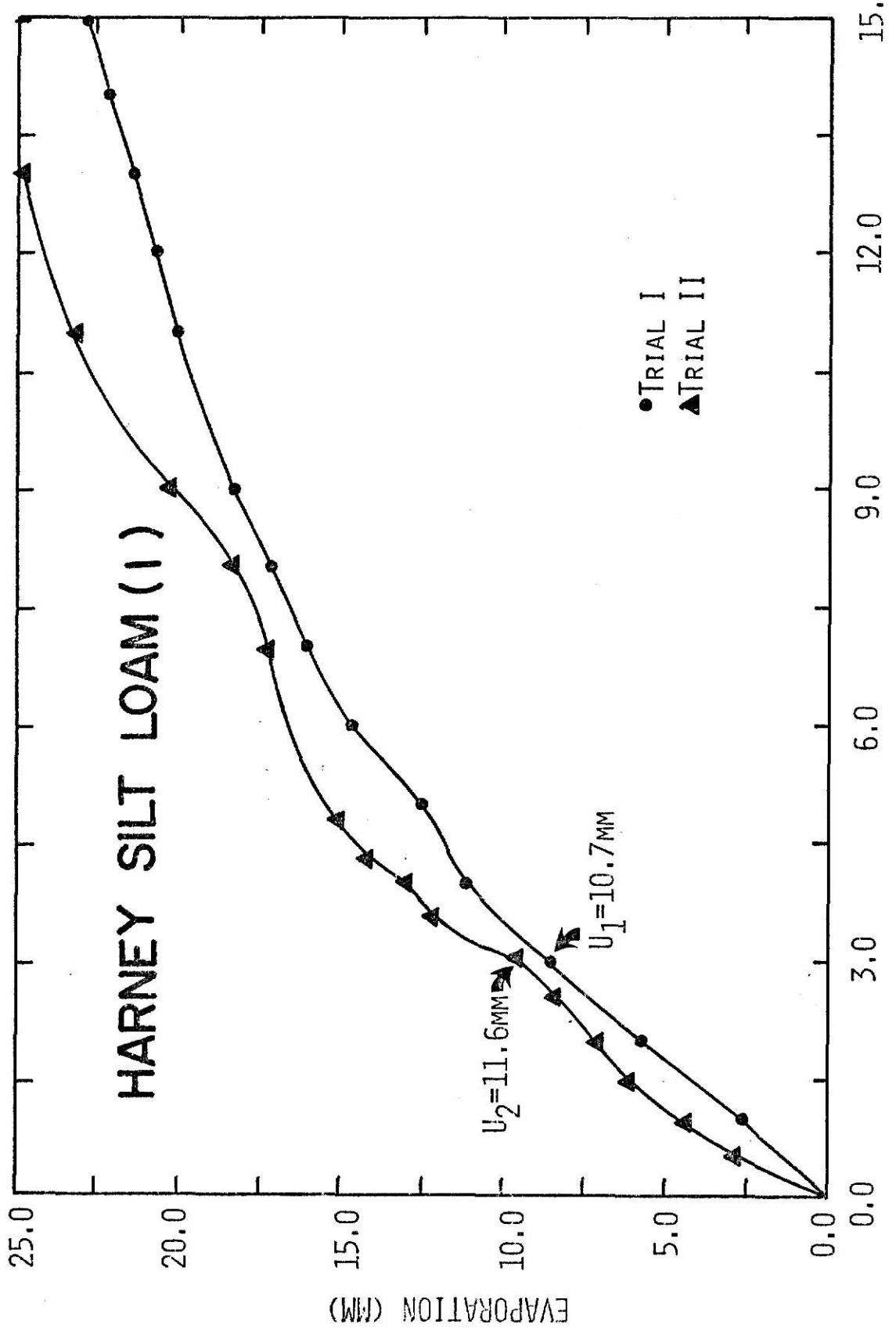

Fig. A1c. Evaporation rate during the energy-limiting stage for the surface 30 cm of Harney silt loam (1).

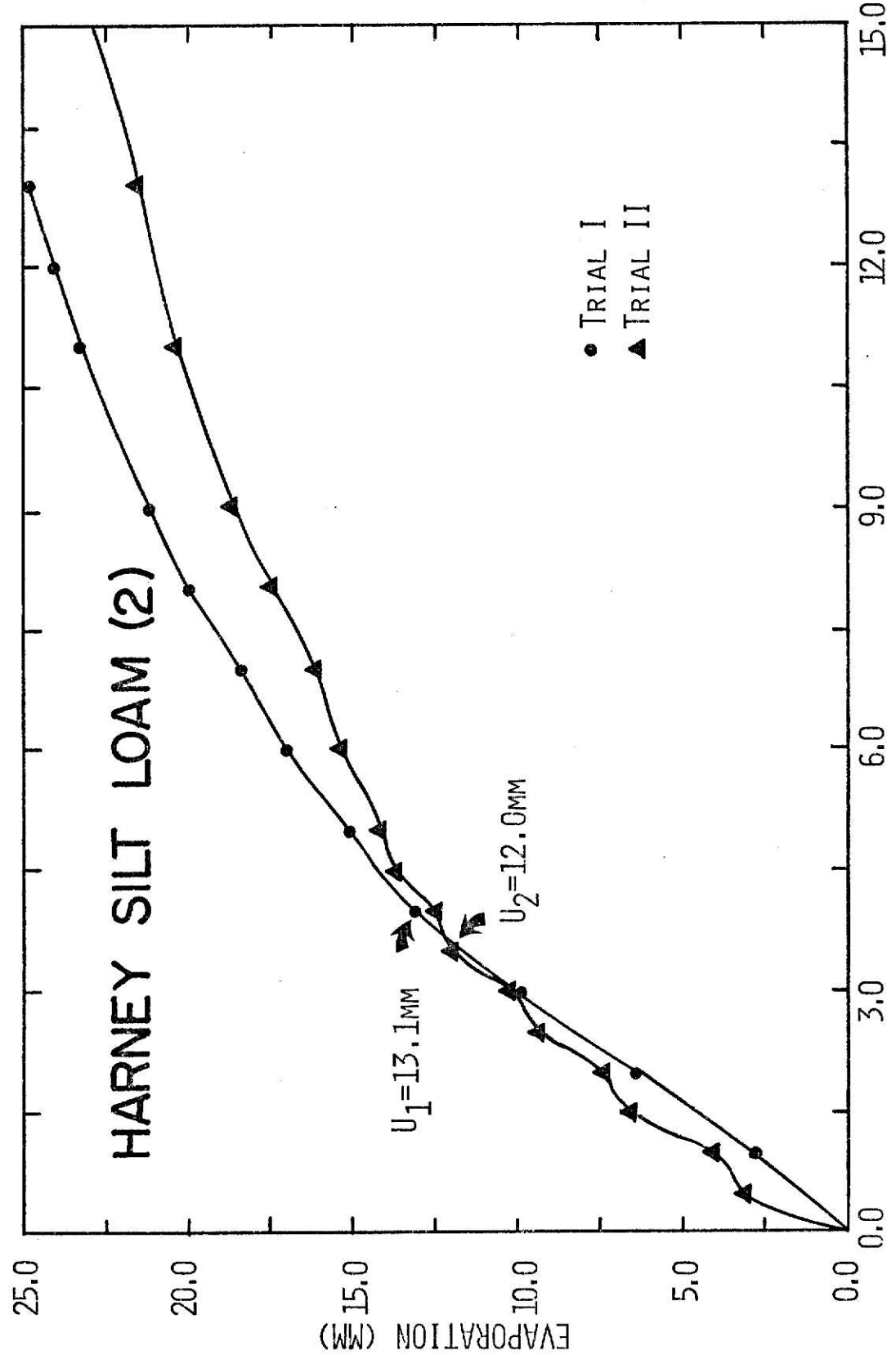

Fig. A1d. Evaporation during the energy-limiting stage for the surface 30 cm for Harney silt loam (2).

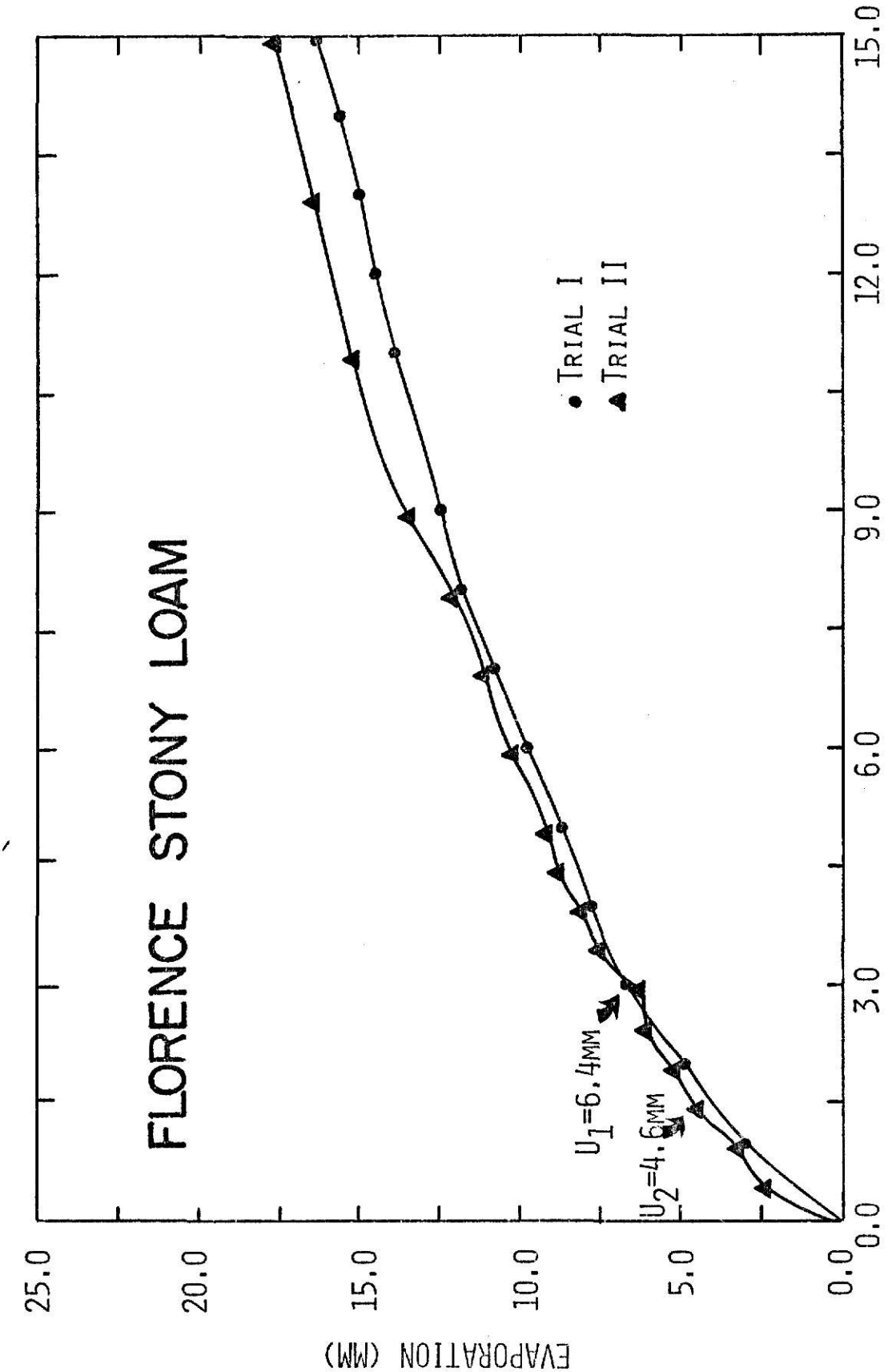

Fig. A1e. Evaporation during the energy-limiting stage for the surface 30 cm for Florence stony loam.

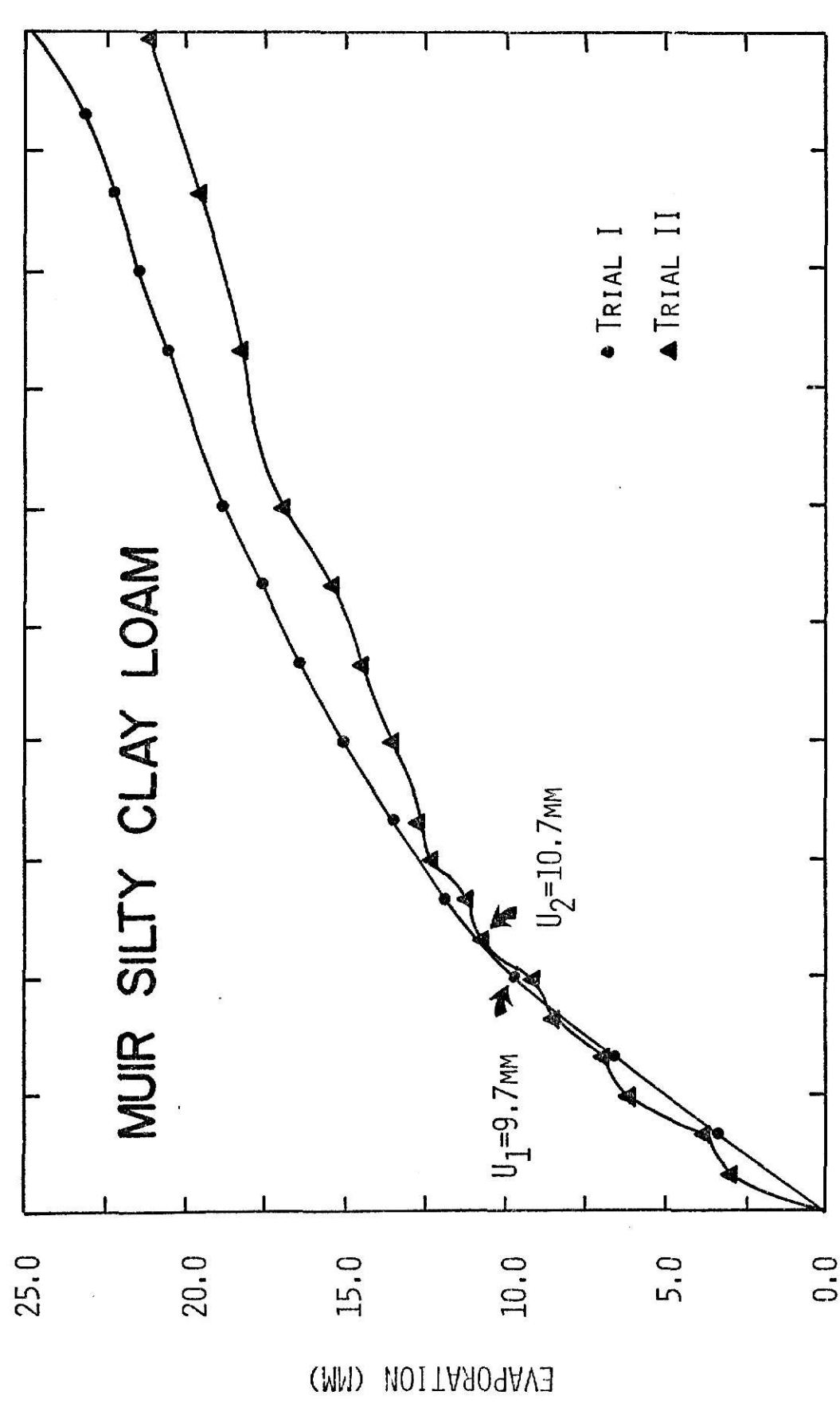

Fig. A1f. Evaporation rate during the energy-limiting stage for the surface 30 cm of Muir silty clay loam.

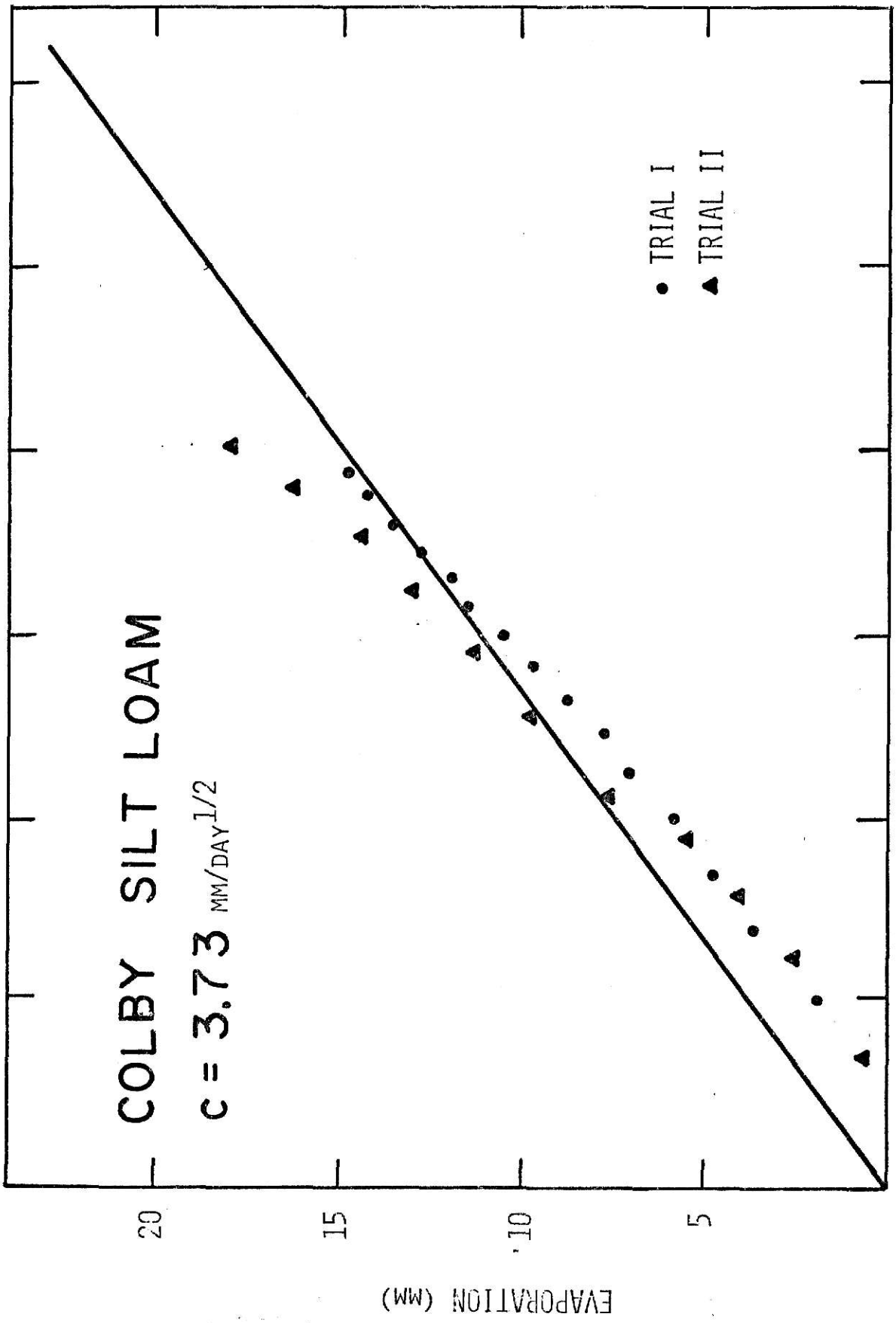

Fig. A2a. Evaporation rate during the soil-limiting stage from surface 30 cm of Colby silt loam.

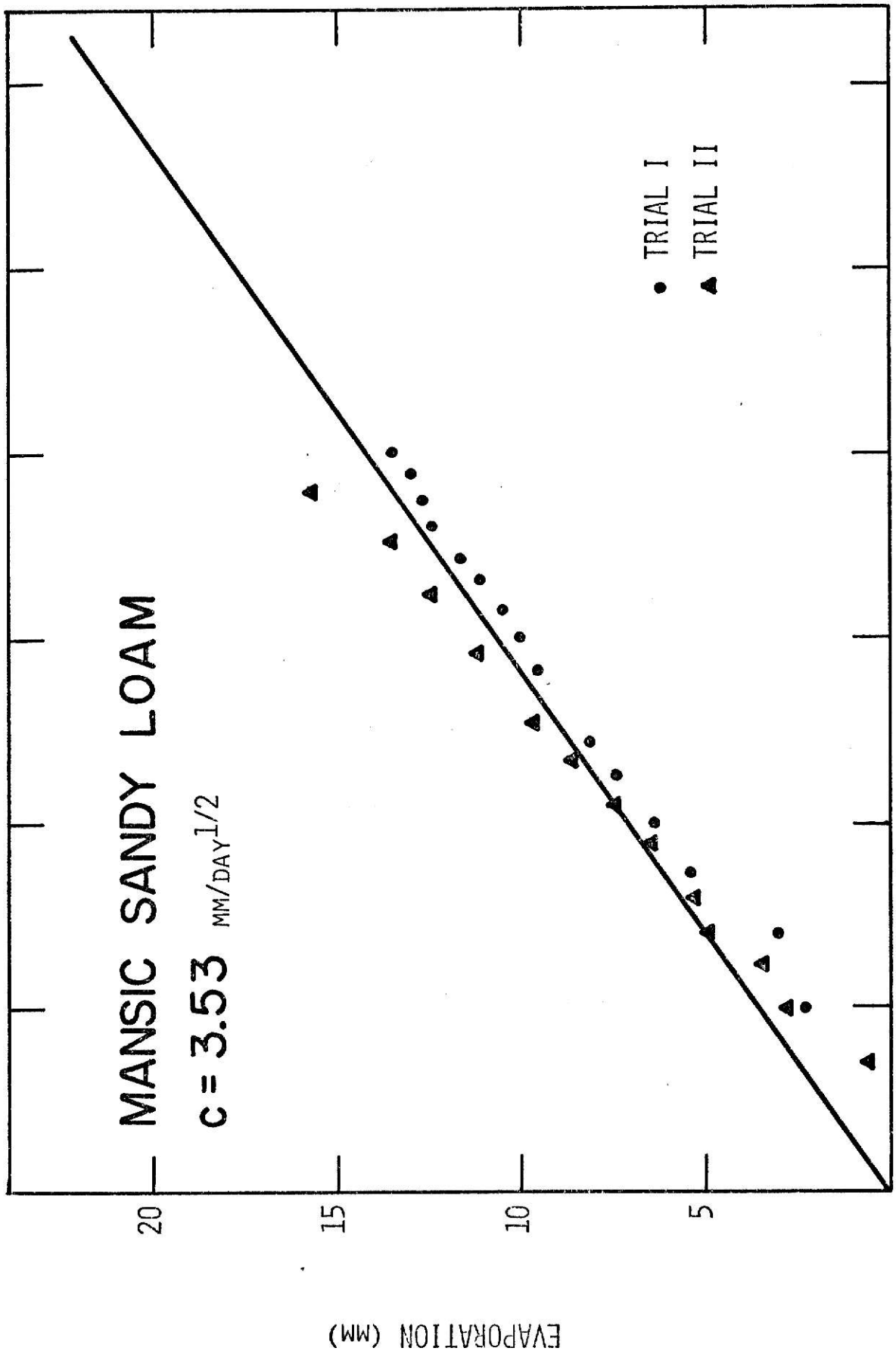

Fig. A2b. Evaporation rate during the soil-limiting stage from surface 30 cm of Mansic sandy loam.

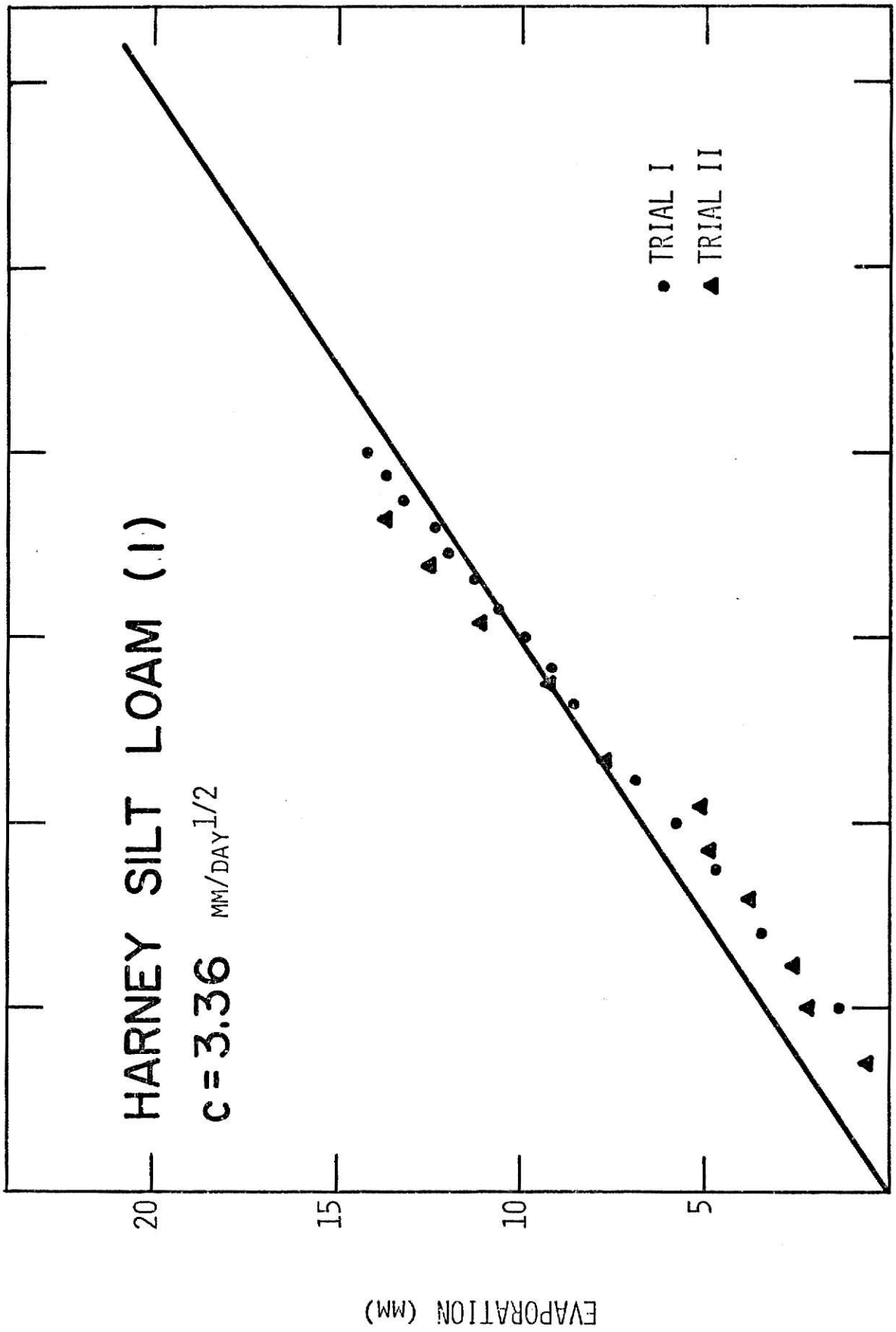

Fig. A2c. Evaporation rate during the soil-limiting stage from surface 30 cm of Harney silt loam (1).

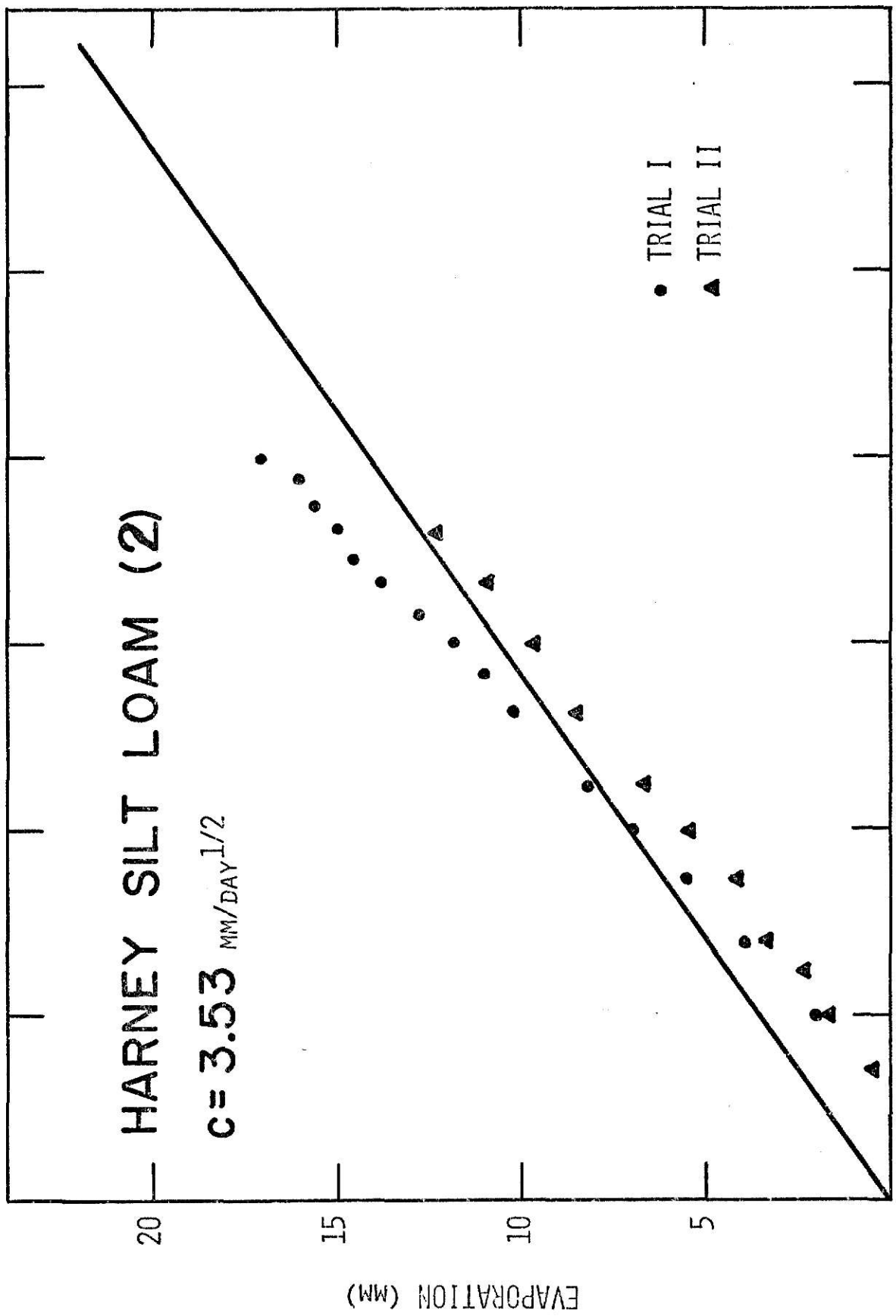

Fig. A2d. Evaporation rate during the soil-limiting stage from surface 30 cm of Harney silt loam (2).

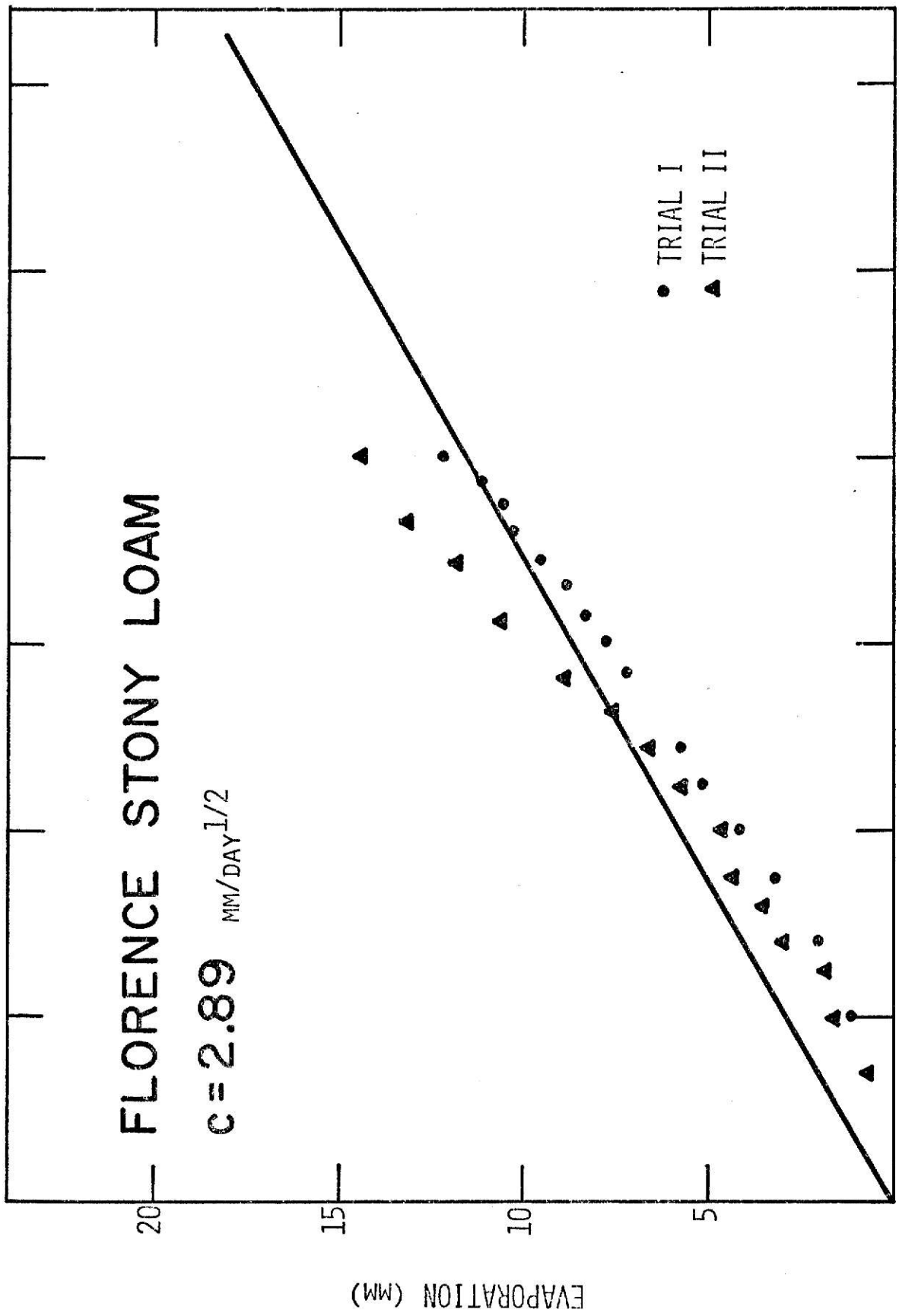

Fig. A2e. Evaporation rate during the soil-limiting stage from surface 30 cm of Florence stony loam.

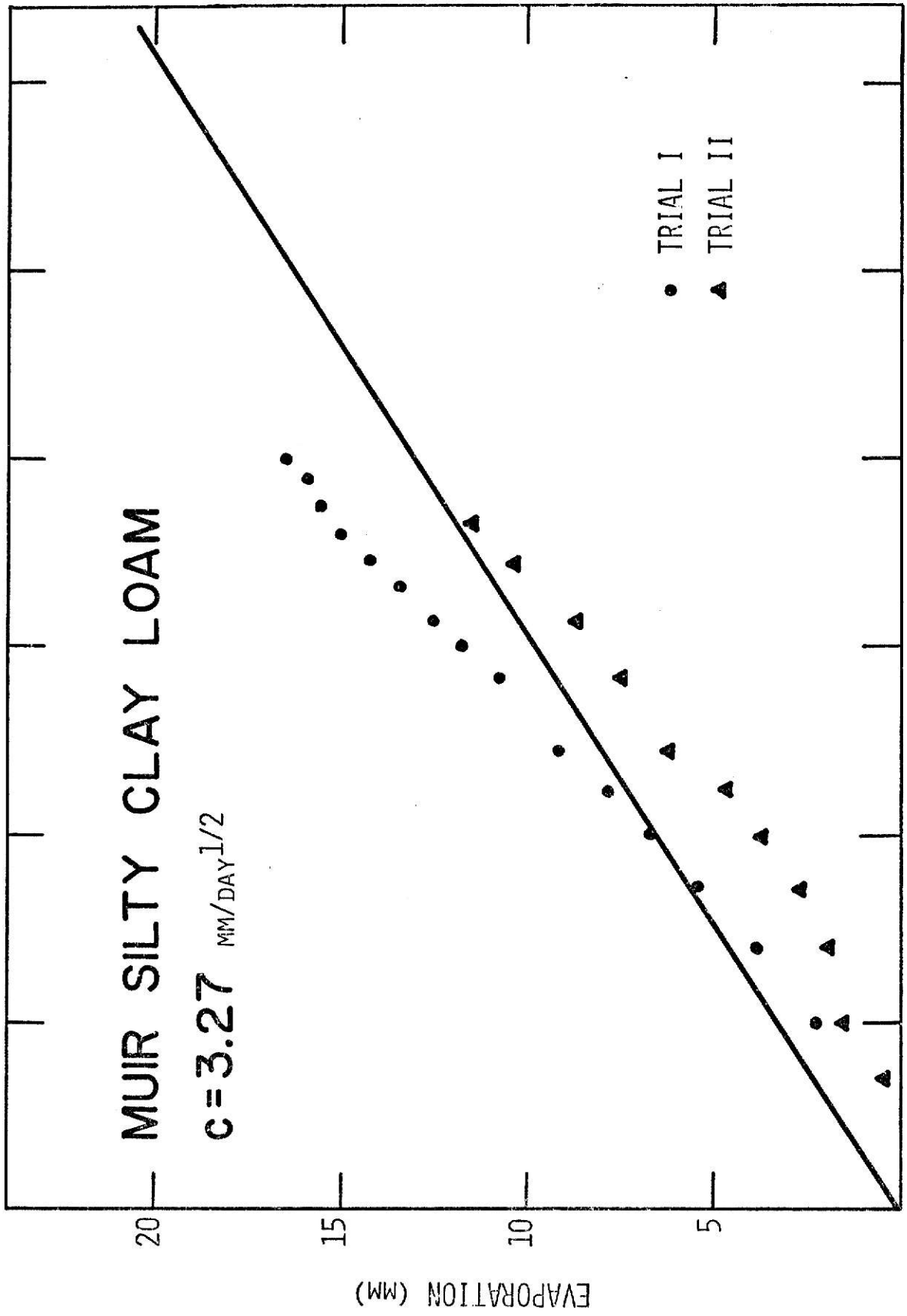

Fig. A2f. Evaporation rate during the soil-limiting stage from surface 30 cm of Muir silty clay loam.

Table A3a. Results of laboratory measurement of water retention for the surface 30 cm of 9 Kansas soils.

SOIL TYPE	Water retention			
	@-1/3 bar	@-5 bar	@-10 bar	@-15 bar
	% by weight			
Carwile sand	27.93	17.15	15.14	14.20
Florence stony loam	4.16	2.60	2.43	2.34
Manter fine sandy loam	17.12	9.45	8.56	8.13
Mansic sandy loam	24.02	15.33	14.08	13.41
Muir silty clay loam	11.84	6.58	6.22	5.86
Harney silt loam[1/]	27.94	16.25	14.47	13.52
Harney silt loam[2/]	28.01	17.34	15.69	14.79
Lancaster clay loam	28.65	14.85	13.22	12.30
Colby silt loam	26.73	18.58	17.98	17.48

1/ Sampled from Hays Expt. Sta.

2/ Sampled from Minneola Expt. Sta.

Table A3b. Summary of the results of trial I and trial II: Values of U and c for the surface 30 cm of 9 Kansas soils.

SOIL TYPE	U_1	U_2	$U_{\bar{x}}$	c_1	c_2	$c_{\bar{x}}$
	mm			mm day$^{\frac{1}{2}}$		
Carwile sand	5.0	4.9	5.0	1.69	1.66	1.68
Florence stony loam	6.7	4.6	5.7	2.68	3.10	2.89
Manter fine sandy loam	8.9	9.1	9.0	2.17	2.65	2.41
Mansic sandy loam	9.5	8.9	9.2	3.33	3.73	3.53
Muir silty clay loam	9.7	10.7	10.2	3.94	2.60	3.27
Harney silt loam 1/	10.7	11.6	11.2	3.35	3.36	3.36
Harney silt loam 2/	13.1	12.0	12.6	4.01	3.05	3.53
Lancaster clay loam	14.7	18.3	16.5	4.22	3.24	3.73
Colby silt loam	18.5	18.9	18.7	3.50	3.95	3.73

1/ Sampled from Hays Expt. Sta.

2/ Sampled from Minneola Expt. Sta.

APPENDIX B

ADDITIONAL DATA ON WATER-USE EFFICIENCY OF GRAIN SORGHUM

Table B1a. The value of moisture content (fraction by volume) at maximum water-holding capacity (θ_{max}), of minimum water-holding capacity (θ_{min}) and initial water-holding capacity (θ_{val}) for Muir silty clay loam.

Layers (cm)	θ_{min}	θ_{max}	θ_{val}		
			sI	sII	sIII
0 - 50	0.13	0.35	0.25	0.29	0.32
50 - 250	0.13	0.35	0.25	0.33	0.35
300 - 600	0.13	0.35	0.30	0.33	0.35
600 - 900	0.13	0.35	0.32	0.33	0.35
900 - 1500	0.13	0.35	0.30	0.35	0.35

Table B1b. The value of moisture content (fraction by volume) of maximum water-holding capacity (θ_{max}), at minimum water-holding capacity (θ_{min}) and initial water-holding (θ_{val}) for Carwile sand.

Layers (cm)	θ_{min}	θ_{max}	θ_{val}
0 - 50	0.05	0.18	0.14
50 - 250	0.05	0.18	0.18
300 - 600	0.05	0.27	0.27
600 - 900	0.10	0.36	0.36
900 - 1500	0.13	0.27	0.27

Table B1c . Adjustment made to evaluate the water content (fraction by volume) of maximum water-holding capacity for Carwile sand.

Layers	Top 300 cm	300-600 cm	600-900 cm	900-1500 cm
Tension	75 cm	50 cm	25 cm	330 cm
	% WHC by volume			
	10.32	31.75	35.47	0.27
	16.81	21.67	37.14	0.28
	25.71	-	-	-
Average	17.61	26.71	36.31	0.27
θ_{max}	0.18	0.27	0.36	0.27

Table B2a . Statistics of the model's estimate of soil moisture in the 150 cm compared to gravimetric and neutron attenuation measurement.

Statistics	Compared to	
	Gravimetric	Neutron
deg. of freedom (n - 1)	36	32
Std. deviation (S_D)	35.34 mm	35.95 mm
Std. deviation of differences ($S_{\overline{D}}$)	5.81 mm	6.25 mm
Mean of differences ($\overline{D}$)	-20.34 mm*	1.75 mm
$t = (\overline{D}/S_{\overline{D}})$	- 3.62 mm	0.28 mm

* Significant difference at 0.001% level.

Table B3a (i). Grain yield: Statistical Analysis

Treatment	Sorghum I	Sorghum II	Sorghum III	St. John
	----------Yield in bu/A----------			
Sample 1	95.2	120.9	102.9	98.9
Sample 2	87.4	121.3	103.9	92.9
Average	91.3[b*]	121.1[a]	103.4[b]	95.9[b]

* Means within a row followed by a common letter does not differ at 5% level of significance by Duncan's multiple range test.

Table B3a (ii). Analysis of Variance.

Source of Variation	Degree of Freedom	S.S	M.S	F
Among Treatment	3	993.59	331.2	15.49*
Error	4	85.51	21.38	
Total	7	1079.10		

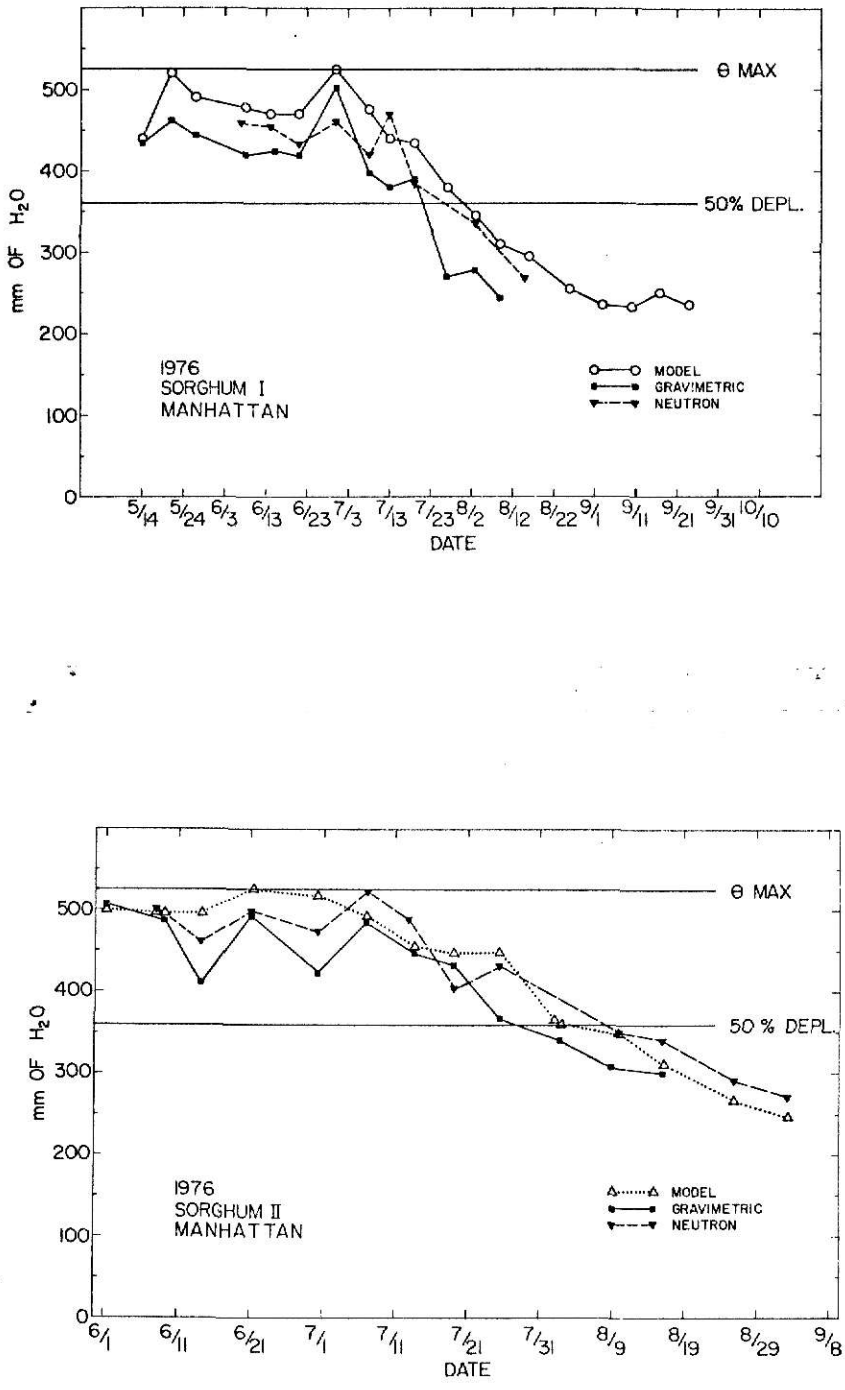

Fig.B1a. Soil moisture content in the 150-cm profile as measured by gravimetric sampling, neutron attenuation and model's estimate for sorghum I and II, Manhattan, 1976.

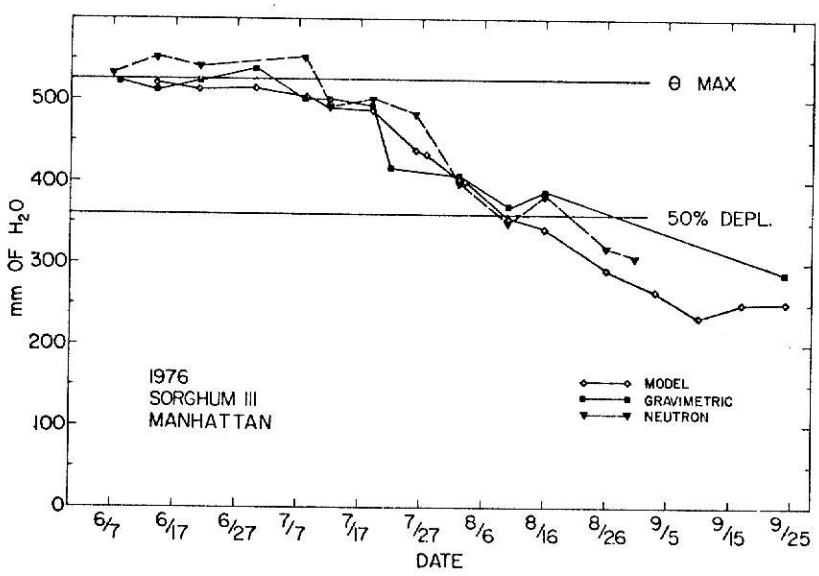

Fig. B1b. Soil moisture content in the 150-cm profile as measured by gravimetric sampling, neutron attenuation and model's estimate for sorghum III, Manhattan, 1976.

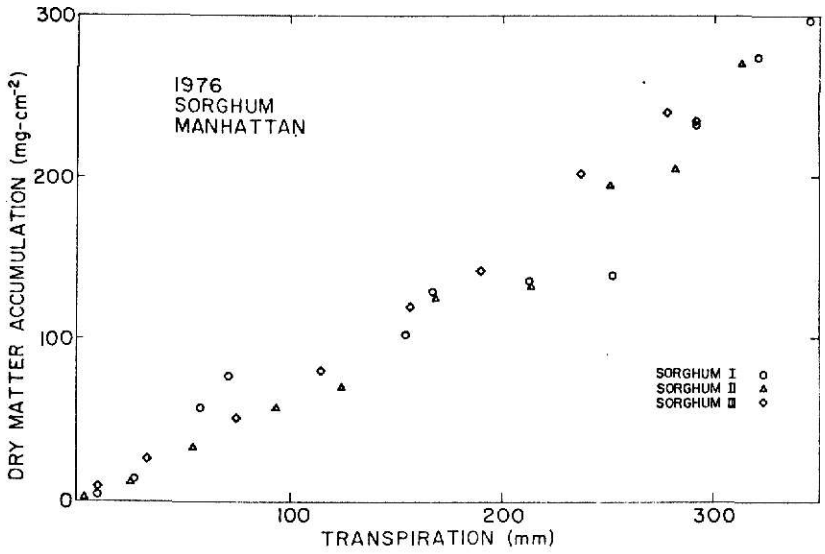

Fig.B2a. Dry matter accumulation in relation to transpiration for sorghum I, II and III; Manhattan, 1976.

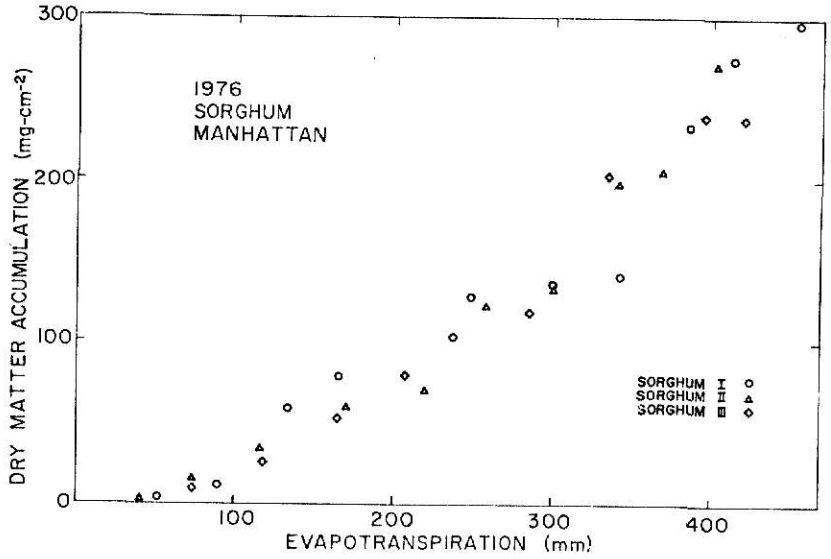

Fig. B2b. Dry matter accumulation in relation to evapotranspiration for sorghum I, II and III; Manhattan, 1976.

APPENDIX C

THE MODEL PRINT-OUT

KSU MODEL 5 FOR SORGHUM OF 1976

MAXIMUM AVAILABLE WATER (MM).....	267.0000
THETA SUB V (15 BAR).....	0.0920
THETA INITIAL IN 5 FT. PROFILE (MM).....	403.2998
THETA SUB 5 CM. LAYER.....	0.1000
U (MM).....	6.2500
ALPHA (P-T).....	3.2800
SOIL CONSTANT (MM DAY TO -1/2).....	1.8000
X SUB 5 (INIT.WATER CONTENT IN 5 CM. LAYER,WT..	0.1100
FIELD CAPACITY.....	404.9998
RMTS MULTIPLIER.....	0.0
PLANTING DATE.....	JUNE 10, 1975
FIELD/LOCATION.....	ST. JOHN SORGHUM

THIS BOOK CONTAINS NUMEROUS PAGES WITH MULTIPLE PENCIL AND/OR PEN MARKS THROUGHOUT THE TEXT.

THIS IS THE BEST IMAGE AVAILABLE.

KSU MODEL 5 FOR SORGHUM OF 1976

MO	DAY	MAX TEMP (C)	MIN TEMP (C)	TAU	RNS RAD. (LYS)	SOLAR RAD (LYS)	NET RAD (LYS)	LEAF AREA	COVER	RAIN (MM)	POT. EVAP (MM)	SOIL EVAP (MM)	TRAN EVAP (MM)	A EVAP (MM)	TOTAL EVAP (MM)	THETA (MM)	KS	PMTS	GDD
6	10	36.1	19.4	1.00	365.20	373.0	365.2	0.0	0.0	0.0	6.749	3.163	0.0	0.0	3.163	403.30	1.00	0.0	26.5
6	11	35.6	17.8	1.00	431.38	665.0	431.9	0.0	0.0	0.0	7.877	0.746	0.0	0.0	0.746	400.14	1.00	0.0	51.5
6	12	34.4	17.4	1.00	463.05	708.0	463.0	0.0	0.0	0.0	8.390	0.572	0.0	0.0	0.572	399.39	1.00	0.0	78.0
6	13	33.3	19.4	1.00	457.25	700.0	457.2	0.0	0.0	0.0	8.676	0.482	0.0	0.0	0.482	398.82	1.00	0.0	104.5
6	14	27.8	21.1	1.00	330.41	525.0	330.4	0.0	0.0	0.0	5.567	0.425	0.0	0.0	0.425	398.34	1.00	0.0	130.5
6	15	26.7	15.6	1.00	390.46	610.0	392.0	0.01	0.00	0.0	6.367	0.384	0.028	0.0	0.413	397.91	1.00	0.0	150.5
6	16	34.4	13.6	1.00	454.71	699.0	456.5	0.01	0.00	0.0	8.147	0.353	0.036	0.004	0.393	397.50	1.00	0.0	173.5
6	17	33.9	15.6	1.00	382.52	599.0	384.0	0.01	0.00	2.30	6.809	0.329	0.030	0.003	0.362	398.40	1.00	0.0	196.5
6	18	31.7	12.8	1.00	476.37	729.0	478.3	0.01	0.00	0.0	8.167	0.309	0.036	0.0	0.345	398.04	1.00	0.0	217.0
6	19	28.3	9.4	1.00	445.33	686.0	447.1	0.01	0.00	0.0	7.228	0.292	0.032	0.0	0.324	398.70	1.00	0.0	238.5
6	20	30.0	11.1	1.00	487.92	749.0	489.9	0.01	0.00	0.0	8.142	0.278	0.036	0.0	0.314	398.37	1.00	0.0	252.5
6	21	31.7	16.7	1.00	442.88	684.0	445.7	0.01	0.00	0.0	7.729	0.265	0.035	0.0	0.300	398.06	1.00	0.0	276.5
6	22	32.2	14.4	0.99	379.56	597.0	382.6	0.02	0.01	0.0	6.621	0.255	0.059	0.0	0.314	397.76	1.00	0.0	298.5
6	23	34.4	21.7	0.99	20.75	98.0	20.9	0.02	0.01	27.70	0.382	0.296	0.003	0.000	0.300	405.00	1.00	0.0	327.0
6	24	33.9	14.4	0.99	465.85	717.0	469.6	0.02	0.01	0.0	8.288	3.854	0.074	0.007	3.936	404.70	1.00	0.0	349.0
6	25	32.2	15.0	0.99	475.92	731.0	479.7	0.02	0.01	0.0	8.320	0.746	0.074	0.0	0.820	400.76	1.00	0.0	371.5
6	26	37.8	18.9	0.99	449.31	694.0	452.9	0.02	0.01	0.0	8.513	0.572	0.076	0.008	0.656	399.94	1.00	0.0	397.5
6	27	35.6	23.9	0.99	317.89	513.0	321.7	0.03	0.01	3.00	6.011	0.482	0.080	0.008	0.571	402.29	1.00	0.0	428.0
6	28	32.8	18.9	0.99	123.80	242.0	125.3	0.03	0.01	15.70	2.221	1.715	0.030	0.0	1.744	405.00	1.00	0.0	454.0
6	29	31.7	13.3	0.98	440.80	692.0	451.5	0.06	0.02	0.0	7.881	3.607	0.209	0.0	3.816	403.26	1.00	0.0	479.5
6	30	30.0	16.1	0.96	467.73	736.0	484.8	0.09	0.03	0.0	8.223	0.746	0.325	0.0	1.071	399.44	1.00	0.0	503.0
TOTALS										48.70	146.310	19.872	1.166	0.030	21.068				

KSU MODEL 5 FOR SORGHUM OF 1976

MO	DAY	MAX TEMP (C)	MIN TEMP (C)	TAU	RNS RAD. (LYS)	SOLAR RAD (LYS)	NET RAD (LYS)	LEAF AREA	COVER	RAIN (MM)	POT. EVAP (MM)	SOIL EVAP (MM)	TRAN EVAP (MM)	A EVAP (MM)	TOTAL EVAP (MM)	THETA (MM)	KS	BMTS	GDD
8	1	30.0	20.0	0.26	92.92	586.0	359.6	3.40	1.00	0.0	6.195	0.745	4.944	0.0	5.690	343.75	1.00	0.0	1351.5
8	2	24.4	16.7	0.24	26.42	286.0	108.5	3.55	1.00	30.00	1.722	0.327	1.394	0.0	1.722	368.06	1.00	0.0	1370.5
8	3	26.1	15.6	0.23	57.67	458.0	252.5	3.71	1.00	0.0	4.072	0.727	3.345	0.0	4.072	366.34	1.00	0.0	1390.0
8	4	32.2	20.0	0.21	79.70	606.0	376.3	3.90	1.00	0.0	6.657	1.101	5.555	0.0	6.657	362.27	1.00	0.0	1417.0
8	5	32.8	20.0	0.19	67.50	572.0	347.9	4.12	1.00	0.0	6.194	0.939	5.255	0.0	6.194	355.61	1.00	0.0	1444.0
8	6	30.6	17.8	0.18	66.86	604.0	374.6	4.33	1.00	0.0	6.440	0.899	5.542	0.0	6.440	349.42	1.00	0.0	1469.0
8	7	32.2	17.8	0.16	52.50	540.0	321.1	4.55	1.00	0.0	5.630	0.719	4.911	0.0	5.630	342.98	1.00	0.0	1494.0
8	8	37.2	20.0	0.15	57.81	623.0	390.5	4.80	1.00	0.0	7.329	0.848	6.481	0.643	7.977	337.35	1.00	0.0	1521.0
8	9	36.7	23.3	0.13	55.26	637.0	402.3	5.08	1.00	27.00	7.599	0.786	6.813	0.681	8.280	356.37	1.00	0.0	1551.0
8	10	36.1	20.6	0.12	31.54	467.0	260.0	5.30	1.00	26.30	4.826	0.457	4.369	0.437	5.263	374.39	1.00	0.0	1578.5
8	11	33.9	26.7	0.11	22.47	396.0	200.6	5.50	1.00	0.0	3.715	0.325	3.390	0.339	4.054	369.13	1.00	0.0	1611.5
8	12	32.9	21.1	0.10	37.09	583.0	357.1	5.69	1.00	0.0	6.470	0.525	5.945	0.595	7.065	365.07	1.00	0.0	1639.5
8	13	34.4	16.7	0.10	20.35	414.0	215.7	5.87	1.00	0.0	3.865	0.292	3.573	0.357	4.222	358.01	1.00	0.0	1663.5
8	14	33.3	20.0	0.09	26.97	513.0	298.5	6.04	1.00	0.0	5.350	0.378	4.972	0.497	5.847	353.78	1.00	0.0	1690.5
8	15	32.2	16.7	0.08	31.06	594.0	366.3	6.20	1.00	0.0	6.394	0.424	5.971	0.0	6.394	347.94	1.00	0.0	1714.5
8	16	34.4	22.2	0.08	29.66	580.0	354.6	6.32	1.00	0.0	6.495	0.410	6.085	0.608	7.104	341.54	1.00	0.0	1743.5
8	17	33.9	21.7	0.08	28.88	597.0	368.8	6.40	1.00	27.00	6.697	0.410	6.287	0.629	7.326	361.44	1.00	0.0	1772.0
8	18	33.9	22.2	0.08	27.15	579.0	353.7	6.45	1.00	26.30	6.437	0.386	6.051	0.605	7.043	380.41	1.00	0.0	1801.0
8	19	31.1	16.7	0.08	29.00	606.0	376.3	6.44	1.00	0.0	6.483	0.390	6.093	0.0	6.483	373.37	1.00	0.0	1825.0
8	20	32.2	16.1	0.08	27.95	589.0	361.3	6.43	1.00	0.0	6.293	0.380	5.913	0.0	6.293	366.89	1.00	0.0	1848.5
8	21	33.9	19.4	0.08	26.80	567.0	343.7	6.41	1.00	0.0	6.187	0.377	5.810	0.581	6.768	360.59	1.00	0.0	1875.0
8	22	34.4	21.1	0.08	25.66	560.0	337.8	6.38	1.00	0.0	6.162	0.380	5.782	0.578	6.740	353.83	1.00	0.0	1903.0
8	23	32.2	18.3	0.08	24.87	524.0	307.7	6.32	1.00	0.0	5.407	0.341	5.066	0.0	5.407	347.09	1.00	0.0	1928.5
8	24	29.4	15.6	0.08	27.14	548.0	327.8	6.26	1.00	0.0	5.510	0.356	5.154	0.0	5.510	341.69	1.00	0.0	1951.0
8	25	32.2	16.7	0.08	25.99	524.0	307.7	6.21	1.00	0.0	5.372	0.354	5.017	0.0	5.372	336.17	1.00	0.0	1975.0
8	26	34.4	20.0	0.09	30.04	568.0	344.5	6.13	1.00	0.0	6.256	0.426	5.830	0.583	6.839	330.80	1.00	0.0	2002.0
8	27	30.6	20.6	0.09	28.41	532.0	314.4	6.04	1.00	0.0	5.465	0.386	5.079	0.0	5.465	323.96	1.00	0.0	2029.5
8	28	34.4	8.3	0.09	34.48	598.0	369.6	5.96	1.00	0.0	6.410	0.467	5.943	0.594	7.005	318.49	1.00	0.0	2047.5
8	29	30.6	9.4	0.10	33.72	573.0	348.7	5.87	1.00	0.0	5.796	0.438	5.358	0.0	5.796	311.49	1.00	0.0	2065.5
8	30	28.3	14.4	0.10	18.20	375.0	183.0	5.80	1.00	0.0	3.021	0.235	2.786	0.0	3.021	305.69	1.00	0.0	2086.0
8	31	26.7	17.8	0.10	22.73	422.0	222.3	5.73	1.00	22.50	3.645	0.291	3.354	0.0	3.645	325.17	1.00	0.0	2108.0
TOTALS										159.10	174.094	15.520	158.069	7.733	181.322				

KSU MODEL 5 FOR SORGHUM OF 1976

MO	DAY	MAX TEMP (C)	MIN TEMP (C)	TAU	PNS RAD. (LYS)	SOLAR RAD (LYS)	NET RAD (LYS)	LEAF AREA	COVER	RAIN (MM)	POT. EVAP (MM)	SOIL EVAP (MM)	TRAN EVAP (MM)	A EVAP (MM)	TOTAL EVAP (MM)	THETA (MM)	KS	BMTS	GDD
7	1	28.9	15.7	0.96	409.22	659.0	427.5	0.11	0.04	13.20	7.171	3.217	0.346	0.0	3.563	405.00	1.00	0.0	526.0
7	2	24.4	17.2	0.95	281.65	480.0	297.8	0.14	0.05	41.10	4.735	3.499	0.289	0.0	3.787	405.00	1.00	0.0	545.5
7	3	26.1	16.1	0.93	68.32	170.0	73.1	0.17	0.06	3.50	1.182	0.363	0.087	0.0	0.950	404.81	1.00	0.0	565.5
7	4	28.3	19.4	0.92	359.35	606.0	389.1	0.20	0.07	0.0	6.556	2.838	0.564	0.0	3.402	403.86	1.00	0.0	590.5
7	5	30.6	18.9	0.91	332.20	647.0	418.8	0.23	0.08	0.0	7.232	-0.746	-0.712	0.0	1.457	400.46	1.00	0.0	616.5
7	6	33.9	18.3	0.90	388.12	663.0	430.4	0.26	0.09	0.0	7.715	0.572	0.353	0.086	1.511	399.00	1.00	0.0	642.0
7	7	35.3	20.0	0.89	306.66	549.0	347.8	0.30	0.10	0.0	6.399	0.482	0.810	0.081	1.374	397.49	1.00	0.0	669.0
7	8	35.6	21.7	0.87	366.46	648.0	419.6	0.34	0.11	0.0	7.770	0.425	1.106	0.111	1.642	396.12	1.00	0.0	697.5
7	9	35.0	18.9	0.86	384.97	687.0	447.8	0.38	0.13	0.0	8.150	0.384	1.287	0.129	1.800	394.48	1.00	0.0	723.5
7	10	32.8	20.6	0.85	370.92	674.0	438.4	0.42	0.14	0.0	7.823	0.353	1.355	0.0	1.708	392.68	1.00	0.0	751.0
7	11	32.8	20.0	0.83	335.96	628.0	405.1	0.47	0.15	0.0	7.212	0.329	1.384	0.0	1.713	390.97	1.00	0.0	778.0
7	12	32.2	20.6	0.81	346.43	657.0	426.1	0.52	0.17	0.0	7.554	0.309	1.589	0.0	1.897	389.25	1.00	0.0	805.5
7	13	32.3	20.0	0.79	310.45	613.0	394.2	0.60	0.20	0.0	7.019	0.292	1.677	0.0	1.969	387.36	1.00	0.0	832.5
7	14	32.8	20.6	0.75	309.58	638.0	412.3	0.72	0.24	0.0	7.358	0.278	2.062	0.0	2.340	385.39	1.00	0.0	860.0
7	15	32.8	18.9	0.71	205.51	479.0	290.5	0.87	0.29	7.60	5.151	2.345	1.696	0.0	4.542	390.65	1.00	0.0	886.0
7	16	31.1	18.3	0.67	293.09	676.0	439.9	1.02	0.34	0.0	7.628	3.971	2.863	0.0	6.835	386.11	1.00	0.0	911.5
7	17	31.1	20.0	0.63	214.74	543.0	343.5	1.18	0.39	0.0	5.996	1.757	2.528	0.0	4.285	379.27	1.00	0.0	938.5
7	18	32.8	20.0	0.58	251.09	662.0	429.7	1.35	0.45	0.0	7.651	0.746	3.578	0.0	4.324	374.99	1.00	0.0	965.5
7	19	32.2	21.1	0.55	233.21	656.0	425.4	1.51	0.50	0.0	7.557	0.572	3.841	0.0	4.413	370.66	1.00	0.0	993.5
7	20	33.9	21.7	0.51	197.94	600.0	384.8	1.67	0.56	0.0	6.987	0.482	3.817	0.382	4.681	366.25	1.00	0.0	1022.0
7	21	33.9	20.0	0.46	166.14	544.0	344.2	1.83	0.61	0.0	6.209	0.425	3.613	0.361	4.400	361.57	1.00	0.0	1049.0
7	22	33.3	21.1	0.46	194.53	657.0	426.1	1.97	0.66	0.0	7.670	0.394	4.689	0.469	5.542	357.17	1.00	0.0	1077.0
7	23	32.2	20.0	0.43	166.46	601.0	385.5	2.11	0.70	0.0	6.819	0.353	4.359	0.0	4.712	351.63	1.00	0.0	1104.0
7	24	34.4	18.9	0.41	174.41	656.0	425.4	2.24	0.75	0.0	7.691	0.329	5.104	0.510	5.944	346.91	1.00	0.0	1130.0
7	25	35.0	19.4	0.39	154.33	616.0	396.4	2.37	0.79	0.0	7.229	0.309	4.966	0.497	5.772	340.97	1.00	0.0	1156.5
7	26	35.6	22.2	0.37	152.98	640.0	413.8	2.50	0.83	27.00	7.680	2.218	5.462	0.546	8.226	362.20	1.00	0.0	1185.5
7	27	35.6	21.1	0.35	129.23	577.0	368.1	2.63	0.88	26.30	6.802	1.866	4.937	0.494	7.296	380.27	1.00	0.0	1213.5
7	28	34.4	20.6	0.33	109.47	524.0	329.7	2.77	0.92	0.0	6.000	1.556	4.443	0.444	6.444	372.98	1.00	0.0	1241.0
7	29	34.4	20.0	0.31	129.82	644.0	416.7	2.93	0.98	0.0	7.566	1.842	5.725	0.572	8.139	366.53	1.00	0.0	1268.0
7	30	34.4	22.2	0.29	120.03	645.0	409.0	3.08	1.00	0.0	7.492	1.718	5.774	0.577	8.069	358.39	1.00	0.0	1297.0
7	31	37.3	20.6	0.27	95.88	574.0	349.5	3.25	1.00	0.0	6.618	0.851	5.199	0.520	6.570	350.32	1.00	0.0	1324.5
TOTALS										118.80	212.621	36.812	86.715	5.779	129.306				

KSU MODEL 5 FOR SORGHUM OF 1976

MO	DAY	MAX TEMP (C)	MIN TEMP (C)	TAU	ENS RAD. (LYS)	SOLAR RAD (LYS)	NET RAD (LYS)	LEAF AREA	COVER	RAIN (MM)	POT. EVAP (MM)	SOIL EVAP (MM)	TRAN EVAP (MM)	A EVAP (MM)	TOTAL EVAP (MM)	THETA (MM)	KS	BMTS	GDD
9	1	23.3	14.4	0.11	30.24	496.0	284.3	5.63	1.00	22.00	4.692	0.390	4.302	0.0	4.692	343.52	1.00	0.0	2128.5
9	2	30.0	12.2	0.11	35.27	537.0	319.6	5.53	1.00	0.0	5.319	0.460	4.859	0.0	5.319	338.83	1.00	0.0	2148.5
9	3	35.6	16.7	0.11	37.84	552.0	331.1	5.45	1.00	0.0	6.013	0.537	5.476	0.548	6.561	333.51	1.00	0.0	2172.5
9	4	37.2	16.7	0.12	38.38	545.0	325.3	5.37	1.00	0.0	6.024	0.555	5.469	0.547	6.571	326.95	1.00	0.0	2196.5
9	5	35.6	19.4	0.12	38.75	538.0	319.4	5.30	1.00	0.0	5.864	0.556	5.308	0.531	6.395	320.38	1.00	0.0	2223.0
9	6	34.4	21.1	0.12	38.90	529.0	311.9	5.23	1.00	0.0	5.698	0.554	5.134	0.513	6.202	313.99	1.00	0.0	2251.0
9	7	32.2	18.9	0.13	35.21	483.0	273.4	5.15	1.00	4.80	4.815	0.484	4.331	0.0	4.815	312.58	1.00	0.0	2277.0
9	8	23.9	12.2	0.13	35.21	146.0	-8.6	5.07	1.00	0.0	0.0	0.0	0.0	0.0	0.0	307.77	1.00	0.0	2291.5
9	9	22.9	10.0	0.14	35.03	463.0	256.7	5.00	1.00	0.0	3.863	0.413	3.451	0.0	3.863	307.77	1.00	0.0	2303.0
9	10	26.7	8.3	0.14	41.65	509.0	295.2	4.92	1.00	0.0	4.648	0.542	4.135	0.0	4.648	303.91	1.00	0.0	2318.0
9	11	31.7	15.0	0.15	43.49	512.0	298.5	4.84	1.00	0.0	5.143	0.585	4.557	0.0	5.143	299.26	1.00	0.0	2340.5
9	12	31.7	16.1	0.15	41.79	487.0	276.7	4.75	1.00	0.0	4.789	0.565	4.224	0.0	4.789	294.12	1.00	0.0	2364.0
9	13	30.0	12.3	0.16	11.23	242.0	71.7	4.66	1.00	4.10	1.227	0.090	1.077	0.0	1.167	293.43	1.00	0.0	2389.5
9	14	26.7	16.7	0.16	10.14	231.0	62.5	4.57	1.00	0.0	1.020	0.174	0.891	0.0	1.065	292.26	1.00	0.0	2410.5
9	15	26.1	14.7	0.17	29.36	365.0	174.7	4.48	1.00	19.60	2.834	0.372	2.458	0.0	2.830	310.79	1.00	0.0	2431.0
9	16	26.7	13.3	0.17	19.14	287.0	109.4	4.38	1.00	0.0	1.797	0.246	1.552	0.0	1.797	307.96	1.00	0.0	2453.5
9	17	23.9	17.2	0.18	42.31	434.0	232.4	4.28	1.00	0.0	3.906	0.556	3.351	0.0	3.906	306.17	1.00	0.0	2477.0
9	18	32.2	19.4	0.19	39.27	405.0	208.1	4.19	1.00	0.0	3.673	0.542	3.132	0.0	3.673	302.26	1.00	0.0	2503.5
9	19	30.0	15.6	0.20	26.96	321.0	137.8	4.10	1.00	0.0	2.333	0.356	1.976	0.0	2.333	298.59	1.00	0.0	2526.5
9	20	20.6	10.0	0.20	50.64	456.0	250.8	4.02	1.00	55.90	3.657	0.577	3.080	0.0	3.657	352.15	1.00	0.0	2536.0
9	21	25.6	10.0	0.14	38.94	490.0	279.3	4.95	1.00	0.0	4.365	0.476	3.890	0.0	4.365	348.53	1.00	0.0	2550.0
9	22	23.9	11.1	0.14	32.23	426.0	225.7	4.89	1.00	0.0	3.700	0.413	3.287	0.0	3.700	344.13	1.00	0.0	2568.0
9	23	24.4	12.8	0.15	38.19	467.0	260.0	4.82	1.00	14.00	4.054	0.465	3.589	0.0	4.054	354.43	1.00	0.0	2583.5
9	24	27.2	11.7	0.15	38.02	456.0	250.8	4.74	1.00	0.0	4.035	0.478	3.557	0.0	4.035	350.38	1.00	0.0	2600.5
9	25	20.0	15.6	0.15	38.02	50.0	-88.9	4.66	1.00	0.0	0.0	0.0	0.0	0.0	0.0	346.34	1.00	0.0	2614.5
9	26	22.2	14.4	0.16	11.68	243.0	72.6	4.59	1.00	12.40	1.106	0.139	0.967	0.0	1.106	358.74	1.00	0.0	2629.5
9	27	13.9	8.3	0.17	7.99	214.0	48.3	4.52	1.00	0.0	0.627	0.081	0.546	0.0	0.627	357.63	1.00	0.0	2633.0
9	28	15.0	3.3	0.17	41.96	451.0	246.6	4.45	1.00	2.30	3.169	0.421	2.747	0.0	3.169	359.31	1.00	0.0	2637.5
9	29	22.2	4.4	0.17	45.64	468.0	260.8	4.38	1.00	0.0	3.793	0.518	3.274	0.0	3.793	356.14	1.00	0.0	2648.5
9	30	31.1	7.8	0.18	47.56	471.0	263.4	4.30	1.00	0.0	4.377	0.618	3.759	0.0	4.377	352.35	1.00	0.0	2666.5
TOTALS										135.10	106.529	12.132	94.382	2.139	108.653				

Total PE = 636.275 mm

KSU MODEL 5 FOR SORGHUM OF 1976

		THETA VALUES					TRANSPIRATION												
MO	DY	LAYER 1	LAYER 2	LAYER 3	LAYER 4	LAYER 5	LAYER 1	LAYER 2	LAYER 3	LAYER 4	LAYER 5	RNOFF	DRAIN	THETA	TRANS EVAP	TOT. EVAP	KS	DEPL.	DEPL.
		0-5 CM	5-30 CM	30-60 CM	60-90 CM	90-180 CM	0-5 CM	5-30 CM	30-60 CM	60-90 CM	90-180 CM	(MM)	(MM)	0-150 CM	(MM)	(MM)		0-90 CM	0-150 CM
6	10	0.100	0.175	0.270	0.360	0.270	0.0	0.0	0.0	0.0	0.0	0.0	0.0	399.84	0.0	3.16	0.0	2.8	1.9
6	11	0.100	0.172	0.270	0.360	0.270	0.0	0.0	0.0	0.0	0.0	0.0	0.0	399.09	0.0	0.75	0.0	3.2	2.2
6	12	0.100	0.170	0.270	0.360	0.270	0.0	0.0	0.0	0.0	0.0	0.0	0.0	398.52	0.0	0.57	0.0	3.5	2.4
6	13	0.100	0.168	0.270	0.360	0.270	0.0	0.0	0.0	0.0	0.0	0.0	0.0	398.04	0.0	0.48	0.0	3.8	2.5
6	14	0.100	0.166	0.270	0.360	0.270	0.0	0.0	0.0	0.0	0.0	0.0	0.0	397.61	0.0	0.42	0.0	4.0	2.8
6	15	0.100	0.165	0.270	0.360	0.270	0.003	0.014	0.011	0.0	0.0	0.0	0.0	397.20	0.03	0.41	1.00	4.3	2.9
6	16	0.100	0.163	0.270	0.360	0.270	0.004	0.020	0.016	0.0	0.0	0.0	0.0	396.81	0.04	0.39	1.00	4.5	3.1
6	17	0.139	0.163	0.270	0.360	0.270	0.003	0.017	0.013	0.0	0.0	0.0	0.0	398.74	0.03	0.36	1.00	3.4	2.3
6	18	0.133	0.163	0.270	0.360	0.270	0.004	0.018	0.015	0.0	0.0	0.0	0.0	398.43	0.04	0.35	1.00	3.6	2.5
6	19	0.127	0.163	0.270	0.360	0.270	0.003	0.016	0.013	0.0	0.0	0.0	0.0	398.07	0.03	0.32	1.00	3.8	2.6
6	20	0.121	0.163	0.270	0.360	0.270	0.004	0.018	0.015	0.0	0.0	0.0	0.0	397.76	0.04	0.31	1.00	4.0	2.7
6	21	0.116	0.163	0.270	0.360	0.270	0.003	0.017	0.014	0.0	0.0	0.0	0.0	397.45	0.03	0.30	1.00	4.1	2.8
6	22	0.111	0.163	0.270	0.360	0.270	0.006	0.030	0.024	0.0	0.0	0.0	0.0	397.15	0.06	0.31	1.00	4.3	2.9
6	23	0.494	0.193	0.270	0.360	0.270	0.000	0.002	0.002	0.0	0.0	0.59	0.0	423.95	0.00	0.30	1.00	-10.4	-7.1
6	24	0.417	0.193	0.269	0.360	0.270	0.008	0.041	0.033	0.0	0.0	0.0	0.0	423.02	0.08	3.94	1.00	-3.2	-5.6
6	25	0.165	0.227	0.280	0.360	0.270	0.007	0.037	0.030	0.0	0.0	0.0	0.0	419.20	0.07	0.82	1.00	-7.8	-5.3
6	26	0.153	0.227	0.280	0.360	0.270	0.008	0.042	0.033	0.0	0.0	0.0	0.0	418.54	0.08	0.66	1.00	-7.4	-5.1
6	27	0.204	0.180	0.309	0.370	0.270	0.009	0.044	0.035	0.0	0.0	0.0	0.0	420.97	0.09	0.57	1.00	-8.7	-6.0
6	28	0.466	0.183	0.309	0.370	0.270	0.003	0.015	0.012	0.0	0.0	0.0	0.0	434.93	0.03	1.74	1.00	-16.4	-11.2
6	29	0.393	0.183	0.270	0.399	0.273	0.021	0.105	0.084	0.0	0.0	0.0	0.0	430.07	0.21	3.82	1.00	-12.6	-9.4
6	30	0.164	0.222	0.272	0.399	0.273	0.033	0.163	0.130	0.0	0.0	0.0	0.0	429.00	0.33	1.07	1.00	-12.0	-9.0
TOTALS												0.6	0.0		1.2	21.1			

KSU MODEL 5 FOR SORGHUM OF 1976

		THETA VALUES					TRANSPIRATION												
MO	DY	LAYER 1	LAYER 2	LAYER 3	LAYER 4	LAYER 5	LAYER 1	LAYER 2	LAYER 3	LAYER 4	LAYER 5	RNOFF	DRAIN	THETA	TRANS EVAP	TOT. EVAP	* KS	DEPL.	DEPL.
		0-5 CM	5-30 CM	30-60 CM	60-90 CM	90-180 CM	0-5 CM	5-30 CM	30-60 CM	60-90 CM	90-180 CM	(MM)	(MM)	0-150 CM	(MM)	(MM)		0-90 CM	0-150 CM
7	1	0.363	0.221	0.271	0.360	0.283	0.035	0.173	0.138	0.0	0.0	0.0	3.11	432.66	0.35	3.56	1.00	-10.8	-10.4
7	2	0.429	0.258	0.304	0.361	0.283	0.029	0.144	0.115	0.0	0.0	4.66	0.0	465.31	0.29	3.79	1.00	-28.7	-22.6
7	3	0.483	0.298	0.304	0.361	0.270	0.009	0.043	0.035	0.0	0.0	0.0	11.71	460.15	0.09	0.95	1.00	-30.1	-20.7
7	4	0.425	0.297	0.269	0.294	0.270	0.056	0.282	0.226	0.0	0.0	0.0	0.0	456.63	0.56	3.40	1.00	-28.1	-19.3
7	5	0.164	0.228	0.366	0.394	0.270	0.071	0.356	0.285	0.0	0.0	0.0	0.0	455.17	0.71	1.46	1.00	-27.3	-18.8
7	6	0.150	0.226	0.364	0.360	0.281	0.094	0.469	0.375	0.0	0.0	0.0	0.36	450.03	0.94	1.51	1.00	-20.9	-16.9
7	7	0.139	0.178	0.307	0.454	0.281	0.089	0.446	0.357	0.0	0.0	0.0	0.0	448.66	0.89	1.37	1.00	-20.2	-16.4
7	8	0.128	0.176	0.305	0.454	0.270	0.122	0.609	0.487	0.0	0.0	0.0	10.17	440.24	1.22	1.64	1.00	-19.3	-13.2
7	9	0.117	0.173	0.268	0.395	0.301	0.142	0.708	0.566	0.0	0.0	0.0	0.0	429.00	1.42	1.80	1.00	-2.8	-9.0
7	10	0.108	0.170	0.266	0.395	0.301	0.135	0.677	0.542	0.0	0.0	0.0	0.0	427.29	1.35	1.71	1.00	-1.9	-8.3
7	11	0.098	0.167	0.264	0.360	0.282	0.138	0.692	0.554	0.0	0.0	0.0	28.33	403.17	1.38	1.71	1.00	4.9	0.7
7	12	0.097	0.163	0.262	0.360	0.282	0.159	0.794	0.635	0.0	0.0	0.0	0.0	401.27	1.59	1.90	1.00	5.9	1.4
7	13	0.097	0.158	0.260	0.360	0.270	0.168	0.839	0.671	0.0	0.0	0.0	10.57	392.26	1.68	1.97	1.00	7.0	4.8
7	14	0.096	0.152	0.257	0.360	0.270	0.206	1.031	0.825	0.0	0.0	0.0	0.0	389.92	2.06	2.34	1.00	8.2	5.6
7	15	0.188	0.149	0.255	0.360	0.270	0.170	0.848	0.678	0.0	0.0	0.0	0.0	382.97	1.70	4.54	1.00	6.6	4.5
7	16	0.105	0.145	0.253	0.358	0.269	0.143	0.716	0.716	0.716	0.573	0.0	0.0	386.33	2.86	6.83	1.00	10.0	7.0
7	17	0.097	0.137	0.251	0.356	0.269	0.126	0.632	0.632	0.632	0.506	0.0	0.0	382.21	2.53	4.29	1.00	12.1	8.5
7	18	0.096	0.130	0.248	0.353	0.268	0.179	0.894	0.894	0.894	0.716	0.0	0.0	378.13	3.58	4.32	1.00	14.0	10.1
7	19	0.096	0.123	0.244	0.349	0.267	0.192	0.960	0.960	0.960	0.768	0.0	0.0	373.97	3.84	4.41	1.00	16.0	11.6
7	20	0.096	0.116	0.241	0.346	0.266	0.210	1.050	1.050	1.050	0.840	0.0	0.0	369.57	4.20	4.68	1.00	18.1	13.3
7	21	0.096	0.110	0.238	0.343	0.265	0.199	0.994	0.994	0.994	0.795	0.0	0.0	365.44	3.97	4.40	1.00	20.1	14.8
7	22	0.095	0.102	0.233	0.338	0.264	0.258	1.290	1.290	1.290	1.032	0.0	0.0	360.24	5.16	5.54	1.00	22.6	16.8
7	23	0.095	0.096	0.229	0.335	0.263	0.218	1.090	1.090	1.090	0.872	0.0	0.0	355.82	4.36	4.71	1.00	24.7	18.4
7	24	0.094	0.094	0.219	0.330	0.262	0.281	1.404	1.404	1.404	1.123	0.0	0.0	350.25	5.61	5.94	1.00	27.3	20.5
7	25	0.095	0.095	0.208	0.325	0.261	0.273	1.366	1.366	1.366	1.093	0.0	0.0	344.84	5.46	5.77	1.00	29.3	22.5
7	26	0.450	0.114	0.203	0.320	0.259	0.300	1.502	1.502	1.502	1.202	0.41	0.0	363.60	6.01	8.23	1.00	19.2	15.5
7	27	0.457	0.203	0.199	0.316	0.258	0.272	1.358	1.358	1.358	1.086	0.23	0.0	382.74	5.43	7.30	1.00	8.3	8.3
7	28	0.421	0.198	0.194	0.312	0.257	0.244	1.222	1.222	1.222	0.978	0.0	0.0	376.62	4.89	6.44	1.00	11.3	10.6
7	29	0.137	0.222	0.204	0.306	0.256	0.315	1.574	1.574	1.574	1.259	0.0	0.0	368.91	6.30	8.14	1.00	15.0	13.5
7	30	0.096	0.216	0.199	0.301	0.254	0.318	1.583	1.588	1.588	1.270	0.0	0.0	361.26	6.35	8.07	1.00	18.8	16.4
7	31	0.094	0.170	0.224	0.296	0.253	0.286	1.430	1.430	1.430	1.144	0.0	0.0	355.07	5.72	6.57	1.00	21.7	18.7
TOTALS												5.3	64.2		92.5	129.3			

KSU MODEL 5 FOR SORGHUM OF 1976

		THETA VALUES					TRANSPIRATION												
MO	DY	LAYER 1	LAYER 2	LAYER 3	LAYER 4	LAYER 5	LAYER 1	LAYER 2	LAYER 3	LAYER 4	LAYER 5	RNOFF	DRAIN	THETA	TRANS	TOT. EVAP	KS	DEPL.	DEPL.
		0-5 CM	5-30 CM	30-60 CM	60-90 CM	90-180 CM	0-5 CM	5-30 CM	30-60 CM	60-90 CM	90-180 CM	(MM)	(MM)	0-150 CM	EVAP (MM)	(MM)		0-90 CM	0-150 CM
8	1	0.095	0.161	0.219	0.292	0.252	0.247	1.236	1.236	1.236	0.989	0.0	0.0	349.71	4.94	5.69	1.00	24.3	20.7
8	2	0.492	0.194	0.218	0.291	0.252	0.070	0.349	0.349	0.349	0.279	1.22	0.0	376.86	1.39	1.72	1.00	9.4	10.5
8	3	0.474	0.190	0.215	0.288	0.251	0.167	0.836	0.836	0.836	0.669	0.0	0.0	373.01	3.35	4.07	1.00	11.2	12.0
8	4	0.152	0.233	0.220	0.284	0.250	0.278	1.389	1.389	1.389	1.111	0.0	0.0	366.72	5.56	6.66	1.00	14.2	14.3
8	5	0.128	0.223	0.215	0.279	0.248	0.263	1.314	1.314	1.314	1.051	0.0	0.0	360.88	5.26	6.19	1.00	17.1	16.5
8	6	0.105	0.174	0.251	0.275	0.247	0.277	1.386	1.386	1.386	1.108	0.0	0.0	354.81	5.54	6.44	1.00	20.0	18.8
8	7	0.095	0.168	0.246	0.271	0.246	0.246	1.228	1.228	1.228	0.982	0.0	0.0	349.51	4.91	5.63	1.00	22.5	20.8
8	8	0.093	0.155	0.241	0.265	0.245	0.356	1.782	1.782	1.782	1.426	0.0	0.0	342.00	7.13	7.98	1.00	25.1	23.6
8	9	0.477	0.174	0.234	0.258	0.243	0.375	1.874	1.874	1.874	1.499	0.41	0.0	360.61	7.49	8.28	1.00	15.3	16.5
8	10	0.436	0.268	0.230	0.254	0.242	0.243	1.201	1.201	1.201	0.961	0.23	0.0	381.94	4.81	5.26	1.00	3.4	8.6
8	11	0.476	0.265	0.227	0.251	0.241	0.186	0.932	0.932	0.932	0.746	0.0	0.0	378.14	3.73	4.05	1.00	5.2	10.1
8	12	0.153	0.233	0.292	0.246	0.240	0.327	1.635	1.635	1.635	1.308	0.0	0.0	371.51	6.54	7.06	1.00	8.3	12.5
8	13	0.153	0.229	0.285	0.243	0.239	0.197	0.983	0.983	0.983	0.786	0.0	0.0	367.55	3.93	4.22	1.00	10.2	14.0
8	14	0.140	0.175	0.306	0.257	0.237	0.273	1.367	1.367	1.367	1.094	0.0	0.0	362.07	5.47	5.85	1.00	12.8	16.1
8	15	0.126	0.169	0.301	0.252	0.236	0.299	1.493	1.493	1.493	1.194	0.0	0.0	356.07	5.97	6.39	1.00	15.6	18.3
8	16	0.111	0.152	0.264	0.278	0.235	0.335	1.673	1.673	1.673	1.339	0.0	0.0	349.41	6.69	7.10	1.00	13.8	20.9
8	17	0.485	0.133	0.259	0.272	0.233	0.346	1.729	1.729	1.729	1.383	0.41	0.0	369.14	6.92	7.33	1.00	7.5	13.4
8	18	0.466	0.278	0.253	0.266	0.232	0.333	1.664	1.664	1.664	1.331	0.23	0.0	388.61	6.66	7.04	1.00	-3.6	6.1
8	19	0.472	0.272	0.248	0.261	0.230	0.305	1.523	1.523	1.523	1.219	0.0	0.0	382.53	6.09	6.48	1.00	-0.7	8.4
8	20	0.166	0.242	0.320	0.256	0.229	0.296	1.478	1.478	1.478	1.182	0.0	0.0	376.64	5.91	6.29	1.00	2.1	10.6
8	21	0.153	0.226	0.314	0.251	0.223	0.323	1.598	1.598	1.598	1.278	0.0	0.0	370.29	6.39	6.77	1.00	5.1	13.0
8	22	0.139	0.174	0.303	0.270	0.226	0.318	1.590	1.590	1.590	1.272	0.0	0.0	363.98	6.36	6.74	1.00	8.0	15.4
8	23	0.127	0.169	0.299	0.286	0.225	0.253	1.266	1.266	1.266	1.013	0.0	0.0	358.91	5.07	5.41	1.00	10.4	17.3
8	24	0.114	0.163	0.266	0.310	0.224	0.258	1.288	1.288	1.288	1.031	0.0	0.0	353.74	5.15	5.51	1.00	12.9	19.2
8	25	0.102	0.158	0.262	0.306	0.223	0.251	1.254	1.254	1.254	1.003	0.0	0.0	348.71	5.02	5.37	1.00	15.3	21.1
8	26	0.094	0.151	0.256	0.301	0.221	0.321	1.603	1.603	1.603	1.283	0.0	0.0	342.29	6.41	6.84	1.00	18.3	23.5
8	27	0.086	0.143	0.252	0.297	0.220	0.254	1.270	1.270	1.270	1.016	0.0	0.0	337.17	5.08	5.46	1.00	20.7	25.4
8	28	0.093	0.133	0.246	0.291	0.219	0.327	1.634	1.634	1.634	1.307	0.0	0.0	330.60	6.54	7.00	1.00	23.9	27.9
8	29	0.095	0.125	0.242	0.287	0.218	0.268	1.339	1.339	1.339	1.072	0.0	0.0	325.16	5.36	5.80	1.00	26.4	29.9
8	30	0.097	0.120	0.240	0.284	0.217	0.139	0.697	0.697	0.697	0.557	0.0	0.0	322.32	2.79	3.02	1.00	27.8	31.0
8	31	0.491	0.126	0.237	0.282	0.216	0.168	0.838	0.838	0.838	0.671	0.0	0.0	341.40	3.35	3.65	1.00	17.1	23.8
TOTALS												2.5	0.0		165.8	181.3			

KSU MODEL 5 FOR SORGHUM OF 1976

		THETA VALUES					TRANSPIRATION												
MO	DY	LAYER 1	LAYER 2	LAYER 3	LAYER 4	LAYER 5	LAYER 1	LAYER 2	LAYER 3	LAYER 4	LAYER 5	RNOFF	DRAIN	THETA	TRANS EVAP	TOT. EVAP	KS	DEPL.	DEPL.
		0-5 CM	5-30 CM	30-60 CM	60-90 CM	90-180 CM	0-5 CM	5-30 CM	30-60 CM	60-90 CM	90-180 CM	(MM)	(MM)	0-150 CM	(MM)	(MM)		0-90 CM	0-150 CM
9	1	0.498	0.208	0.233	0.278	0.215	0.215	1.076	1.076	1.076	0.860	0.0	0.0	359.00	4.30	4.69	1.00	7.2	17.2
9	2	0.474	0.203	0.229	0.274	0.214	0.243	1.215	1.215	1.215	0.972	0.0	0.0	354.00	4.86	5.32	1.00	9.6	19.1
9	3	0.163	0.232	0.244	0.269	0.213	0.301	1.506	1.506	1.506	1.205	0.0	0.0	347.84	6.02	6.56	1.00	12.5	21.4
9	4	0.146	0.227	0.239	0.264	0.211	0.301	1.504	1.504	1.504	1.203	0.0	0.0	341.67	6.02	6.57	1.00	15.4	23.7
9	5	0.129	0.174	0.273	0.259	0.210	0.292	1.460	1.460	1.460	1.168	0.0	0.0	335.67	5.84	6.39	1.00	18.3	26.0
9	6	0.112	0.169	0.268	0.254	0.209	0.282	1.412	1.412	1.412	1.129	0.0	0.0	329.84	5.65	6.20	1.00	21.1	28.1
9	7	0.104	0.164	0.264	0.251	0.208	0.217	1.083	1.083	1.083	0.866	0.0	0.0	330.12	4.33	4.81	1.00	20.6	28.0
9	8	0.194	0.164	0.264	0.251	0.208	0.0	0.0	0.0	0.0	0.0	0.0	0.0	330.12	0.0	0.0	0.0	20.6	28.0
9	9	0.168	0.164	0.262	0.248	0.207	0.173	0.863	0.863	0.863	0.690	0.0	0.0	326.48	3.45	3.86	1.00	22.3	29.4
9	10	0.154	0.159	0.258	0.244	0.206	0.207	1.034	1.034	1.034	0.827	0.0	0.0	322.11	4.14	4.65	1.00	24.4	31.0
9	11	0.138	0.155	0.254	0.241	0.205	0.228	1.139	1.139	1.139	0.911	0.0	0.0	317.27	4.56	5.14	1.00	26.7	32.9
9	12	0.122	0.151	0.251	0.237	0.204	0.211	1.056	1.056	1.056	0.845	0.0	0.0	312.76	4.22	4.79	1.00	28.9	34.5
9	13	0.201	0.150	0.250	0.236	0.204	0.054	0.269	0.269	0.269	0.215	0.0	0.0	315.77	1.08	1.17	1.00	27.2	33.4
9	14	0.197	0.149	0.249	0.236	0.204	0.045	0.223	0.223	0.223	0.178	0.0	0.0	314.76	0.89	1.06	1.00	27.6	33.8
9	15	0.490	0.154	0.247	0.233	0.203	0.123	0.615	0.615	0.615	0.492	0.0	0.0	331.70	2.46	2.83	1.00	18.2	27.5
9	16	0.484	0.152	0.245	0.232	0.203	0.078	0.388	0.388	0.388	0.310	0.0	0.0	330.00	1.55	1.80	1.00	19.0	28.1
9	17	0.166	0.220	0.243	0.229	0.202	0.168	0.838	0.838	0.838	0.670	0.0	0.0	326.32	3.35	3.91	1.00	20.8	29.5
9	18	0.152	0.217	0.240	0.227	0.202	0.157	0.783	0.783	0.783	0.626	0.0	0.0	322.85	3.13	3.67	1.00	22.5	30.8
9	19	0.142	0.178	0.269	0.225	0.201	0.099	0.494	0.494	0.494	0.395	0.0	0.0	320.65	1.98	2.33	1.00	23.5	31.6
9	20	0.485	0.287	0.267	0.223	0.200	0.154	0.770	0.770	0.770	0.616	10.00	0.0	363.10	3.08	3.66	1.00	0.1	15.7
9	21	0.472	0.283	0.264	0.219	0.200	0.194	0.972	0.972	0.972	0.778	0.0	0.0	358.99	3.89	4.37	1.00	2.1	17.2
9	22	0.168	0.235	0.347	0.217	0.199	0.164	0.822	0.822	0.822	0.657	0.0	0.0	355.51	3.29	3.70	1.00	3.7	18.5
9	23	0.436	0.232	0.344	0.214	0.198	0.179	0.897	0.897	0.897	0.718	0.0	0.0	365.70	3.59	4.05	1.00	-2.1	14.7
9	24	0.422	0.176	0.310	0.284	0.197	0.178	0.889	0.889	0.889	0.711	0.0	0.0	361.90	3.56	4.04	1.00	-0.3	16.1
9	25	0.180	0.225	0.310	0.284	0.197	0.0	0.0	0.0	0.0	0.0	0.0	0.0	361.90	0.0	0.0	0.0	-0.3	16.1
9	26	0.424	0.224	0.269	0.324	0.197	0.048	0.242	0.242	0.242	0.193	0.0	0.0	373.26	0.97	1.11	1.00	-6.6	11.9
9	27	0.422	0.179	0.305	0.323	0.197	0.027	0.136	0.136	0.136	0.109	0.0	0.0	372.67	0.55	0.63	1.00	-6.3	12.1
9	28	0.215	0.225	0.303	0.321	0.196	0.137	0.687	0.687	0.687	0.549	0.0	0.0	371.98	2.75	3.17	1.00	-6.1	12.4
9	29	0.201	0.222	0.267	0.351	0.196	0.164	0.819	0.819	0.819	0.655	0.0	0.0	368.41	3.27	3.79	1.00	-4.4	13.7
9	30	0.164	0.180	0.299	0.348	0.195	0.188	0.940	0.940	0.940	0.752	0.0	0.0	364.28	3.76	4.38	1.00	-2.4	15.3
TOTALS												10.0	0.0		96.5	108.7			

KSU MODEL 5 FOR SORGHUM OF 1976

MONTH	POT. EVAP	SOIL EVAP	TRAN EVAP	A EVAP	TOTAL EVAP	RAIN (MM)	RATIO T/EO	TRAN EVAP(2)	TOT. EVAP(2)	RATIO T3/EO(2)	RATIO ET/EO(2)	RUNOFF	DRAINAGE
6	146.31	19.87	1.17	0.03	21.07	48.70	0.17	1.20	21.07	0.17	4.07	0.59	0.0
7	212.62	36.31	86.72	5.78	129.31	118.80	13.13	92.49	129.31	13.13	19.34	5.30	64.25
8	174.09	15.52	158.07	7.73	181.32	159.10	29.38	165.80	181.32	29.38	32.21	2.50	0.0
9	106.53	12.13	94.38	2.14	108.65	135.10	25.03	96.52	108.65	25.03	28.36	10.00	0.0
TOT.	639.55	84.34	340.33	15.68	440.35	461.70	67.72	356.01	440.35	67.72	83.98	18.39	64.25

KSU MODEL 5 FOR SORGHUM OF 1976

MAXIMUM AVAILABLE WATER (MM).....	330.0000
THETA SUB V (15 BAR).....	0.1300
THETA INITIAL IN 5 FT. PROFILE (MM).....	441.0000
THETA SUB 5 CM. LAYER.....	0.2000
U (MM).....	10.0000
ALPHA (P-T).....	1.2800
SOIL CONSTANT (MM DAY TO -1/2).....	3.5000
X SUB 5 (INIT.WATER CONTENT IN 5 CM. LAYER,WT..	0.1700
FIELD CAPACITY.....	524.9998
BMTS MULTIPLIER.....	0.0
PLANTING DATE.....	MAY 13, 1976
FIELD/LOCATION.....	ASHLAND SORGHUM - I - ACCO 1090

KSU MODEL 5 FOR SORGHUM OF 1976

MO	DAY	MAX TEMP (C)	MIN TEMP (C)	TAU	PNS RAD. (LYS)	SOLAR RAD (LYS)	NET RAD (LYS)	LEAF AREA	COVER	RAIN (MM)	POT. EVAP (MM)	SOIL EVAP (MM)	TRAN EVAP (MM)	A EVAP (MM)	TOTAL EVAP (MM)	THETA (MM)	KS	BMTS	GDD
5	13	17.8	7.3	1.00	228.21	384.0	226.2	0.0	0.0	5.10	3.152	1.450	0.0	0.0	1.450	446.10	1.00	0.0	7.0
5	14	22.8	7.2	1.00	346.36	547.0	346.4	0.0	0.0	0.0	5.146	1.112	0.0	0.0	1.112	444.65	1.00	0.0	18.5
5	15	19.4	13.3	1.00	41.94	127.0	41.9	0.0	0.0	1.00	0.411	0.719	0.0	0.0	0.719	444.54	1.00	0.0	30.0
5	16	16.7	11.1	1.00	124.57	241.0	124.6	0.0	0.0	18.80	1.721	1.344	0.0	0.0	1.344	462.62	1.00	0.0	37.0
5	17	20.0	7.2	1.00	487.26	741.4	487.3	0.0	0.0	7.90	6.948	5.428	0.0	0.0	5.428	469.17	1.00	0.0	46.0
5	18	22.8	3.9	1.00	482.11	734.3	482.1	0.0	0.0	0.0	7.048	3.304	0.0	0.0	3.304	463.74	1.00	0.0	57.5
5	19	28.3	11.7	1.00	463.77	709.0	463.8	0.0	0.0	0.0	7.568	1.450	0.0	0.0	1.450	460.44	1.00	0.0	75.5
5	20	27.2	14.4	1.00	415.86	642.9	415.9	0.0	0.0	0.0	6.770	1.112	0.0	0.0	1.112	458.99	1.00	0.0	95.0
5	21	27.8	15.0	1.00	321.71	513.0	321.7	0.0	0.0	0.0	5.286	0.938	0.0	0.0	0.938	457.98	1.00	0.0	115.5
5	22	25.0	16.1	1.00	145.37	269.7	145.4	0.0	0.0	13.70	2.317	1.810	0.0	0.0	1.810	470.64	1.00	0.0	134.5
5	23	20.6	15.6	1.00	122.17	237.7	122.2	0.0	0.0	20.30	1.829	1.429	0.0	0.0	1.429	489.13	1.00	0.0	149.0
5	24	16.7	11.1	1.00	136.16	257.0	136.2	0.0	0.0	0.80	1.381	1.469	0.0	0.0	1.469	488.50	1.00	0.0	156.0
5	25	20.6	10.6	1.00	340.56	539.0	340.6	0.0	0.0	0.0	4.979	3.899	0.0	0.0	3.899	487.03	1.00	0.0	166.0
5	26	13.9	10.6	1.00	39.04	123.0	39.0	0.0	0.0	3.80	0.557	0.435	0.0	0.0	0.435	486.94	1.00	0.0	174.5
5	27	23.3	7.2	1.00	375.35	587.0	375.3	0.0	0.0	5.10	5.621	2.635	0.0	0.0	2.635	491.61	1.00	0.0	186.5
5	28	26.1	3.9	1.00	460.15	704.0	460.1	0.0	0.0	0.0	7.211	1.450	0.0	0.0	1.450	488.97	1.00	0.0	201.0
5	29	27.8	13.9	1.00	341.28	540.0	341.3	0.0	0.0	0.0	5.582	1.112	0.0	0.0	1.112	487.52	1.00	0.0	220.5
5	30	25.0	16.7	1.00	203.57	350.0	203.6	0.0	0.0	0.0	3.252	0.938	0.0	0.0	0.938	486.41	1.00	0.0	240.0
5	31	26.7	10.0	0.98	350.90	563.0	358.0	0.05	0.02	0.0	5.678	0.825	0.126	0.0	0.952	485.47	1.00	0.0	255.0
TOTALS										76.50	83.156	32.852	0.126	0.0	32.978				

KSU MODEL 5 FOR SORGHUM OF 1976

MO	DAY	MAX TEMP (C)	MIN TEMP (C)	TAU	RNS RAD. (LYS)	SOLAR RAD (LYS)	NET RAD (LYS)	LEAF AREA	COVER	RAIN (MM)	POT. EVAP (MM)	SOIL EVAP (MM)	TRAN EVAP (MM)	A EVAP (MM)	TOTAL EVAP (MM)	THETA (MM)	KS	BATS	GDD
6	1	27.8	12.8	0.96	380.70	615.0	395.6	0.10	0.03	0.0	6.441	0.747	0.283	0.0	1.030	484.52	1.00	0.0	273.5
6	2	27.2	12.8	0.96	362.79	590.0	377.5	0.10	0.03	0.0	6.103	-0.687	-0.268	0.0	-0.955	483.49	1.00	0.0	291.5
6	3	26.7	12.8	0.96	425.48	680.0	442.8	0.10	0.03	0.0	7.107	0.639	0.312	0.0	0.951	482.53	1.00	0.0	309.0
6	4	27.2	8.3	0.96	440.10	701.0	458.0	0.10	0.03	0.0	7.264	0.601	0.319	0.0	0.919	481.54	1.00	0.0	324.5
6	5	26.7	12.8	0.96	360.01	586.0	374.6	0.10	0.03	0.0	6.013	0.568	0.264	0.0	0.832	480.66	1.00	0.0	342.0
6	6	27.8	14.4	0.94	359.06	595.0	381.1	0.15	0.05	0.30	6.248	0.540	0.407	0.0	0.948	480.13	1.00	0.0	362.0
6	7	28.3	14.4	0.93	359.60	600.0	384.8	0.17	0.06	0.0	6.351	-0.516	-0.467	0.0	0.984	479.18	1.00	0.0	382.5
6	8	28.9	15.6	0.92	364.70	614.0	394.9	0.20	0.07	0.0	6.594	0.495	0.568	0.0	1.063	478.20	1.00	0.0	404.5
6	9	30.0	17.3	0.92	382.77	641.0	414.5	0.20	0.07	0.0	7.078	0.476	0.609	0.0	1.086	477.14	1.00	0.0	429.5
6	10	33.3	18.4	0.91	330.61	573.0	365.2	0.25	0.08	0.0	6.531	0.460	0.696	0.070	1.225	476.05	1.00	0.0	456.0
6	11	33.3	20.0	0.89	383.27	665.0	431.9	0.30	0.10	2.00	7.741	0.445	0.980	0.098	1.523	476.82	1.00	0.0	483.0
6	12	35.0	22.2	0.85	394.90	708.0	463.0	0.40	0.13	0.0	8.538	0.431	1.414	0.141	1.586	475.30	1.00	0.0	512.0
6	13	35.0	16.1	0.82	374.74	700.0	457.2	0.50	0.17	0.0	8.231	0.418	1.671	0.167	2.256	473.32	1.00	0.0	535.5
6	14	30.6	22.2	0.77	255.09	525.0	330.4	0.65	0.22	0.30	5.781	0.407	1.482	0.0	1.689	471.35	1.00	0.0	554.5
6	15	27.9	12.8	0.74	290.85	610.0	392.0	0.75	0.25	1.50	6.063	0.396	1.762	0.0	2.158	470.97	1.00	0.0	579.5
6	16	29.4	6.7	0.71	325.40	695.0	456.5	0.85	0.28	0.0	7.397	0.387	2.389	0.0	2.775	468.81	1.00	0.0	597.0
6	17	32.2	18.3	0.69	263.13	559.0	384.0	0.95	0.32	0.0	6.764	0.377	2.396	0.0	2.773	466.04	1.00	0.0	623.0
6	18	22.2	13.3	0.66	314.91	729.0	478.3	1.05	0.35	34.30	7.255	3.732	2.788	0.0	6.520	497.56	1.00	0.0	637.0
6	19	25.0	8.9	0.62	277.32	686.0	447.1	1.20	0.40	0.0	6.903	3.345	2.949	0.0	6.294	491.04	1.00	0.0	650.5
6	20	27.8	9.9	0.58	286.24	745.0	489.9	1.35	0.45	0.0	7.945	3.581	3.668	0.0	7.250	484.75	1.00	0.0	666.5
6	21	28.9	15.0	0.56	250.25	684.0	445.7	1.45	0.48	0.0	7.424	1.954	3.662	0.0	5.616	477.50	1.00	0.0	688.0
6	22	30.0	15.1	0.53	202.29	597.0	387.6	1.60	0.53	0.0	6.489	1.430	3.439	0.0	4.883	471.88	1.00	0.0	711.5
6	23	26.1	16.7	0.50	10.43	98.0	20.9	1.75	0.58	36.80	0.339	0.132	0.191	0.0	0.323	503.79	1.00	0.0	732.0
6	24	26.7	15.6	0.49	224.87	717.0	469.6	1.85	0.62	40.60	7.627	2.853	4.471	0.0	7.324	525.00	1.00	0.0	752.0
6	25	30.0	11.7	0.45	216.42	731.0	479.7	2.00	0.67	0.0	7.991	2.816	4.934	0.0	7.751	517.68	1.00	0.0	771.5
6	26	31.1	19.4	0.41	184.97	694.0	452.9	2.25	0.75	0.0	7.889	2.517	5.251	0.0	7.768	509.92	1.00	0.0	798.0
6	27	33.9	19.9	0.37	113.94	513.0	321.7	2.50	0.83	0.0	5.779	1.669	4.109	0.411	6.190	502.15	1.00	0.0	824.0
6	28	28.3	17.8	0.34	42.78	242.0	125.3	2.70	0.90	11.70	2.097	0.559	1.537	0.0	2.097	507.67	1.00	0.0	847.5
6	29	27.8	17.2	0.31	139.54	692.0	451.5	2.95	0.98	31.00	7.486	-1.808	-5.678	0.0	7.486	525.00	1.00	0.0	870.0
6	30	26.1	11.7	0.28	136.21	738.0	486.8	3.20	1.00	0.0	7.721	1.688	6.033	0.0	7.721	517.51	1.00	0.0	886.0
TOTALS										158.50	199.095	36.695	64.998	0.887	102.581				

65 mm

135.355

Rain bet 5/28 - 6/18 = 4.1 mm

KSU MODEL 5 FOR SORGHUM OF 1976

MO	DAY	MAX TEMP (C)	MIN TEMP (C)	TAU	PNS RAD. (LYS)	SOLAR RAD (LYS)	NET RAD (LYS)	LEAF AREA	COVER	RAIN (MM)	POT. EVAP (MM)	SOIL EVAP (MM)	TRAN EVAP (MM)	A EVAP (MM)	TOTAL EVAP (MM)	THETA (MM)	KS	BMTS	GDD
7	1	26.7	12.3	0.25	106.56	659.0	420.7	3.45	1.00	0.0	6.769	1.340	5.429	0.0	6.769	509.79	1.00	0.0	904.0
7	2	25.0	18.9	0.22	60.90	480.0	270.9	3.75	1.00	0.0	4.369	0.767	3.601	0.0	4.369	503.02	1.00	0.0	925.5
7	3	23.9	17.3	0.20	2.34	170.0	11.5	4.00	1.00	0.0	0.182	0.029	0.153	0.0	0.182	493.65	1.00	0.0	945.0
7	4	28.3	13.3	0.18	67.97	606.0	376.3	4.30	1.00	0.0	6.183	0.872	5.311	0.0	6.183	498.47	1.00	0.0	964.5
7	5	27.8	12.2	0.16	65.82	647.0	410.6	4.60	1.00	0.0	6.669	0.835	5.834	0.0	6.669	492.29	1.00	0.0	982.5
7	6	28.9	11.7	0.15	61.53	663.0	424.9	4.85	1.00	0.0	6.967	0.790	6.177	0.0	6.967	486.62	1.00	0.0	1001.0
7	7	32.2	13.9	0.13	43.17	549.0	328.6	5.10	1.00	0.0	5.788	0.594	5.194	0.0	5.788	478.65	1.00	0.0	1027.0
7	8	33.3	18.3	0.12	40.93	648.0	411.5	5.35	1.00	0.0	7.325	0.681	6.646	0.665	7.991	479.87	1.00	0.0	1052.5
7	9	34.4	21.1	0.10	46.55	694.0	450.0	5.70	1.00	0.0	8.207	0.663	7.543	0.754	8.961	464.87	1.00	0.0	1090.5
7	10	32.8	13.9	0.09	41.54	697.0	452.5	6.00	1.00	0.0	8.021	0.575	7.446	0.0	8.021	456.91	1.00	0.0	1106.5
7	11	31.7	20.6	0.08	34.00	665.0	425.7	6.35	1.00	0.0	7.497	0.468	7.029	0.0	7.497	447.89	1.00	0.0	1134.0
7	12	32.2	20.0	0.07	30.95	678.0	436.6	6.65	1.00	0.0	7.723	0.428	7.295	0.0	7.723	440.39	1.00	0.0	1161.0
7	13	32.8	18.9	0.06	28.10	679.6	437.9	6.90	1.00	0.0	7.763	0.234	7.374	0.0	7.608	432.67	1.00	0.0	1187.0
7	14	32.2	20.0	0.06	25.61	672.8	432.2	7.10	1.00	0.0	7.646	0.439	7.292	0.0	7.731	425.06	1.00	0.0	1214.0
7	15	31.7	19.4	0.06	9.13	347.9	160.3	7.20	1.00	0.0	2.812	0.157	2.686	0.0	2.843	417.33	1.00	0.0	1240.5
7	16	27.8	13.3	0.05	25.61	715.5	468.0	7.30	1.00	0.80	7.636	0.439	7.309	0.0	7.749	415.29	1.00	0.0	1259.5
7	17	26.7	15.1	0.05	0.43	166.1	8.2	7.40	1.00	4.30	0.134	0.007	0.128	0.0	0.136	411.84	1.00	0.0	1280.0
7	18	31.1	17.8	0.05	19.87	607.7	377.7	7.40	1.00	16.30	6.537	0.269	6.268	0.0	6.537	428.00	1.00	0.0	1305.0
7	19	31.7	21.1	0.05	20.56	605.3	375.7	7.30	1.00	0.0	6.632	0.284	6.348	0.0	6.632	421.47	1.00	0.0	1333.0
7	20	32.8	22.2	0.06	23.29	654.8	417.2	7.25	1.00	0.0	7.493	0.327	7.166	0.0	7.493	414.84	1.00	0.0	1362.0
7	21	32.2	21.1	0.06	12.06	414.4	216.0	7.25	1.00	0.0	3.837	0.167	3.670	0.0	3.837	407.34	1.00	0.0	1390.0
7	22	33.9	20.0	0.06	24.21	654.4	416.8	7.15	1.00	0.0	7.520	0.341	7.178	0.718	8.238	403.50	1.00	0.0	1417.0
7	23	35.6	21.1	0.06	25.80	666.4	426.9	7.05	1.00	0.0	7.888	0.373	7.515	0.752	8.640	395.27	1.00	0.0	1445.0
7	24	34.4	19.9	0.06	25.51	650.6	413.6	7.00	1.00	0.0	7.479	0.360	7.118	0.712	8.191	386.63	1.00	0.0	1471.0
7	25	36.1	18.3	0.07	26.14	624.0	391.4	6.80	1.00	0.0	7.201	0.376	6.825	0.683	7.884	378.44	1.00	0.0	1496.5
7	26	36.7	21.1	0.07	23.74	548.6	328.3	6.60	1.00	0.0	6.147	0.347	5.800	0.580	6.727	370.53	1.00	0.0	1524.5
7	27	30.0	23.9	0.08	29.81	611.2	380.7	6.40	1.00	0.0	6.660	0.407	6.253	0.0	6.660	363.93	1.00	0.0	1555.0
7	28	32.2	20.0	0.08	30.07	588.6	361.8	6.25	1.00	6.60	6.399	0.416	5.984	0.0	6.399	363.75	1.00	0.0	1582.0
7	29	32.2	17.8	0.08	32.23	612.0	381.3	6.20	1.00	0.0	6.687	0.443	6.244	0.0	6.687	357.37	1.00	0.0	1607.0
7	30	37.2	25.3	0.09	32.12	591.3	364.0	6.10	1.00	0.0	6.969	0.480	6.488	0.649	7.618	350.68	1.00	0.0	1637.0
7	31	31.7	19.4	0.09	29.76	543.6	324.1	6.00	1.00	0.0	5.683	0.408	5.275	0.0	5.683	343.06	1.00	0.0	1663.5
TOTALS										28.00	194.822	14.315	180.583	5.512	200.409				
												245.789			325.968				

6/30 — 7/15 =

KSU MODEL 5 FOR SORGHUM OF 1976

MO	DAY	MAX TEMP (C)	MIN TEMP (C)	TAU	RNS RAD. (LYS)	SOLAR RAD (LYS)	NET RAD (LYS)	LEAF AREA	COVER	RAIN (MM)	POT. EVAP (MM)	SOIL EVAP (MM)	TRAN EVAP (MM)	A EVAP (MM)	TOTAL EVAP (MM)	THETA (MM)	KS	BMTS	GDD
8	1	26.7	13.9	0.09	25.25	478.5	269.6	5.95	1.00	0.0	4.441	0.325	4.116	0.0	4.441	337.38	1.00	0.0	1686.5
8	2	26.7	16.1	0.10	31.74	553.3	332.2	5.90	1.00	0.0	5.408	0.404	5.005	0.0	5.408	332.94	1.00	0.0	1707.0
8	3	27.2	13.0	0.10	33.12	633.1	399.0	5.90	1.00	0.0	6.374	0.476	5.899	0.0	6.374	327.53	1.00	0.0	1722.5
8	4	31.7	13.9	0.10	36.63	614.5	383.4	5.90	1.00	0.0	6.709	0.501	6.208	0.0	6.709	321.15	1.00	0.0	1749.5
8	5	31.1	17.2	0.10	33.88	592.4	197.6	5.90	1.00	0.0	3.411	0.255	3.157	0.0	3.411	314.45	1.00	0.0	1773.0
8	6	27.8	17.2	0.10	39.14	623.9	391.3	5.85	1.00	2.00	6.489	0.494	5.995	0.0	6.489	313.03	1.00	0.0	1795.5
8	7	27.8	12.8	0.10	37.34	614.1	383.1	5.85	1.00	0.0	6.237	0.475	5.762	0.0	6.237	306.54	1.00	0.0	1814.0
8	8	32.8	18.9	0.10	37.80	610.6	380.2	5.80	1.00	0.0	6.740	0.523	6.216	0.0	6.740	300.31	1.00	0.0	1840.0
8	9	30.4	19.4	0.10	39.94	636.4	401.8	5.80	1.00	0.0	7.726	0.600	6.907	0.691	8.198	293.57	0.97	0.0	1866.5
8	10	31.7	23.3	0.10	10.21	279.0	102.7	5.80	1.00	0.0	1.828	0.142	1.495	0.0	1.637	285.37	0.89	0.0	1896.5
8	11	36.1	25.7	0.10	16.38	349.3	161.5	5.75	1.00	0.0	3.071	0.243	2.460	0.246	2.950	283.73	0.87	0.0	1929.5
8	12	31.7	13.9	0.10	36.69	580.1	354.6	5.70	1.00	15.70	6.205	0.502	5.697	0.0	6.198	296.48	1.00	0.0	1955.5
8	13	32.2	17.2	0.11	37.82	584.5	358.3	5.65	1.00	0.0	6.269	0.517	5.386	0.0	5.902	290.29	0.94	0.0	1980.0
8	14	29.4	18.9	0.11	29.64	485.3	275.3	5.60	1.00	1.30	4.691	0.395	3.822	0.0	4.217	285.68	0.89	0.0	2005.5
8	15	28.9	18.3	0.11	35.04	537.6	319.1	5.55	1.00	0.0	5.388	0.462	4.173	0.0	4.635	281.46	0.85	0.0	2030.0
8	16	35.0	18.9	0.11	39.66	579.3	354.0	5.50	1.00	0.0	6.442	0.564	4.704	0.470	5.739	276.83	0.80	0.0	2056.0
8	17	34.4	22.2	0.12	41.98	586.6	360.1	5.40	1.00	0.0	6.596	0.601	4.451	0.445	5.497	271.09	0.74	0.0	2085.0
8	18	33.9	21.1	0.12	42.53	583.7	357.7	5.35	1.00	0.0	6.481	0.602	4.037	0.404	5.043	265.55	0.69	0.0	2113.0
8	19	31.1	17.2	0.13	49.81	613.5	386.8	5.15	1.00	0.0	6.678	0.672	3.819	0.0	4.491	260.55	0.64	0.0	2137.5
8	20	32.8	15.6	0.14	49.14	585.9	359.5	5.00	1.00	0.0	6.290	0.672	3.318	0.0	3.989	256.06	0.59	0.0	2160.5
8	21	33.9	19.4	0.15	52.50	563.6	340.8	4.70	1.00	0.0	6.136	0.738	2.970	0.297	4.005	252.07	0.55	0.0	2187.0
8	22	35.0	19.4	0.16	54.58	524.7	308.3	4.35	1.00	0.0	5.623	0.778	2.470	0.247	3.495	248.07	0.51	0.0	2213.5
8	23	33.9	15.6	0.20	64.66	543.6	324.1	4.05	1.00	0.0	5.746	0.846	2.301	0.230	3.427	244.57	0.47	0.0	2236.5
8	24	32.8	20.6	0.22	43.14	390.2	195.7	3.80	1.00	0.0	3.493	0.601	1.272	0.0	1.873	241.14	0.44	0.0	2264.0
8	25	33.3	17.2	0.25	77.43	528.9	311.8	3.50	1.00	0.0	5.528	1.072	1.875	0.188	3.135	239.27	0.42	0.0	2286.5
8	26	37.8	22.2	0.27	92.35	558.6	336.7	3.25	1.00	0.0	6.416	1.375	1.962	0.196	3.534	236.14	0.39	0.0	2317.5
8	27	35.0	25.0	0.30	94.23	527.9	311.0	3.00	1.00	0.0	5.797	0.823	1.564	0.156	2.544	232.60	0.35	0.0	2349.0
8	28	31.7	12.2	0.33	128.62	599.3	394.3	2.75	0.92	0.0	6.547	1.450	1.585	0.0	3.035	230.06	0.33	0.0	2369.0
8	29	33.3	12.2	0.36	131.61	580.2	370.4	2.60	0.87	0.0	6.433	1.112	1.382	0.138	2.633	227.02	0.30	0.0	2389.0
8	30	32.2	13.9	0.38	129.75	543.8	344.0	2.45	0.82	0.0	5.940	0.938	1.126	0.0	2.064	224.39	0.27	0.0	2410.5
8	31	30.6	19.4	0.39	70.11	315.6	178.6	2.35	0.78	0.0	3.091	0.826	0.528	0.0	1.354	222.33	0.25	0.0	2437.0
TOTALS										19.00	174.228	20.033	111.661	3.709	135.403				
													357.362		421.391				

KSU MODEL 5 FOR SORGHUM OF 1976

MC	DAY	MAX TEMP (C)	MIN TEMP (C)	TAU	RNS RAD. (LYS)	SOLAR RAD (LYS)	NET RAD (LYS)	LEAF AREA	COVER	RAIN (MM)	POT. EVAP (MM)	SOIL EVAP (MM)	TRAN EVAP (MM)	A EVAP (MM)	TOTAL EVAP (MM)	THETA (MM)	KS	BMTS	GDD
9	1	30.6	13.3	0.41	118.51	469.5	290.2	2.25	0.75	0.0	4.900	0.747	0.770	0.0	1.517	220.97	0.24	0.0	2458.0
9	2	32.2	15.6	0.42	146.49	544.7	344.7	2.15	0.72	0.0	5.991	0.687	0.856	0.0	1.542	219.46	0.22	0.0	2481.0
9	3	35.0	16.4	0.43	147.96	540.0	341.3	2.10	0.70	0.0	6.225	0.639	0.814	0.081	1.535	217.91	0.21	0.0	2507.5
9	4	33.9	13.9	0.45	148.93	524.6	330.1	2.00	0.67	0.0	5.930	0.601	0.694	0.069	1.364	216.38	0.19	0.0	2533.5
9	5	37.8	21.1	0.47	154.91	524.4	330.0	1.90	0.63	0.0	6.261	0.568	0.657	0.065	1.291	215.01	0.18	0.0	2561.5
9	6	36.1	22.8	0.48	154.34	513.8	322.3	1.85	0.62	0.0	6.035	0.540	0.576	0.058	1.174	213.72	0.16	0.0	2591.0
9	7	33.3	19.4	0.50	171.62	544.3	344.4	1.75	0.58	0.0	6.159	0.516	0.525	0.052	1.094	212.55	0.15	0.0	2617.5
9	8	27.2	12.8	0.51	41.99	183.1	82.6	1.70	0.57	0.0	1.935	0.495	0.103	0.0	0.598	211.45	0.14	0.0	2635.5
9	9	24.4	12.2	0.52	185.26	552.6	350.4	1.60	0.53	4.80	5.451	0.476	0.527	0.0	1.003	215.66	0.18	0.0	2650.5
9	10	25.7	9.1	1.00	345.79	547.6	346.8	0.0	0.40	0.0	5.408	0.460	0.0	0.0	0.460	214.65	0.17	0.0	2665.5
9	11	31.7	15.1	1.00	316.71	506.1	316.7	0.0	0.40	0.0	5.481	0.445	0.0	0.0	0.445	214.19	0.17	0.0	2680.0
9	12	30.0	18.9	1.00	273.01	445.8	273.0	0.0	0.40	0.0	4.683	0.431	0.0	0.0	0.431	213.75	0.16	0.0	2715.0
9	13	25.6	15.7	1.00	78.90	178.0	78.9	0.0	0.40	5.80	1.270	0.418	0.0	0.0	0.418	219.12	0.22	0.0	2735.0
9	14	29.4	17.8	1.00	277.86	452.5	277.9	0.0	0.40	0.30	4.713	0.407	0.0	0.0	0.407	219.00	0.22	0.0	2759.5
9	15	25.6	13.9	1.00	40.63	125.2	40.6	0.0	0.40	0.0	0.660	0.396	0.0	0.0	0.396	218.59	0.21	0.0	2781.5
9	16	27.2	15.6	1.00	232.49	389.9	232.5	0.0	0.40	22.60	3.802	2.971	0.0	0.0	2.971	240.80	0.44	0.0	2802.0
9	17	30.0	15.0	1.00	263.29	432.4	263.3	0.0	0.40	0.0	4.446	3.473	0.0	0.0	3.473	237.83	0.41	0.0	2824.5
9	18	31.7	17.2	1.00	215.38	366.3	215.4	0.0	0.40	0.0	3.744	2.925	0.0	0.0	2.925	234.35	0.37	0.0	2849.0
9	19	31.7	17.2	1.00	167.11	299.7	167.1	0.0	0.40	0.0	2.905	2.269	0.0	0.0	2.269	231.43	0.34	0.0	2873.5
9	20	26.7	20.0	1.00	167.11	299.7	167.1	0.0	0.40	0.0	2.765	1.296	0.0	0.0	1.296	229.16	0.32	0.0	2897.5
9	21	22.2	13.3	1.00	300.62	483.9	300.6	0.0	0.40	0.0	4.560	1.450	0.0	0.0	1.450	227.86	0.31	0.0	2911.5
9	22	31.1	11.1	1.00	270.76	442.7	270.8	0.0	0.40	0.0	4.562	1.112	0.0	0.0	1.112	226.41	0.29	0.0	2930.5
9	23	25.0	16.7	1.00	276.27	450.3	276.3	0.0	0.40	1.00	4.414	0.938	0.0	0.0	0.938	226.30	0.29	0.0	2950.0
9	24	27.2	9.4	1.00	279.17	454.3	279.2	0.0	0.40	0.0	4.449	0.826	0.0	0.0	0.826	225.36	0.28	0.0	2965.5
9	25	22.8	12.8	1.00	4.97	76.0	5.0	0.0	0.40	0.0	0.076	0.085	0.0	0.0	0.085	224.54	0.27	0.0	2979.5
9	26	22.2	14.4	1.00	153.49	280.9	153.5	0.0	0.40	23.40	2.340	1.828	0.0	0.0	1.828	247.85	0.51	0.0	2994.5
9	27	17.8	11.1	1.00	247.93	411.2	247.9	0.0	0.40	0.0	3.485	2.723	0.0	0.0	2.723	246.02	0.49	0.0	3002.5
TOTALS										57.90	112.047	29.723	5.522	0.327	35.572				

362.89

KSU MODEL 5 FOR SORGHUM OF 1976

		THETA VALUES					TRANSPIRATION												
MO	DY	LAYER 1	LAYER 2	LAYER 3	LAYER 4	LAYER 5	LAYER 1	LAYER 2	LAYER 3	LAYER 4	LAYER 5	RNOFF	DRAIN	THETA	TRANS EVAP	TOT. EVAP	KS	DEPL.	DEPL.
		0-5 CM	5-30 CM	30-60 CM	60-90 CM	90-180 CM	0-5 CM	5-30 CM	30-60 CM	60-90 CM	90-180 CM	(MM)	(MM)	0-150 CM	(MM)	(MM)		0-90 CM	0-150 CM
5	13	0.323	0.250	0.300	0.320	0.300	0.0	0.0	0.0	0.0	0.0	0.0	0.0	444.65	0.0	1.45	0.0	25.4	24.3
5	14	0.301	0.250	0.300	0.320	0.300	0.0	0.0	0.0	0.0	0.0	0.0	0.0	443.54	0.0	1.11	0.0	26.0	24.7
5	15	0.306	0.250	0.300	0.320	0.300	0.0	0.0	0.0	0.0	0.0	0.0	0.0	443.82	0.0	0.72	0.0	25.8	24.6
5	16	0.473	0.280	0.300	0.320	0.300	0.0	0.0	0.0	0.0	0.0	0.0	0.0	461.27	0.0	1.34	0.0	17.9	19.3
5	17	0.391	0.313	0.300	0.320	0.300	0.0	0.0	0.0	0.0	0.0	0.0	0.0	463.75	0.0	5.43	0.0	15.8	18.6
5	18	0.325	0.313	0.300	0.320	0.300	0.0	0.0	0.0	0.0	0.0	0.0	0.0	460.44	0.0	3.30	0.0	17.5	19.6
5	19	0.296	0.313	0.300	0.320	0.300	0.0	0.0	0.0	0.0	0.0	0.0	0.0	458.99	0.0	1.45	0.0	18.2	20.0
5	20	0.274	0.313	0.300	0.320	0.300	0.0	0.0	0.0	0.0	0.0	0.0	0.0	457.88	0.0	1.11	0.0	18.7	20.3
5	21	0.255	0.313	0.300	0.320	0.300	0.0	0.0	0.0	0.0	0.0	0.0	0.0	456.94	0.0	0.94	0.0	19.2	20.6
5	22	0.464	0.319	0.300	0.320	0.300	0.0	0.0	0.0	0.0	0.0	0.0	0.0	468.83	0.0	1.81	0.0	13.2	17.0
5	23	0.471	0.393	0.300	0.320	0.300	0.0	0.0	0.0	0.0	0.0	0.0	0.0	487.70	0.0	1.43	0.0	3.7	11.3
5	24	0.468	0.393	0.300	0.320	0.300	0.0	0.0	0.0	0.0	0.0	0.0	0.0	487.03	0.0	1.47	0.0	4.0	11.5
5	25	0.330	0.350	0.335	0.320	0.300	0.0	0.0	0.0	0.0	0.0	0.0	0.0	483.14	0.0	3.89	0.0	6.0	12.7
5	26	0.417	0.356	0.335	0.320	0.300	0.0	0.0	0.0	0.0	0.0	0.0	0.0	486.51	0.0	0.43	0.0	4.3	11.7
5	27	0.447	0.360	0.335	0.320	0.300	0.0	0.0	0.0	0.0	0.0	0.0	0.0	488.97	0.0	2.63	0.0	3.0	10.9
5	28	0.418	0.360	0.335	0.320	0.300	0.0	0.0	0.0	0.0	0.0	0.0	0.0	487.52	0.0	1.45	0.0	3.8	11.4
5	29	0.328	0.364	0.344	0.320	0.300	0.0	0.0	0.0	0.0	0.0	0.0	0.0	486.41	0.0	1.11	0.0	4.3	11.7
5	30	0.309	0.364	0.344	0.320	0.300	0.0	0.0	0.0	0.0	0.0	0.0	0.0	485.47	0.0	0.94	0.0	4.8	12.0
5	31	0.292	0.350	0.355	0.320	0.300	0.013	0.063	0.050	0.0	0.0	0.0	0.0	484.52	0.13	0.95	1.00	5.3	12.3
TOTALS												0.0	0.0		0.1	33.0			

KSU MODEL 5 FOR SORGHUM OF 1976

		THETA VALUES					TRANSPIRATION												
MO	DY	LAYER 1	LAYER 2	LAYER 3	LAYER 4	LAYER 5	LAYER 1	LAYER 2	LAYER 3	LAYER 4	LAYER 5	RNOFF	DRAIN	THETA	TRANS EVAP	TOT. EVAP	KS	DEPL.	DEPL.
		0-5 CM	5-30 CM	30-60 CM	60-90 CM	90-180 CM	0-5 CM	5-30 CM	30-60 CM	60-90 CM	90-180 CM	(MM)	(MM)	0-150 CM	(MM)	(MM)		0-90 CM	0-150 CM
6	1	0.277	0.349	0.355	0.320	0.300	0.028	0.141	0.113	0.0	0.0	0.0	0.0	483.49	0.28	1.03	1.00	5.8	12.6
6	2	0.262	0.349	0.350	0.325	0.300	0.027	0.134	0.107	0.0	0.0	0.0	0.0	482.54	0.27	0.95	1.00	6.3	12.9
6	3	0.249	0.348	0.349	0.325	0.300	0.031	0.156	0.125	0.0	0.0	0.0	0.0	481.59	0.31	0.95	1.00	6.8	13.2
6	4	0.236	0.347	0.349	0.325	0.300	0.032	0.159	0.128	0.0	0.0	0.0	0.0	480.67	0.32	0.92	1.00	7.2	13.4
6	5	0.224	0.347	0.348	0.325	0.300	0.026	0.132	0.106	0.0	0.0	0.0	0.0	479.83	0.26	0.83	1.00	7.7	13.7
6	6	0.219	0.346	0.348	0.325	0.300	0.041	0.204	0.163	0.0	0.0	0.0	0.0	479.19	0.41	0.95	1.00	8.0	13.9
6	7	0.208	0.345	0.347	0.325	0.300	0.047	0.234	0.187	0.0	0.0	0.0	0.0	478.20	0.47	0.98	1.00	8.5	14.2
6	8	0.197	0.344	0.347	0.325	0.300	0.057	0.284	0.227	0.0	0.0	0.0	0.0	477.14	0.57	1.06	1.00	9.0	14.5
6	9	0.186	0.343	0.346	0.325	0.300	0.061	0.305	0.244	0.0	0.0	0.0	0.0	476.05	0.61	1.09	1.00	9.6	14.8
6	10	0.175	0.341	0.345	0.325	0.300	0.077	0.383	0.306	0.0	0.0	0.0	0.0	474.83	0.77	1.23	1.00	10.2	15.2
6	11	0.204	0.339	0.343	0.325	0.300	0.108	0.539	0.431	0.0	0.0	0.0	0.0	475.31	1.08	1.52	1.00	9.9	15.1
6	12	0.192	0.336	0.341	0.325	0.300	0.156	0.778	0.622	0.0	0.0	0.0	0.0	473.32	1.56	1.99	1.00	10.9	15.7
6	13	0.180	0.332	0.339	0.325	0.300	0.184	0.919	0.735	0.0	0.0	0.0	0.0	471.06	1.84	2.26	1.00	12.1	16.3
6	14	0.175	0.329	0.337	0.325	0.300	0.148	0.741	0.593	0.0	0.0	0.0	0.0	469.47	1.48	1.59	1.00	12.9	16.8
6	15	0.194	0.326	0.334	0.325	0.300	0.176	0.881	0.705	0.0	0.0	0.0	0.0	468.52	1.76	2.16	1.00	13.7	17.0
6	16	0.181	0.321	0.331	0.325	0.300	0.239	1.194	0.955	0.0	0.0	0.0	0.0	466.04	2.39	2.76	1.00	14.6	17.9
6	17	0.169	0.316	0.328	0.325	0.300	0.240	1.198	0.958	0.0	0.0	0.0	0.0	463.27	2.40	2.77	1.00	16.0	18.7
6	18	0.423	0.374	0.326	0.322	0.299	0.139	0.697	0.697	0.697	0.558	2.48	0.0	488.75	2.79	6.52	1.00	3.0	11.0
6	19	0.353	0.372	0.323	0.320	0.299	0.147	0.737	0.737	0.737	0.590	0.0	0.0	482.66	2.95	6.29	1.00	5.8	12.8
6	20	0.275	0.347	0.338	0.317	0.298	0.183	0.917	0.917	0.917	0.734	0.0	0.0	475.65	3.67	7.25	1.00	9.1	15.0
6	21	0.232	0.343	0.335	0.314	0.297	0.183	0.916	0.916	0.916	0.732	0.0	0.0	470.28	3.66	5.62	1.00	11.6	16.6
6	22	0.200	0.340	0.332	0.311	0.296	0.172	0.860	0.860	0.860	0.688	0.0	0.0	465.62	3.44	4.89	1.00	13.7	18.0
6	23	0.497	0.414	0.332	0.311	0.296	0.010	0.048	0.048	0.048	0.038	3.26	0.0	498.85	0.19	0.32	1.00	-3.1	7.9
6	24	0.438	0.496	0.376	0.307	0.295	0.224	1.118	1.118	1.118	0.894	4.49	0.0	527.93	4.47	7.32	1.00	-18.1	-0.9
6	25	0.377	0.491	0.372	0.303	0.294	0.247	1.234	1.234	1.234	0.987	0.0	0.0	520.51	4.93	7.75	1.00	-14.6	1.4
6	26	0.294	0.350	0.463	0.321	0.293	0.263	1.313	1.313	1.313	1.050	0.0	0.0	513.09	5.25	7.77	1.00	-11.2	3.4
6	27	0.257	0.346	0.459	0.317	0.292	0.226	1.130	1.130	1.130	0.904	0.0	0.0	507.20	4.52	6.19	1.00	-8.6	5.4
6	28	0.478	0.344	0.349	0.425	0.292	0.077	0.384	0.384	0.384	0.307	0.0	0.0	516.91	1.54	2.10	1.00	-13.6	2.5
6	29	0.458	0.452	0.344	0.420	0.290	0.284	1.420	1.420	1.420	1.136	1.51	0.0	539.30	5.68	7.49	1.00	-25.3	-4.3
6	30	0.418	0.446	0.339	0.345	0.312	0.302	1.508	1.508	1.508	1.207	0.0	0.0	525.00	6.03	7.72	1.00	-11.4	0.0
TOTALS												11.7	0.0		65.9	102.6			

KSU MODEL 5 FOR SORGHUM OF 1976

		THETA VALUES					TRANSPIRATION												
MO	DY	LAYER 1	LAYER 2	LAYER 3	LAYER 4	LAYER 5	LAYER 1	LAYER 2	LAYER 3	LAYER 4	LAYER 5	RNOFF	DRAIN	THETA	TRANS EVAP	TOT. EVAP	KS	DEPL.	DEPL.
		0-5	5-30	30-60	60-90	90-180	0-5	5-30	30-60	60-90	90-180			0-150				0-90	0-150
		CM	CM	CM	CM	CM	CM	CM	CM	CM	CM	(MM)	(MM)	CM	(MM)	(MM)		CM	CM
7	1	0.319	0.358	0.414	0.340	0.311	0.271	1.357	1.357	1.357	1.036	0.0	0.0	518.59	5.43	6.77	1.00	-1.5	1.9
7	2	0.299	0.355	0.411	0.337	0.310	0.180	0.900	0.900	0.900	0.720	0.0	0.0	514.46	3.60	4.37	1.00	-6.7	3.2
7	3	0.298	0.350	0.354	0.339	0.310	0.008	0.038	0.038	0.038	0.031	0.0	0.0	514.29	0.15	0.18	1.00	-6.6	3.2
7	4	0.275	0.345	0.249	0.304	0.309	0.266	1.328	1.328	1.328	1.062	0.0	0.0	508.46	5.31	6.18	1.00	-4.0	5.0
7	5	0.258	0.339	0.344	0.345	0.323	0.292	1.459	1.459	1.459	1.167	0.0	0.0	497.75	5.83	6.67	1.00	5.5	8.3
7	6	0.231	0.333	0.339	0.340	0.321	0.309	1.544	1.544	1.544	1.235	0.0	0.0	491.20	6.18	6.97	1.00	8.4	10.2
7	7	0.214	0.327	0.335	0.336	0.320	0.260	1.298	1.298	1.298	1.039	0.0	0.0	485.75	5.19	5.79	1.00	10.8	11.9
7	8	0.193	0.320	0.329	0.330	0.318	0.366	1.828	1.828	1.828	1.462	0.0	0.0	478.25	7.31	7.99	1.00	14.0	14.2
7	9	0.171	0.312	0.322	0.323	0.317	0.415	2.074	2.074	2.074	1.660	0.0	0.0	469.84	8.30	8.96	1.00	17.7	16.7
7	10	0.152	0.304	0.316	0.316	0.315	0.372	1.861	1.861	1.861	1.489	0.0	0.0	462.32	7.45	8.02	1.00	21.0	19.0
7	11	0.136	0.297	0.310	0.311	0.313	0.351	1.757	1.757	1.757	1.406	0.0	0.0	455.29	7.03	7.50	1.00	24.1	21.1
7	12	0.127	0.288	0.304	0.305	0.312	0.0	2.188	1.824	1.824	1.459	0.0	0.0	448.05	7.29	7.72	1.00	27.3	23.3
7	13	0.123	0.280	0.298	0.298	0.310	0.0	2.212	1.844	1.844	1.475	0.0	0.0	440.94	7.37	7.61	1.00	30.4	25.5
7	14	0.114	0.271	0.292	0.292	0.309	0.0	2.187	1.823	1.823	1.458	0.0	0.0	433.69	7.29	7.73	1.00	33.5	27.7
7	15	0.111	0.268	0.289	0.290	0.308	0.0	0.806	0.672	0.672	0.537	0.0	0.0	431.03	2.69	2.84	1.00	34.7	28.5
7	16	0.118	0.259	0.283	0.284	0.306	0.0	2.193	1.827	1.827	1.462	0.0	0.0	424.57	7.31	7.75	1.00	37.5	30.4
7	17	0.204	0.259	0.283	0.284	0.306	0.006	0.032	0.032	0.032	0.026	0.0	0.0	428.74	0.13	0.14	1.00	35.4	29.2
7	18	0.468	0.258	0.278	0.279	0.305	0.313	1.567	1.567	1.567	1.254	0.0	0.0	438.92	6.27	6.54	1.00	29.8	26.1
7	19	0.476	0.252	0.273	0.273	0.303	0.317	1.587	1.587	1.587	1.270	0.0	0.0	432.71	6.35	6.63	1.00	32.5	28.0
7	20	0.336	0.270	0.267	0.267	0.302	0.358	1.792	1.792	1.792	1.433	0.0	0.0	425.70	7.17	7.49	1.00	35.6	30.1
7	21	0.329	0.267	0.264	0.264	0.301	0.184	0.918	0.918	0.918	0.734	0.0	0.0	422.10	3.67	3.84	1.00	37.1	31.2
7	22	0.315	0.259	0.257	0.258	0.299	0.395	1.974	1.974	1.974	1.579	0.0	0.0	414.39	7.90	8.24	1.00	40.5	33.5
7	23	0.299	0.250	0.250	0.251	0.297	0.413	2.067	2.067	2.067	1.653	0.0	0.0	406.30	8.27	8.64	1.00	44.0	36.0
7	24	0.284	0.243	0.244	0.244	0.296	0.392	1.958	1.958	1.958	1.566	0.0	0.0	398.64	7.83	8.19	1.00	47.4	38.3
7	25	0.269	0.235	0.237	0.238	0.294	0.375	1.877	1.877	1.877	1.502	0.0	0.0	391.25	7.51	7.88	1.00	50.6	40.5
7	26	0.255	0.229	0.232	0.233	0.293	0.319	1.595	1.595	1.595	1.276	0.0	0.0	384.95	6.38	6.73	1.00	53.3	42.4
7	27	0.241	0.222	0.227	0.228	0.291	0.313	1.563	1.563	1.563	1.251	0.0	0.0	378.71	6.25	6.66	1.00	56.1	44.3
7	28	0.359	0.216	0.222	0.223	0.290	0.299	1.496	1.496	1.496	1.197	0.0	0.0	379.31	5.98	6.40	1.00	55.4	44.1
7	29	0.344	0.210	0.217	0.217	0.289	0.312	1.561	1.561	1.561	1.249	0.0	0.0	373.04	6.24	6.69	1.00	58.1	46.0
7	30	0.327	0.203	0.211	0.211	0.287	0.357	1.784	1.784	1.784	1.427	0.0	0.0	365.89	7.14	7.62	1.00	61.2	48.2
7	31	0.313	0.198	0.206	0.207	0.286	0.264	1.319	1.319	1.319	1.055	0.0	0.0	360.56	5.28	5.68	1.00	63.6	49.8
TOTALS												0.0	0.0		186.1	200.4			

KSU MODEL 5 FOR SORGHUM OF 1976

		THETA VALUES					TRANSPIRATION												
MO	DY	LAYER 1	LAYER 2	LAYER 3	LAYER 4	LAYER 5	LAYER 1	LAYER 2	LAYER 3	LAYER 4	LAYER 5	RNOFF	DRAIN	THETA	TRANS EVAP	TOT. EVAP	KS	DEPL.	DEPL.
		0-5 CM	5-30 CM	30-60 CM	60-90 CM	90-130 CM	0-5 CM	5-30 CM	30-60 CM	60-90 CM	90-180 CM	(MM)	(MM)	0-150 CM	(MM)	(MM)		0-90 CM	0-150 CM
8	1	0.303	0.194	0.203	0.204	0.235	0.206	1.029	1.029	1.029	0.823	0.0	0.0	356.40	4.12	4.44	1.00	65.4	51.1
8	2	0.290	0.189	0.199	0.199	0.234	0.250	1.251	1.251	1.251	1.001	0.0	0.0	351.32	5.00	5.41	1.00	67.6	52.6
8	3	0.274	0.183	0.194	0.194	0.232	0.295	1.475	1.475	1.475	1.180	0.0	0.0	345.34	5.90	6.37	1.00	70.3	54.4
8	4	0.258	0.177	0.189	0.189	0.231	0.310	1.552	1.552	1.552	1.242	0.0	0.0	339.05	6.21	6.71	1.00	73.0	56.3
8	5	0.250	0.173	0.186	0.187	0.230	0.158	0.789	0.789	0.789	0.631	0.0	0.0	335.84	3.16	3.41	1.00	74.4	57.3
8	6	0.274	0.167	0.181	0.182	0.229	0.300	1.499	1.499	1.499	1.199	0.0	0.0	331.76	5.99	6.49	1.00	76.1	58.6
8	7	0.259	0.162	0.176	0.177	0.228	0.288	1.440	1.440	1.440	1.152	0.0	0.0	325.90	5.76	6.24	1.00	78.7	60.3
8	8	0.242	0.155	0.171	0.172	0.226	0.311	1.554	1.554	1.554	1.243	0.0	0.0	319.58	6.22	6.74	1.00	81.4	62.2
8	9	0.222	0.148	0.165	0.165	0.225	0.391	1.954	1.954	1.954	1.563	0.0	0.0	311.68	7.82	8.42	1.00	84.9	64.6
8	10	0.218	0.146	0.163	0.164	0.224	0.084	0.422	0.422	0.422	0.337	0.0	0.0	309.97	1.69	1.83	1.00	85.6	65.2
8	11	0.210	0.143	0.161	0.161	0.224	0.154	0.769	0.769	0.769	0.615	0.0	0.0	306.85	3.07	3.32	1.00	87.0	66.1
8	12	0.484	0.142	0.156	0.156	0.222	0.285	1.426	1.426	1.426	1.141	0.0	0.0	316.73	5.70	6.20	1.00	81.6	63.1
8	13	0.468	0.136	0.151	0.152	0.221	0.288	1.438	1.438	1.438	1.150	0.0	0.0	310.84	5.75	6.27	1.00	84.2	64.9
8	14	0.364	0.155	0.147	0.148	0.220	0.215	1.074	1.074	1.074	0.859	0.0	0.0	307.74	4.30	4.69	1.00	85.5	65.8
8	15	0.350	0.151	0.143	0.144	0.219	0.246	1.231	1.231	1.231	0.985	0.0	0.0	302.68	4.93	5.39	1.00	87.7	67.4
8	16	0.332	0.144	0.138	0.139	0.218	0.317	1.587	1.587	1.587	1.270	0.0	0.0	296.19	6.35	6.91	1.00	90.6	69.3
8	17	0.314	0.138	0.133	0.133	0.216	0.322	1.610	1.610	1.610	1.288	0.0	0.0	289.58	6.44	7.04	1.00	93.5	71.3
8	18	0.296	0.132	0.130	0.130	0.263	0.300	1.500	0.795	1.000	2.407	0.0	0.0	283.78	6.00	6.60	0.96	95.6	73.1
8	19	0.277	0.130	0.130	0.130	0.258	0.269	0.438	0.0	0.0	4.679	0.0	0.0	279.23	5.39	6.06	0.90	96.3	74.5
8	20	0.258	0.130	0.130	0.130	0.253	0.239	0.0	0.0	0.0	4.544	0.0	0.0	275.34	4.78	5.45	0.85	96.8	75.7
8	21	0.239	0.130	0.130	0.130	0.248	0.231	0.0	0.0	0.0	4.390	0.0	0.0	271.44	4.62	5.36	0.81	97.2	76.8
8	22	0.220	0.130	0.130	0.130	0.244	0.197	0.0	0.0	0.0	3.735	0.0	0.0	267.98	3.93	4.71	0.77	97.7	77.9
8	23	0.198	0.130	0.130	0.130	0.240	0.187	0.0	0.0	0.0	3.558	0.0	0.0	264.52	3.74	4.64	0.74	98.3	78.9
8	24	0.184	0.130	0.130	0.130	0.238	0.102	0.0	0.0	0.0	1.929	0.0	0.0	262.53	2.03	2.63	0.70	98.6	79.5
8	25	0.159	0.130	0.130	0.130	0.235	0.158	0.0	0.0	0.0	3.009	0.0	0.0	259.30	3.17	4.24	0.68	98.2	80.5
8	26	0.130	0.130	0.130	0.130	0.231	0.089	0.0	0.0	0.0	3.313	0.0	0.0	255.63	3.40	4.78	0.65	100.0	81.6
8	27	0.114	0.130	0.130	0.130	0.228	0.0	0.0	0.0	0.0	2.806	0.0	0.0	252.93	2.81	3.63	0.61	100.0	82.4
8	28	0.100	0.127	0.130	0.130	0.225	0.0	0.0	0.0	0.0	2.829	0.0	0.0	249.60	2.83	4.28	0.56	100.0	83.3
8	29	0.100	0.122	0.130	0.130	0.222	0.0	0.0	0.0	0.0	2.641	0.0	0.0	246.72	2.64	3.75	0.55	100.0	84.3
8	30	0.100	0.119	0.130	0.130	0.219	0.0	0.0	0.0	0.0	2.175	0.0	0.0	244.34	2.17	3.11	0.52	100.0	85.0
8	31	0.100	0.115	0.130	0.130	0.218	0.0	0.0	0.0	0.0	1.053	0.0	0.0	242.81	1.05	1.88	0.50	100.0	85.5
TOTALS												0.0	0.0		137.0	157.0			

KSU MODEL 5 FOR SORGHUM OF 1976

		THETA VALUES					TRANSPIRATION												
MO	DY	LAYER 1	LAYER 2	LAYER 3	LAYER 4	LAYER 5	LAYER 1	LAYER 2	LAYER 3	LAYER 4	LAYER 5	RNOFF	DRAIN	THETA	TRANS EVAP	TOT. EVAP	KS	DEPL.	DEPL.
		0-5 CM	5-30 CM	30-60 CM	60-90 CM	90-180 CM	0-5 CM	5-30 CM	30-60 CM	60-90 CM	90-180 CM	(MM)	(MM)	0-150 CM	(MM)	(MM)		0-90 CM	0-150 CM
9	1	0.100	0.112	0.130	0.130	0.217	0.0	0.0	0.0	0.0	1.575	0.0	0.0	241.01	1.57	2.32	0.48	100.0	86.1
9	2	0.100	0.110	0.130	0.130	0.215	0.0	0.0	0.0	0.0	1.801	0.0	0.0	239.12	1.80	2.49	0.46	100.0	86.6
9	3	0.100	0.107	0.130	0.130	0.213	0.0	0.0	0.0	0.0	1.804	0.0	0.0	237.28	1.80	2.44	0.45	100.0	87.2
9	4	0.100	0.105	0.130	0.130	0.211	0.0	0.0	0.0	0.0	1.593	0.0	0.0	235.62	1.59	2.19	0.43	100.0	87.7
9	5	0.100	0.102	0.130	0.130	0.209	0.0	0.0	0.0	0.0	1.569	0.0	0.0	234.01	1.56	2.13	0.41	100.0	88.2
9	6	0.100	0.100	0.130	0.130	0.207	0.0	0.0	0.0	0.0	1.417	0.0	0.0	232.52	1.42	1.96	0.39	100.0	88.6
9	7	0.100	0.100	0.129	0.130	0.206	0.0	0.0	0.0	0.0	1.337	0.0	0.0	231.12	1.34	1.85	0.38	100.0	89.1
9	8	0.100	0.100	0.127	0.130	0.206	0.0	0.0	0.0	0.0	0.269	0.0	0.0	230.44	0.27	0.76	0.36	100.0	89.3
9	9	0.185	0.100	0.127	0.130	0.205	0.052	0.0	0.0	0.0	0.982	0.0	0.0	234.06	1.03	1.51	0.36	100.0	88.2
9	10	0.176	0.100	0.127	0.130	0.205	0.0	0.0	0.0	0.0	0.0	0.0	0.0	233.60	0.0	0.46	0.0	100.0	88.3
9	11	0.167	0.100	0.127	0.130	0.205	0.0	0.0	0.0	0.0	0.0	0.0	0.0	233.15	0.0	0.44	0.0	100.0	88.4
9	12	0.159	0.100	0.127	0.130	0.205	0.0	0.0	0.0	0.0	0.0	0.0	0.0	232.72	0.0	0.43	0.0	100.0	88.6
9	13	0.266	0.100	0.127	0.130	0.205	0.0	0.0	0.0	0.0	0.0	0.0	0.0	232.11	0.0	0.42	0.0	100.0	88.9
9	14	0.264	0.100	0.127	0.130	0.205	0.0	0.0	0.0	0.0	0.0	0.0	0.0	230.00	0.0	0.41	0.0	100.0	87.0
9	15	0.256	0.100	0.127	0.130	0.205	0.0	0.0	0.0	0.0	0.0	0.0	0.0	237.60	0.0	0.40	0.0	100.0	87.1
9	16	0.441	0.142	0.127	0.130	0.205	0.0	0.0	0.0	0.0	0.0	0.0	0.0	257.23	0.0	2.97	0.0	91.2	81.1
9	17	0.371	0.142	0.127	0.130	0.205	0.0	0.0	0.0	0.0	0.0	0.0	0.0	253.76	0.0	3.47	0.0	92.9	82.2
9	18	0.292	0.146	0.127	0.130	0.205	0.0	0.0	0.0	0.0	0.0	0.0	0.0	250.83	0.0	2.92	0.0	94.4	83.1
9	19	0.246	0.146	0.127	0.130	0.205	0.0	0.0	0.0	0.0	0.0	0.0	0.0	248.56	0.0	2.27	0.0	95.5	83.8
9	20	0.220	0.146	0.127	0.130	0.205	0.0	0.0	0.0	0.0	0.0	0.0	0.0	247.27	0.0	1.30	0.0	96.2	84.2
9	21	0.191	0.146	0.127	0.130	0.205	0.0	0.0	0.0	0.0	0.0	0.0	0.0	245.82	0.0	1.45	0.0	96.9	84.6
9	22	0.169	0.146	0.127	0.130	0.205	0.0	0.0	0.0	0.0	0.0	0.0	0.0	244.71	0.0	1.11	0.0	97.5	84.9
9	23	0.170	0.146	0.127	0.130	0.205	0.0	0.0	0.0	0.0	0.0	0.0	0.0	244.77	0.0	0.94	0.0	97.5	84.9
9	24	0.154	0.146	0.127	0.130	0.205	0.0	0.0	0.0	0.0	0.0	0.0	0.0	243.94	0.0	0.83	0.0	97.9	85.2
9	25	0.152	0.146	0.127	0.130	0.205	0.0	0.0	0.0	0.0	0.0	0.0	0.0	243.86	0.0	0.09	0.0	97.9	85.2
9	26	0.463	0.170	0.127	0.130	0.205	0.0	0.0	0.0	0.0	0.0	0.0	0.0	265.43	0.0	1.83	0.0	87.0	78.7
9	27	0.409	0.170	0.127	0.130	0.205	0.0	0.0	0.0	0.0	0.0	0.0	0.0	262.71	0.0	2.72	0.0	88.4	79.5
TOTALS												0.0	0.0		12.4	42.1			

KSU MODEL 5 FOR SORGHUM OF 1976

MONTH	POT. EVAP	SOIL EVAP	TRAN EVAP	A EVAP	TOTAL EVAP	RAIN (MM)	RATIO T/EO	TRAN EVAP(2)	TOT. EVAP(2)	RATIO T3/EO(2)	RATIO ET/EO(2)	RUNOFF	DRAINAGE
5	83.16	32.85	0.13	0.0	32.98	76.50	0.02	0.13	32.98	0.02	9.65	0.0	0.0
6	199.09	36.70	65.00	0.89	102.58	154.50	10.21	65.89	102.58	10.21	15.88	11.74	0.0
7	194.82	14.32	190.59	5.51	200.41	23.00	29.39	186.09	200.41	29.39	31.78	0.0	0.0
8	174.23	20.03	111.66	3.71	135.40	19.00	20.44	136.97	157.00	24.28	27.88	0.0	0.0
9	112.05	29.72	5.52	0.33	35.57	57.90	1.06	17.39	42.11	2.27	11.98	0.0	0.0
TOT.	763.35	133.62	362.89	10.43	506.94	339.90	61.13	401.47	535.09	66.17	97.17	11.74	0.0

KSU MODEL 5 FOR SORGHUM OF 1976

MAXIMUM AVAILABLE WATER (MM).....	330.0000
THETA SUB V (15 BAR).....	0.1300
THETA INITIAL IN 5 FT. PROFILE (MM).....	505.0000
THETA SUB 5 CM. LAYER.....	0.2000
U (MM).....	10.0000
ALPHA (P-T).....	1.2800
SOIL CONSTANT (MM DAY TO -1/2).....	3.5000
X SUB 5 (INIT.WATER CONTENT IN 5 CM. LAYER,WT..	0.1700
FIELD CAPACITY.....	524.9998
RMTS MULTIPLIER.....	0.0
PLANTING DATE.....	MAY 29, 1976
FIELD/LOCATION.....	ASHLAND SORGHUM - II - ACCO 1090

KSU MODEL 5 FOR SORGHUM OF 1976

MO	DAY	MAX TEMP (C)	MIN TEMP (C)	TAU	RNS RAD. (LYS)	SOLAR RAD (LYS)	NET RAD (LYS)	LEAF AREA	COVER	RAIN (MM)	POT. EVAP (MM)	SOIL EVAP (MM)	TRAN EVAP (MM)	A EVAP (MM)	TOTAL EVAP (MM)	THETA (MM)	KS	BMTS	GDD
5	29	27.8	13.9	1.00	341.28	540.0	341.3	0.0	0.0	0.0	5.582	1.450	0.0	0.0	1.450	505.00	1.00	0.0	19.5
5	30	25.0	16.7	1.00	203.57	350.0	203.6	0.0	0.0	0.0	3.252	1.112	0.0	0.0	1.112	503.55	1.00	0.0	39.0
5	31	26.7	10.0	1.00	357.95	563.0	358.0	0.0	0.0	0.0	5.678	0.938	0.0	0.0	0.938	502.44	1.00	0.0	54.0
TOTALS										0.0	14.512	3.500	0.0	0.0	3.500				

KSU MODEL 5 FOR SORGHUM OF 1976

MO	DAY	MAX TEMP (C)	MIN TEMP (C)	TAU	RNS RAD. (LYS)	SOLAR RAD (LYS)	NET RAD (LYS)	LEAF AREA	COVER	RAIN (MM)	POT. EVAP (MM)	SOIL EVAP (MM)	TRAN EVAP (MM)	A EVAP (MM)	TOTAL EVAP (MM)	THETA (MM)	KS	AMTS	GDD
6	1	27.8	12.9	1.00	395.64	615.0	395.6	0.0	0.0	0.0	6.441	0.826	0.0	0.0	0.826	501.50	1.00	0.0	72.5
6	2	27.2	12.8	1.00	377.52	590.0	377.5	0.0	0.0	0.0	6.103	0.747	0.0	0.0	0.747	500.67	1.00	0.0	90.5
6	3	26.7	12.3	1.00	442.75	680.0	442.8	0.0	0.0	0.0	7.107	0.687	0.0	0.0	0.687	499.93	1.00	0.0	108.0
6	4	27.2	3.3	1.00	457.97	701.0	458.0	0.0	0.0	0.0	7.264	0.639	0.0	0.0	0.639	499.24	1.00	0.0	123.5
6	5	26.7	12.8	1.00	374.62	586.0	374.6	0.0	0.0	0.0	6.013	0.601	0.0	0.0	0.601	498.60	1.00	0.0	141.0
6	6	27.8	14.4	1.00	381.15	595.0	381.1	0.0	0.0	0.30	6.248	0.568	0.0	0.0	0.568	498.30	1.00	0.0	161.0
6	7	28.3	14.4	1.00	384.77	600.0	384.8	0.0	0.0	0.0	6.351	0.540	0.0	0.0	0.540	497.73	1.00	0.0	181.5
6	8	28.9	15.6	1.00	394.92	614.0	394.9	0.0	0.0	0.0	6.594	0.516	0.0	0.0	0.516	497.19	1.00	0.0	203.5
6	9	30.0	17.8	1.00	414.49	641.0	414.5	0.0	0.0	0.0	7.073	0.495	0.0	0.0	0.495	496.67	1.00	0.0	228.5
6	10	33.3	19.4	1.00	365.20	573.0	365.2	0.0	0.0	0.0	6.531	0.476	0.0	0.0	0.476	496.18	1.00	0.0	255.0
6	11	33.3	20.0	1.00	431.88	665.0	431.9	0.0	0.0	2.00	7.741	0.460	0.0	0.0	0.460	497.70	1.00	0.0	282.0
6	12	35.0	22.2	1.00	463.05	708.0	463.0	0.0	0.0	0.0	8.538	0.445	0.0	0.0	0.445	497.24	1.00	0.0	311.0
6	13	35.0	16.1	1.00	457.25	700.0	457.2	0.0	0.0	0.0	8.231	0.431	0.0	0.0	0.431	496.80	1.00	0.0	334.5
6	14	30.6	22.2	1.00	330.41	525.0	330.4	0.0	0.0	0.30	5.781	0.418	0.0	0.0	0.418	496.67	1.00	0.0	363.5
6	15	23.9	12.8	0.98	384.29	610.0	392.0	0.05	0.02	1.50	6.963	0.407	0.135	0.0	0.541	497.75	1.00	0.0	378.5
6	16	29.4	6.7	0.96	433.71	699.0	456.5	0.10	0.03	26.00	7.397	5.554	0.325	0.0	5.878	524.21	1.00	0.0	396.0
6	17	32.2	13.9	0.94	361.79	599.0	384.0	0.15	0.05	0.0	6.764	4.978	0.441	0.0	5.419	517.33	1.00	0.0	422.0
6	18	22.2	13.3	0.92	441.67	729.0	478.3	0.20	0.07	34.30	7.255	5.234	0.625	0.0	5.859	525.00	1.00	0.0	436.0
6	19	25.0	8.9	0.91	404.76	686.0	447.1	0.25	0.08	0.0	6.903	4.882	0.736	0.0	5.618	519.14	1.00	0.0	449.5
6	20	27.8	9.9	0.89	434.73	745.0	489.9	0.30	0.10	0.0	7.045	3.263	0.993	0.0	4.257	513.52	1.00	0.0	465.5
6	21	23.9	15.0	0.85	380.06	684.0	445.7	0.40	0.13	0.0	7.424	-1.450	-1.229	0.0	2.679	509.27	1.00	0.0	487.0
6	22	30.0	16.1	0.80	307.34	597.0	382.6	0.55	0.18	0.0	6.489	1.112	1.435	0.0	2.548	506.59	1.00	0.0	510.5
6	23	26.1	16.7	0.74	15.52	98.0	20.9	0.75	0.25	36.80	0.339	0.196	0.098	0.0	0.295	525.00	1.00	0.0	531.0
6	24	26.7	15.6	0.67	315.39	717.0	469.6	1.00	0.33	40.60	7.627	4.002	2.817	0.0	6.819	525.00	1.00	0.0	551.0
6	25	30.0	11.7	0.60	285.95	731.0	479.7	1.30	0.43	0.0	7.991	3.721	3.631	0.0	7.353	518.18	1.00	0.0	570.5
6	26	31.1	19.4	0.54	244.39	694.0	452.9	1.55	0.52	0.0	7.889	3.326	4.086	0.0	7.412	510.33	1.00	0.0	597.0
6	27	33.9	13.9	0.49	157.16	513.0	321.7	1.80	0.60	0.0	5.779	2.205	3.325	0.333	5.863	503.42	1.00	0.0	623.0
6	28	28.3	17.8	0.44	55.41	242.0	125.3	2.05	0.68	11.70	2.097	0.724	1.316	0.0	2.040	509.25	1.00	0.0	646.5
6	29	27.8	17.2	0.40	180.74	692.0	451.5	2.30	0.77	31.00	7.486	2.342	5.050	0.0	7.392	525.00	1.00	0.0	669.0
6	30	26.1	11.7	0.37	179.24	738.0	484.8	2.50	0.83	0.0	7.690	2.221	5.468	0.0	7.690	517.61	1.00	0.0	685.0
TOTALS										184.50	199.063	53.468	31.710	0.333	85.511				

KSU MODEL 5 FOR SORGHUM OF 1976

MO	DAY	MAX TEMP (C)	MIN TEMP (C)	TAU	RMS RAD. (LYS)	SOLAR RAD (LYS)	NET RAD (LYS)	LEAF AREA	COVER	RAIN (MM)	POT. EVAP (MM)	SOIL EVAP (MM)	TRAN EVAP (MM)	A EVAP (MM)	TOTAL EVAP (MM)	THETA (MM)	KS	RMTS	GDD
7	1	26.7	13.3	0.34	146.97	559.0	427.5	2.70	0.90	0.0	6.879	1.835	5.044	0.0	6.879	509.92	1.00	0.0	703.0
7	2	25.0	13.9	0.32	93.90	480.0	297.8	2.80	0.97	0.0	4.803	1.183	3.620	0.0	4.803	503.04	1.00	0.0	724.5
7	3	23.9	17.8	0.30	3.41	170.0	11.5	3.05	1.00	0.0	0.182	0.042	0.139	0.0	0.182	498.24	1.00	0.0	744.0
7	4	28.3	13.3	0.27	103.23	606.0	376.3	3.25	1.00	0.0	6.183	1.325	4.858	0.0	6.183	498.06	1.00	0.0	763.5
7	5	27.8	12.2	0.26	106.11	647.0	410.6	3.40	1.00	0.0	6.669	1.346	5.323	0.0	6.669	491.87	1.00	0.0	781.5
7	6	28.9	11.7	0.24	101.19	663.0	424.9	3.60	1.00	0.0	6.967	-1.299	-5.668	0.0	6.967	485.20	1.00	0.0	800.0
7	7	32.2	18.9	0.22	72.42	549.0	328.6	3.80	1.00	0.0	5.788	0.598	4.791	0.0	5.389	478.23	1.00	0.0	826.0
7	8	33.3	18.3	0.20	80.47	648.0	411.5	4.10	1.00	0.0	7.326	1.380	6.207	0.621	8.208	472.45	1.00	0.0	851.5
7	9	34.4	21.1	0.17	78.10	694.0	450.0	4.40	1.00	0.0	8.207	1.112	7.094	0.709	8.915	464.64	1.00	0.0	878.5
7	10	32.8	18.9	0.15	68.32	697.0	452.5	4.75	1.00	0.0	8.021	0.938	7.075	0.0	8.013	456.72	1.00	0.0	905.5
7	11	31.7	20.6	0.13	57.04	665.0	425.7	5.05	1.00	0.0	7.497	0.826	6.712	0.0	7.539	447.71	1.00	0.0	923.0
7	12	32.2	20.0	0.12	51.92	678.0	436.6	5.35	1.00	0.0	7.723	0.747	7.005	0.0	7.752	440.17	1.00	0.0	960.0
7	13	32.8	18.9	0.11	48.09	679.6	437.9	5.55	1.00	0.0	7.763	0.687	7.097	0.0	7.784	432.42	1.00	0.0	986.0
7	14	32.2	20.0	0.10	42.12	672.8	432.2	5.85	1.00	0.0	7.646	0.639	7.063	0.0	7.703	424.63	1.00	0.0	1013.0
7	15	31.7	19.4	0.08	13.60	347.9	160.3	6.20	1.00	0.0	2.312	0.233	2.625	0.0	2.859	416.93	1.00	0.0	1039.5
7	16	27.8	13.3	0.08	35.21	715.5	468.0	6.50	1.00	0.80	7.636	0.568	7.187	0.0	7.755	414.87	1.00	0.0	1058.5
7	17	26.7	16.1	0.07	0.56	166.1	8.2	6.75	1.00	4.30	0.134	0.010	0.127	0.0	0.136	411.42	1.00	0.0	1079.0
7	18	31.1	17.3	0.06	23.76	607.7	377.7	6.95	1.00	16.30	6.537	0.321	6.215	0.0	6.537	427.58	1.00	0.0	1104.0
7	19	31.7	21.1	0.06	21.33	605.3	375.7	7.15	1.00	0.0	6.637	-0.301	-6.331	0.0	5.632	421.04	1.00	0.0	1132.0
7	20	32.8	22.2	0.05	22.83	654.8	417.2	7.30	1.00	0.0	7.493	0.320	7.173	0.0	7.493	414.41	1.00	0.0	1161.0
7	21	32.2	21.1	0.05	10.92	414.4	216.0	7.50	1.00	0.0	3.837	0.152	3.686	0.0	3.837	408.92	1.00	0.0	1189.0
7	22	33.9	20.0	0.05	19.45	654.4	416.3	7.70	1.00	0.0	7.520	-0.274	-7.246	0.725	8.244	403.08	1.00	0.0	1216.0
7	23	35.6	21.1	0.04	18.77	666.4	426.9	7.85	1.00	0.0	7.388	0.271	7.617	0.762	8.650	394.64	1.00	0.0	1244.0
7	24	34.4	18.9	0.04	17.13	650.6	413.6	8.00	1.00	0.0	7.479	0.242	7.237	0.724	8.202	386.19	1.00	0.0	1270.0
7	25	36.1	13.3	0.04	15.58	624.0	391.4	8.10	1.00	0.0	7.201	0.224	6.977	0.698	7.899	377.98	1.00	0.0	1295.5
7	26	36.7	21.1	0.04	12.81	548.6	328.3	8.15	1.00	0.0	6.147	-0.137	-5.960	0.596	6.743	370.03	1.00	0.0	1323.5
7	27	30.0	23.9	0.04	14.85	611.2	380.7	8.15	1.00	0.0	6.660	0.203	6.457	0.0	6.660	363.34	1.00	0.0	1354.0
7	28	32.2	20.0	0.04	14.40	588.6	361.8	8.10	1.00	6.60	6.399	0.199	6.200	0.0	6.399	363.28	1.00	0.0	1381.0
7	29	32.2	17.8	0.04	15.80	612.0	381.3	8.00	1.00	0.0	6.687	0.216	6.470	0.0	6.687	356.88	1.00	0.0	1406.0
7	30	37.8	23.3	0.04	15.69	591.3	364.0	7.90	1.00	0.0	6.969	0.235	6.734	0.673	7.642	350.19	1.00	0.0	1436.0
7	31	31.7	19.4	0.05	14.83	543.6	324.1	7.75	1.00	0.0	5.683	0.203	5.480	0.0	5.683	342.55	1.00	0.0	1462.5
TOTALS										28.00	195.366	18.118	177.419	5.507	201.044				

KSU MODEL 5 FOR SORGHUM OF 1976

MO	DAY	MAX TEMP (C)	MIN TEMP (C)	TAU	RMS RAD. (LYS)	SOLAR RAD (LYS)	NET RAD (LYS)	LEAF AREA	COVER	RAIN. (MM)	POT. EVAP (MM)	SOIL EVAP (MM)	TRAN EVAP (MM)	A EVAP (MM)	TOTAL EVAP (MM)	THETA (MM)	KS	BMTS	GDD
8	1	26.7	13.9	0.05	13.10	478.5	269.6	7.60	1.00	0.0	4.441	0.168	4.272	0.0	4.441	336.97	1.00	0.0	1485.5
8	2	26.7	16.1	0.05	16.79	553.3	332.2	7.50	1.00	0.0	5.408	0.214	5.195	0.0	5.408	332.43	1.00	0.0	1506.0
8	3	27.2	10.0	0.05	20.67	633.1	399.0	7.45	1.00	0.0	6.374	0.257	6.118	0.0	6.374	327.02	1.00	0.0	1521.5
8	4	31.7	16.9	0.05	20.17	614.5	383.4	7.40	1.00	0.0	6.709	0.276	6.433	0.0	6.709	320.65	1.00	0.0	1547.5
8	5	31.1	17.2	0.05	19.39	592.4	197.6	7.40	1.00	0.0	3.411	0.140	3.271	0.0	3.411	313.94	1.00	0.0	1572.0
8	6	27.8	17.2	0.05	20.58	623.9	391.3	7.40	1.00	2.00	6.489	0.267	6.222	0.0	6.489	312.53	1.00	0.0	1594.5
8	7	27.8	12.8	0.05	20.15	614.1	383.1	7.40	1.00	0.0	6.237	0.256	5.980	0.0	6.237	306.04	1.00	0.0	1613.0
8	8	32.8	18.9	0.05	19.99	610.6	380.2	7.40	1.00	0.0	6.740	0.277	6.463	0.0	6.740	299.30	1.00	0.0	1639.0
8	9	30.4	19.4	0.05	21.13	636.4	401.8	7.40	1.00	0.0	7.726	—0.317	—7.143	0.714	8.175	293.06	0.96	0.0	1665.5
8	10	31.7	23.3	0.05	5.62	279.0	102.7	7.30	1.00	0.0	1.828	0.078	1.543	0.0	1.621	284.89	0.88	0.0	1695.5
8	11	36.1	26.7	0.06	9.20	349.3	161.5	7.20	1.00	0.0	3.071	0.137	2.539	0.254	2.930	283.26	0.87	0.0	1728.5
8	12	31.7	19.9	0.06	21.44	580.1	354.6	7.05	1.00	15.79	6.205	0.293	5.878	0.0	6.171	296.03	0.99	0.0	1754.5
8	13	32.2	17.2	0.06	22.54	584.5	358.3	6.95	1.00	0.0	6.269	0.308	5.556	0.0	5.864	289.86	0.93	0.0	1779.0
8	14	29.4	13.9	0.07	19.02	485.3	275.3	6.85	1.00	1.30	4.691	0.240	3.943	0.0	4.183	285.30	0.89	0.0	1804.5
8	15	28.9	13.3	0.07	22.17	537.4	319.1	6.70	1.00	0.0	5.388	0.292	4.298	0.0	4.591	281.12	0.84	0.0	1829.0
8	16	35.0	13.9	0.07	26.11	579.3	354.0	6.55	1.00	0.0	6.442	0.371	4.840	0.484	5.695	276.52	0.80	0.0	1855.0
8	17	34.4	22.2	0.08	27.64	586.6	360.1	6.45	1.00	0.0	6.596	0.396	4.587	0.459	5.441	270.83	0.74	0.0	1884.0
8	18	33.9	21.1	0.08	29.14	583.7	357.7	6.30	1.00	0.0	6.481	0.413	4.155	0.416	4.983	265.39	0.68	0.0	1912.0
8	19	31.1	17.2	0.09	33.45	618.5	386.8	6.15	1.00	0.0	6.678	0.451	3.950	0.0	4.402	260.41	0.63	0.0	1936.5
8	20	32.8	15.6	0.09	33.01	585.9	359.5	6.00	1.00	0.0	6.290	0.451	3.444	0.0	3.896	256.01	0.59	0.0	1959.5
8	21	33.9	19.4	0.10	33.22	563.6	340.8	5.85	1.00	0.0	6.136	0.467	3.121	0.312	3.900	252.11	0.55	0.0	1986.0
8	22	35.0	19.4	0.10	31.27	524.7	308.3	5.75	1.00	0.0	5.623	0.445	2.647	0.265	3.357	248.21	0.51	0.0	2012.5
8	23	33.9	15.6	0.11	34.89	543.6	324.1	5.60	1.00	0.0	5.746	0.483	2.512	0.251	3.246	244.85	0.48	0.0	2035.5
8	24	32.8	20.6	0.11	22.37	390.2	195.7	5.45	1.00	0.0	3.493	0.312	1.414	0.0	1.726	241.60	0.44	0.0	2063.0
8	25	33.3	17.2	0.12	37.83	528.9	311.8	5.30	1.00	0.0	5.528	—0.524	—2.137	0.214	2.874	239.88	0.43	0.0	2087.5
8	26	37.8	22.2	0.13	42.50	558.6	336.7	5.20	1.00	0.0	6.416	0.633	2.302	0.230	3.165	237.00	0.40	0.0	2116.5
8	27	35.0	25.0	0.13	41.67	527.9	311.0	5.05	1.00	0.0	5.797	0.607	1.900	0.190	2.697	233.84	0.37	0.0	2148.0
8	28	31.7	12.2	0.14	52.73	599.3	370.7	4.90	1.00	0.0	6.316	0.702	1.902	0.0	2.604	231.14	0.34	0.0	2168.0
8	29	33.3	12.2	0.15	53.56	580.2	354.7	4.75	1.00	0.0	6.166	0.727	1.700	0.170	2.597	228.54	0.31	0.0	2188.0
8	30	32.2	13.9	0.16	50.95	543.8	324.3	4.65	1.00	0.0	5.599	0.687	1.406	0.0	2.093	225.94	0.29	0.0	2209.5
8	31	30.6	19.4	0.17	22.24	315.6	133.3	4.50	1.00	0.0	2.307	0.301	0.532	0.0	0.833	223.85	0.27	0.0	2236.0
TOTALS										19.00	172.599	11.490	117.402	3.958	132.851				

KSU MODEL 5 FOR SORGHUM OF 1976

MO	DAY	MAX TEMP (C)	MIN TEMP (C)	TAU	RHS RAD. (LYS)	SOLAR RAD (LYS)	NET RAD (LYS)	LEAF AREA	COVER	RAIN (MM)	POT. EVAP (MM)	SOIL EVAP (MM)	TRAN EVAP (MM)	A EVAP (MM)	TOTAL EVAP (MM)	THETA (MV)	KS	BMTS	GDD
9	1	30.6	13.3	0.17	45.49	469.5	262.1	4.40	1.00	0.0	4.426	0.600	0.982	0.0	1.582	223.02	0.26	0.0	2257.0
9	2	32.2	15.6	0.18	58.70	544.7	325.0	4.30	1.00	0.0	5.648	0.478	1.168	0.0	1.646	221.43	0.24	0.0	2280.0
9	3	35.0	19.4	0.20	62.80	540.0	321.1	4.10	1.00	0.0	5.856	1.077	1.112	0.111	2.300	219.79	0.22	0.0	2306.5
9	4	32.9	13.9	0.21	63.99	524.6	308.2	3.95	1.00	0.0	5.536	1.098	0.922	0.093	2.122	217.49	0.20	0.0	2332.5
9	5	37.8	21.1	0.22	67.89	524.4	308.0	3.80	1.00	0.0	5.845	0.933	0.868	0.087	1.893	215.36	0.18	0.0	2360.5
9	6	36.1	22.3	0.23	68.61	513.8	299.2	3.70	1.00	0.0	5.602	0.826	0.737	0.074	1.637	213.47	0.16	0.0	2390.0
9	7	33.3	19.4	0.24	79.04	544.3	324.7	3.55	1.00	0.0	5.807	0.747	0.676	0.068	1.491	211.83	0.14	0.0	2416.5
9	8	27.2	12.3	0.25	5.68	183.1	22.4	3.45	1.00	0.0	0.363	0.097	0.037	0.0	0.135	210.34	0.13	0.0	2434.5
9	9	24.4	12.2	0.26	87.42	552.6	331.6	3.35	1.00	4.80	5.159	0.639	0.720	0.0	1.360	219.01	0.18	0.0	2449.5
9	10	26.7	6.1	1.00	346.79	547.6	346.8	0.0	0.40	0.0	5.408	0.601	0.0	0.0	0.601	213.65	0.16	0.0	2464.5
9	11	31.7	16.1	1.00	316.71	500.1	316.7	0.0	0.40	0.0	5.481	0.568	0.0	0.0	0.568	213.05	0.15	0.0	2489.0
9	12	30.0	18.9	1.00	273.01	445.3	273.0	0.0	0.40	0.0	4.683	0.540	0.0	0.0	0.540	212.49	0.15	0.0	2514.0
9	13	25.6	15.7	1.00	78.90	178.0	78.9	0.0	0.40	5.80	1.270	0.516	0.0	0.0	0.516	217.74	0.20	0.0	2534.0
9	14	20.4	17.8	1.00	277.96	452.5	277.9	0.0	0.40	0.30	4.713	0.495	0.0	0.0	0.495	217.52	0.20	0.0	2558.5
9	15	25.6	13.9	1.00	40.63	125.2	40.6	0.0	0.40	0.0	0.660	0.476	0.0	0.0	0.476	217.03	0.20	0.0	2580.5
9	16	27.2	15.6	1.00	232.49	389.9	232.5	0.0	0.40	22.60	3.802	2.971	0.0	0.0	2.971	239.15	0.42	0.0	2601.0
9	17	30.0	15.0	1.00	263.29	422.4	263.3	0.0	0.40	0.0	4.446	3.473	0.0	0.0	3.473	236.18	0.39	0.0	2623.5
9	18	31.7	17.2	1.00	215.38	366.3	215.4	0.0	0.40	0.0	3.744	2.925	0.0	0.0	2.925	232.71	0.35	0.0	2648.0
9	19	31.7	17.2	1.00	167.11	299.7	167.1	0.0	0.40	0.0	2.905	2.269	0.0	0.0	2.269	229.78	0.33	0.0	2672.5
9	20	25.7	23.0	1.00	167.11	299.7	167.1	0.0	0.40	0.0	2.765	1.296	0.0	0.0	1.296	227.51	0.30	0.0	2696.5
9	21	22.2	12.3	1.00	300.62	483.9	300.6	0.0	0.40	0.0	4.563	1.450	0.0	0.0	1.450	226.22	0.29	0.0	2710.5
9	22	31.1	11.1	1.00	270.76	442.7	270.8	0.0	0.40	0.0	4.562	1.112	0.0	0.0	1.112	224.77	0.27	0.0	2729.5
9	23	25.0	16.7	1.00	276.27	450.3	276.3	0.0	0.40	1.00	4.414	0.938	0.0	0.0	0.938	224.65	0.27	0.0	2749.0
9	24	27.2	9.4	1.00	279.17	454.3	279.2	0.0	0.40	0.0	4.449	0.826	0.0	0.0	0.826	223.72	0.26	0.0	2764.5
9	25	22.8	12.3	1.00	4.97	76.0	5.0	0.0	0.40	0.0	0.076	0.085	0.0	0.0	0.085	222.87	0.26	0.0	2778.5
9	26	22.2	14.4	1.00	153.49	280.9	153.5	0.0	0.40	23.40	2.340	1.828	0.0	0.0	1.828	246.21	0.49	0.0	2793.5
9	27	17.8	11.1	1.00	247.93	411.2	247.9	0.0	0.40	0.0	3.485	2.723	0.0	0.0	2.723	244.38	0.47	0.0	2801.5
TOTALS										57.90	108.003	31.594	7.233	0.433	39.260				

462.768

KSU MODEL 5 FOR SORGHUM OF 1976

	THETA VALUES					TRANSPIRATION												
MO DY	LAYER 1	LAYER 2	LAYER 3	LAYER 4	LAYER 5	LAYER 1	LAYER 2	LAYER 3	LAYER 4	LAYER 5	RNOFF	DRAIN	THETA	TRANS EVAP	TOT. EVAP	KS	DEPL.	DEPL.
	0-5 CM	5-30 CM	30-60 CM	60-90 CM	90-180 CM	0-5 CM	5-30 CM	30-60 CM	60-90 CM	90-180 CM	(MM)	(MM)	0-150 CM	(MM)	(MM)		0-90 CM	0-150 CM
5 29	0.261	0.330	0.330	0.330	0.350	0.0	0.0	0.0	0.0	0.0	0.0	0.0	503.55	0.0	1.45	0.0	10.8	6.5
5 30	0.239	0.330	0.330	0.330	0.350	0.0	0.0	0.0	0.0	0.0	0.0	0.0	502.44	0.0	1.11	0.0	11.4	6.8
5 31	0.220	0.330	0.330	0.330	0.350	0.0	0.0	0.0	0.0	0.0	0.0	0.0	501.50	0.0	0.94	0.0	11.9	7.1
TOTALS											0.0	0.0		0.0	3.5			

KSU MODEL 5 FOR SORGHUM OF 1976

		THETA VALUES					TRANSPIRATION												
MO	DY	LAYER 1	LAYER 2	LAYER 3	LAYER 4	LAYER 5	LAYER 1	LAYER 2	LAYER 3	LAYER 4	LAYER 5	RNOFF	DRAIN	THETA	TRANS EVAP	TOT. EVAP	KS	DEPL.	DEPL.
		0-5 CM	5-30 CM	30-60 CM	60-90 CM	90-120 CM	0-5 CM	5-30 CM	30-60 CM	60-90 CM	90-180 CM	(MM)	(MM)	0-150 CM	(MM)	(MM)		0-90 CM	0-150 CM
6	1	0.203	0.330	0.330	0.330	0.350	0.0	0.0	0.0	0.0	0.0	0.0	0.0	500.67	0.0	0.83	0.0	12.3	7.4
6	2	0.189	0.330	0.330	0.330	0.350	0.0	0.0	0.0	0.0	0.0	0.0	0.0	499.93	0.0	0.75	0.0	12.7	7.6
6	3	0.175	0.330	0.330	0.330	0.350	0.0	0.0	0.0	0.0	0.0	0.0	0.0	499.24	0.0	0.69	0.0	13.0	7.8
6	4	0.162	0.330	0.330	0.330	0.350	0.0	0.0	0.0	0.0	0.0	0.0	0.0	498.60	0.0	0.64	0.0	13.3	8.0
6	5	0.150	0.330	0.330	0.330	0.350	0.0	0.0	0.0	0.0	0.0	0.0	0.0	498.00	0.0	0.60	0.0	13.6	8.2
6	6	0.145	0.330	0.330	0.330	0.350	0.0	0.0	0.0	0.0	0.0	0.0	0.0	497.73	0.0	0.57	0.0	13.8	8.3
6	7	0.134	0.330	0.330	0.330	0.350	0.0	0.0	0.0	0.0	0.0	0.0	0.0	497.19	0.0	0.54	0.0	14.0	8.4
6	8	0.124	0.330	0.330	0.330	0.350	0.0	0.0	0.0	0.0	0.0	0.0	0.0	496.68	0.0	0.52	0.0	14.3	8.6
6	9	0.114	0.330	0.330	0.330	0.350	0.0	0.0	0.0	0.0	0.0	0.0	0.0	496.18	0.0	0.50	0.0	14.6	8.7
6	10	0.104	0.330	0.330	0.330	0.350	0.0	0.0	0.0	0.0	0.0	0.0	0.0	495.70	0.0	0.48	0.0	14.8	8.9
6	11	0.135	0.330	0.330	0.330	0.350	0.0	0.0	0.0	0.0	0.0	0.0	0.0	497.24	0.0	0.46	0.0	14.0	8.4
6	12	0.126	0.330	0.330	0.330	0.350	0.0	0.0	0.0	0.0	0.0	0.0	0.0	496.80	0.0	0.44	0.0	14.2	8.5
6	13	0.117	0.330	0.330	0.330	0.350	0.0	0.0	0.0	0.0	0.0	0.0	0.0	496.37	0.0	0.43	0.0	14.5	8.7
6	14	0.115	0.330	0.330	0.330	0.350	0.0	0.0	0.0	0.0	0.0	0.0	0.0	496.25	0.0	0.42	0.0	14.5	8.7
6	15	0.137	0.330	0.330	0.330	0.350	0.013	0.067	0.054	0.0	0.0	0.0	0.0	497.21	0.13	0.54	1.00	14.0	8.4
6	16	0.338	0.360	0.329	0.330	0.350	0.032	0.162	0.130	0.0	0.0	0.15	0.0	517.18	0.32	5.38	1.00	3.9	2.4
6	17	0.288	0.359	0.329	0.330	0.350	0.044	0.220	0.176	0.0	0.0	0.0	0.0	511.76	0.44	5.42	1.00	6.7	4.0
6	18	0.394	0.434	0.335	0.330	0.350	0.062	0.312	0.250	0.0	0.0	2.48	0.0	537.72	0.62	5.86	1.00	-6.4	-3.9
6	19	0.295	0.432	0.334	0.330	0.350	0.074	0.368	0.294	0.0	0.0	0.0	0.0	532.10	0.74	5.62	1.00	-3.6	-2.2
6	20	0.228	0.348	0.402	0.330	0.350	0.099	0.497	0.397	0.0	0.0	0.0	0.0	527.85	0.99	4.26	1.00	-1.4	-0.9
6	21	0.196	0.346	0.400	0.330	0.350	0.123	0.615	0.492	0.0	0.0	0.0	0.0	525.17	1.23	2.68	1.00	-0.1	-0.1
6	22	0.171	0.343	0.348	0.380	0.350	0.144	0.718	0.574	0.0	0.0	0.0	0.0	522.62	1.44	2.55	1.00	1.2	0.7
6	23	0.496	0.411	0.346	0.380	0.350	0.010	0.049	0.039	0.0	0.0	3.26	0.0	555.87	0.10	0.29	1.00	-15.6	-9.4
6	24	0.414	0.494	0.390	0.350	0.360	0.282	1.409	1.127	0.0	0.0	4.49	0.0	582.17	2.82	6.82	1.00	-25.9	-17.3
6	25	0.336	0.491	0.387	0.347	0.359	0.182	0.908	0.908	0.908	0.726	0.0	0.0	575.06	3.63	7.35	1.00	-22.5	-15.2
6	26	0.266	0.346	0.464	0.384	0.349	0.204	1.022	1.022	1.022	0.817	0.0	8.24	563.58	4.09	7.41	1.00	-19.8	-11.7
6	27	0.218	0.342	0.461	0.381	0.348	0.183	0.914	0.914	0.914	0.732	0.0	0.0	557.96	3.66	5.96	1.00	-17.2	-10.0
6	28	0.436	0.341	0.349	0.460	0.358	0.066	0.329	0.329	0.329	0.263	0.0	0.0	564.61	1.32	2.04	1.00	-17.5	-12.0
6	29	0.448	0.441	0.345	0.456	0.357	0.253	1.263	1.263	1.263	1.010	1.51	0.0	597.05	5.05	7.39	1.00	-29.2	-18.3
6	30	0.398	0.436	0.340	0.345	0.384	0.273	1.367	1.367	1.367	1.094	0.0	6.47	564.86	5.47	7.69	1.00	-9.8	-12.1
TOTALS												11.9	14.7		32.0	85.5			

KSU MODEL 5 FOR SORGHUM OF 1976

		THETA VALUES					TRANSPIRATION												
MO	DY	LAYER 1	LAYER 2	LAYER 3	LAYER 4	LAYER 5	LAYER 1	LAYER 2	LAYER 3	LAYER 4	LAYER 5	RNOFF	DRAIN	THETA	TRANS EVAP	TOT. EVAP	KS	DEPL.	DEPL.
		0-5 CM	5-30 CM	30-60 CM	60-90 CM	90-180 CM	0-5 CM	5-30 CM	30-60 CM	60-90 CM	90-180 CM	(MM)	(MM)	0-150 CM	(MM)	(MM)		0-90 CM	0-150 CM
7	1	0.308	0.355	0.407	0.341	0.383	0.252	1.261	1.261	1.261	1.009	0.0	0.0	558.32	5.04	6.88	1.00	-6.9	-10.1
7	2	0.281	0.351	0.404	0.328	0.349	0.181	0.905	0.905	0.905	0.724	0.0	29.55	534.06	3.62	4.80	1.00	-4.8	-2.7
7	3	0.280	0.350	0.351	0.392	0.349	0.007	0.035	0.035	0.035	0.028	0.0	0.0	533.89	0.14	0.18	1.00	-4.7	-2.7
7	4	0.249	0.345	0.347	0.388	0.348	0.243	1.215	1.215	1.215	0.972	0.0	0.0	528.03	4.86	6.18	1.00	-2.1	-0.9
7	5	0.216	0.340	0.342	0.346	0.360	0.266	1.331	1.331	1.331	1.065	0.0	0.0	517.88	5.32	6.67	1.00	6.5	2.2
7	6	0.185	0.334	0.337	0.341	0.358	0.283	1.417	1.417	1.417	1.134	0.0	0.0	511.29	5.67	6.97	1.00	9.5	4.2
7	7	0.168	0.329	0.334	0.337	0.349	0.240	1.198	1.198	1.198	0.958	0.0	7.57	501.17	4.79	5.39	1.00	11.7	7.2
7	8	0.134	0.322	0.328	0.331	0.347	0.341	1.707	1.707	1.707	1.366	0.0	0.0	493.42	6.83	8.21	1.00	15.2	9.5
7	9	0.111	0.313	0.321	0.325	0.346	0.0	2.341	1.951	1.951	1.561	0.0	0.0	485.02	7.80	8.92	1.00	18.9	12.1
7	10	0.100	0.303	0.315	0.319	0.344	0.0	2.123	1.769	1.769	1.415	0.0	0.0	477.48	7.08	8.01	1.00	22.2	14.4
7	11	0.100	0.292	0.310	0.313	0.343	0.0	2.014	1.678	1.678	1.342	0.0	0.0	470.39	6.71	7.54	1.00	25.3	16.5
7	12	0.100	0.280	0.304	0.307	0.341	0.0	2.102	1.751	1.751	1.401	0.0	0.0	463.10	7.01	7.75	1.00	28.6	18.8
7	13	0.100	0.269	0.298	0.301	0.339	0.0	2.129	1.774	1.774	1.419	0.0	0.0	455.79	7.10	7.78	1.00	31.8	21.0
7	14	0.100	0.258	0.292	0.296	0.338	0.0	2.119	1.766	1.766	1.413	0.0	0.0	448.56	7.06	7.70	1.00	34.9	23.2
7	15	0.100	0.254	0.290	0.293	0.337	0.0	0.788	0.656	0.656	0.525	0.0	0.0	445.88	2.63	2.86	1.00	36.1	24.0
7	16	0.105	0.245	0.284	0.287	0.236	0.0	2.156	1.797	1.797	1.437	0.0	0.0	439.40	7.19	7.75	1.00	38.9	25.9
7	17	0.190	0.245	0.284	0.287	0.336	0.006	0.032	0.032	0.032	0.025	0.0	0.0	443.57	0.13	0.14	1.00	36.4	24.7
7	18	0.487	0.242	0.279	0.282	0.334	0.311	1.554	1.554	1.554	1.243	0.0	0.0	453.75	6.22	6.54	1.00	31.2	21.6
7	19	0.475	0.236	0.273	0.277	0.333	0.317	1.583	1.583	1.583	1.266	0.0	0.0	447.54	6.33	6.63	1.00	33.9	23.5
7	20	0.336	0.254	0.267	0.271	0.331	0.359	1.793	1.793	1.793	1.435	0.0	0.0	440.53	7.17	7.49	1.00	37.0	25.5
7	21	0.330	0.250	0.264	0.268	0.331	0.184	0.921	0.921	0.921	0.737	0.0	0.0	436.94	3.69	3.84	1.00	38.6	26.7
7	22	0.316	0.242	0.258	0.261	0.329	0.399	1.993	1.993	1.993	1.594	0.0	0.0	429.22	7.97	8.24	1.00	41.9	29.0
7	23	0.302	0.234	0.251	0.254	0.327	0.419	2.095	2.095	2.095	1.676	0.0	0.0	421.13	8.38	8.65	1.00	45.5	31.5
7	24	0.290	0.226	0.244	0.247	0.325	0.398	1.990	1.990	1.990	1.592	0.0	0.0	413.46	7.96	8.20	1.00	48.8	33.8
7	25	0.277	0.218	0.238	0.241	0.323	0.384	1.919	1.919	1.919	1.535	0.0	0.0	406.07	7.67	7.90	1.00	52.0	36.0
7	26	0.267	0.211	0.232	0.236	0.322	0.328	1.639	1.639	1.639	1.311	0.0	0.0	399.77	6.56	6.74	1.00	54.7	37.9
7	27	0.257	0.205	0.227	0.230	0.321	0.323	1.614	1.614	1.614	1.291	0.0	0.0	393.54	6.46	6.66	1.00	57.5	39.8
7	28	0.378	0.199	0.222	0.225	0.319	0.310	1.550	1.550	1.550	1.240	0.0	0.0	394.15	6.20	6.40	1.00	56.7	39.7
7	29	0.368	0.192	0.216	0.220	0.318	0.324	1.618	1.618	1.618	1.294	0.0	0.0	387.89	6.47	6.69	1.00	59.5	41.5
7	30	0.338	0.198	0.210	0.214	0.316	0.370	1.852	1.852	1.852	1.481	0.0	0.0	380.75	7.41	7.64	1.00	62.6	43.7
7	31	0.328	0.183	0.206	0.209	0.315	0.274	1.370	1.370	1.370	1.096	0.0	0.0	375.43	5.48	5.68	1.00	64.9	45.3
TOTALS												0.0	37.1		182.9	201.0			

KSU MODEL 5 FOR SORGHUM OF 1976

		THETA VALUES					TRANSPIRATION												
MO	DY	LAYER 1	LAYER 2	LAYER 3	LAYER 4	LAYER 5	LAYER 1	LAYER 2	LAYER 3	LAYER 4	LAYER 5	RNOFF	DRAIN	THETA	TRANS EVAP	TOT. EVAP	KS	DEPL.	DEPL.
		0-5 CM	5-30 CM	30-60 CM	60-90 CM	90-180 CM	0-5 CM	5-30 CM	30-60 CM	60-90 CM	90-180 CM	(MM)	(MM)	0-150 CM	(MM)	(MM)		0-90 CM	0-150 CM
8	1	0.321	0.179	0.202	0.205	0.314	0.214	1.068	1.068	1.068	0.854	0.0	0.0	371.27	4.27	4.44	1.00	65.7	46.6
8	2	0.311	0.174	0.198	0.201	0.313	0.260	1.299	1.299	1.299	1.039	0.0	0.0	366.21	5.19	5.41	1.00	68.9	48.1
8	3	0.300	0.167	0.193	0.196	0.311	0.306	1.529	1.529	1.529	1.224	0.0	0.0	360.24	6.12	6.37	1.00	71.5	49.9
8	4	0.288	0.161	0.187	0.191	0.310	0.322	1.608	1.608	1.608	1.287	0.0	0.0	353.96	6.43	6.71	1.00	74.2	51.8
8	5	0.272	0.158	0.185	0.188	0.309	0.164	0.818	0.818	0.818	0.654	0.0	0.0	350.77	3.27	3.41	1.00	75.6	52.8
8	6	0.310	0.151	0.179	0.183	0.308	0.311	1.556	1.556	1.556	1.244	0.0	0.0	346.70	6.22	6.49	1.00	77.3	54.0
8	7	0.299	0.146	0.174	0.178	0.306	0.299	1.495	1.495	1.495	1.196	0.0	0.0	340.86	5.98	6.24	1.00	79.8	55.8
8	8	0.287	0.139	0.169	0.172	0.305	0.323	1.616	1.616	1.616	1.293	0.0	0.0	334.55	6.46	6.74	1.00	82.6	57.7
8	9	0.273	0.131	0.162	0.166	0.303	0.405	2.031	2.031	2.031	1.624	0.0	0.0	326.65	8.12	8.44	1.00	86.0	60.1
8	10	0.270	0.130	0.160	0.164	0.303	0.088	0.233	0.643	0.438	0.350	0.0	0.0	324.94	1.75	1.83	1.00	86.8	60.6
8	11	0.264	0.130	0.155	0.161	0.302	0.159	0.0	1.594	0.797	0.638	0.0	0.0	321.83	3.19	3.33	1.00	88.1	61.6
8	12	0.488	0.140	0.150	0.157	0.301	0.296	1.478	1.478	1.478	1.182	0.0	0.0	331.72	5.91	6.20	1.00	82.7	58.6
8	13	0.476	0.134	0.145	0.152	0.300	0.298	1.490	1.490	1.490	1.192	0.0	0.0	325.64	5.96	6.27	1.00	85.3	60.4
8	14	0.367	0.154	0.141	0.148	0.299	0.223	1.113	1.113	1.113	0.890	0.0	0.0	322.75	4.45	4.69	1.00	86.5	61.3
8	15	0.356	0.149	0.137	0.144	0.297	0.255	1.274	1.274	1.274	1.019	0.0	0.0	317.70	5.10	5.39	1.00	88.8	62.8
8	16	0.336	0.144	0.131	0.138	0.296	0.328	1.639	1.639	1.639	1.311	0.0	0.0	311.21	6.55	6.93	1.00	91.6	64.8
8	17	0.321	0.137	0.130	0.130	0.294	0.333	1.665	0.430	2.436	1.796	0.0	0.0	304.76	6.66	7.05	1.00	94.2	66.7
8	18	0.307	0.131	0.130	0.130	0.239	0.324	1.621	0.0	0.0	4.539	0.0	0.0	299.37	6.48	6.90	1.00	95.4	68.4
8	19	0.291	0.130	0.130	0.130	0.233	0.311	0.196	0.0	0.0	5.719	0.0	0.0	294.60	6.23	6.68	1.00	95.9	69.3
8	20	0.277	0.130	0.130	0.130	0.276	0.292	0.0	0.0	0.0	5.547	0.0	0.0	290.16	5.84	6.29	1.00	96.3	71.2
8	21	0.262	0.130	0.130	0.130	0.270	0.287	0.0	0.0	0.0	5.461	0.0	0.0	285.77	5.75	6.22	0.96	96.7	72.5
8	22	0.248	0.130	0.130	0.130	0.265	0.249	0.0	0.0	0.0	4.740	0.0	0.0	281.91	4.99	5.43	0.92	97.0	73.7
8	23	0.233	0.130	0.130	0.130	0.260	0.242	0.0	0.0	0.0	4.598	0.0	0.0	278.12	4.84	5.32	0.88	97.4	74.8
8	24	0.224	0.130	0.130	0.130	0.257	0.134	0.0	0.0	0.0	2.537	0.0	0.0	275.98	2.67	2.98	0.84	97.6	75.5
8	25	0.209	0.130	0.130	0.130	0.253	0.213	0.0	0.0	0.0	4.054	0.0	0.0	272.54	4.27	4.79	0.82	98.0	76.5
8	26	0.192	0.130	0.130	0.130	0.248	0.236	0.0	0.0	0.0	4.475	0.0	0.0	268.69	4.71	5.34	0.78	98.4	77.7
8	27	0.176	0.130	0.130	0.130	0.243	0.200	0.0	0.0	0.0	3.805	0.0	0.0	265.35	4.00	4.61	0.74	98.8	78.7
8	28	0.158	0.130	0.130	0.130	0.239	0.199	0.0	0.0	0.0	3.790	0.0	0.0	261.92	3.99	4.69	0.71	99.3	79.7
8	29	0.140	0.130	0.130	0.130	0.235	0.190	0.0	0.0	0.0	3.601	0.0	0.0	258.60	3.79	4.52	0.68	99.8	80.7
8	30	0.126	0.130	0.130	0.130	0.232	0.0	0.0	0.0	0.0	3.155	0.0	0.0	255.81	3.16	3.84	0.64	100.0	81.6
8	31	0.120	0.130	0.130	0.130	0.230	0.0	0.0	0.0	0.0	1.232	0.0	0.0	254.69	1.23	1.53	0.61	100.0	81.9
TOTALS												0.0	0.0		153.6	165.1			

KSU MODEL 5 FOR SORGHUM OF 1976

		THETA VALUES					TRANSPIRATION												
MO	DY	LAYER 1	LAYER 2	LAYER 3	LAYER 4	LAYER 5	LAYER 1	LAYER 2	LAYER 3	LAYER 4	LAYER 5	RNOFF	DRAIN	THETA	TRANS EVAP	TOT. EVAP	KS	DEPL.	DEPL.
		0-5 CM	5-30 CM	30-60 CM	60-90 CM	90-180 CM	0-5 CM	5-30 CM	30-60 CM	60-90 CM	90-180 CM	(MM)	(MM)	0-150 CM	(MM)	(MM)		0-90 CM	0-150 CM
9	1	0.109	0.120	0.130	0.130	0.228	0.0	0.0	0.0	0.0	2.306	0.0	0.0	252.55	2.31	2.91	0.60	100.0	82.6
9	2	0.100	0.130	0.130	0.130	0.225	0.0	0.0	0.0	0.0	2.821	0.0	0.0	250.19	2.82	3.30	0.58	100.0	83.3
9	3	0.100	0.126	0.130	0.130	0.221	0.0	0.0	0.0	0.0	2.828	0.0	0.0	247.23	2.83	3.91	0.56	100.0	84.2
9	4	0.100	0.121	0.130	0.130	0.219	0.0	0.0	0.0	0.0	2.496	0.0	0.0	244.47	2.50	3.59	0.53	100.0	85.0
9	5	0.100	0.117	0.130	0.130	0.216	0.0	0.0	0.0	0.0	2.461	0.0	0.0	241.89	2.46	3.40	0.50	100.0	85.8
9	6	0.100	0.114	0.130	0.130	0.214	0.0	0.0	0.0	0.0	2.213	0.0	0.0	239.59	2.21	3.04	0.47	100.0	86.5
9	7	0.100	0.111	0.130	0.130	0.211	0.0	0.0	0.0	0.0	2.148	0.0	0.0	237.41	2.15	2.90	0.45	100.0	87.1
9	8	0.100	0.111	0.130	0.130	0.211	0.0	0.0	0.0	0.0	0.125	0.0	0.0	237.23	0.12	0.22	0.43	100.0	87.2
9	9	0.181	0.111	0.130	0.130	0.209	0.087	0.0	0.0	0.0	1.660	0.0	0.0	240.19	1.75	2.39	0.43	100.0	86.3
9	10	0.169	0.111	0.130	0.130	0.209	0.0	0.0	0.0	0.0	0.0	0.0	0.0	239.59	0.0	0.60	0.0	100.0	86.5
9	11	0.153	0.111	0.130	0.130	0.209	0.0	0.0	0.0	0.0	0.0	0.0	0.0	239.03	0.0	0.57	0.0	100.0	86.7
9	12	0.147	0.111	0.130	0.130	0.209	0.0	0.0	0.0	0.0	0.0	0.0	0.0	238.49	0.0	0.54	0.0	100.0	86.8
9	13	0.253	0.111	0.130	0.130	0.209	0.0	0.0	0.0	0.0	0.0	0.0	0.0	243.77	0.0	0.52	0.0	99.4	85.2
9	14	0.249	0.111	0.130	0.130	0.209	0.0	0.0	0.0	0.0	0.0	0.0	0.0	243.57	0.0	0.50	0.0	99.5	85.3
9	15	0.249	0.111	0.130	0.130	0.209	0.0	0.0	0.0	0.0	0.0	0.0	0.0	243.10	0.0	0.48	0.0	99.7	85.4
9	16	0.441	0.149	0.130	0.130	0.209	0.0	0.0	0.0	0.0	0.0	0.0	0.0	262.73	0.0	2.97	0.0	89.3	79.5
9	17	0.371	0.149	0.130	0.130	0.209	0.0	0.0	0.0	0.0	0.0	0.0	0.0	259.25	0.0	3.47	0.0	91.5	80.5
9	18	0.292	0.153	0.130	0.130	0.209	0.0	0.0	0.0	0.0	0.0	0.0	0.0	256.33	0.0	2.92	0.0	93.0	81.4
9	19	0.246	0.153	0.130	0.130	0.209	0.0	0.0	0.0	0.0	0.0	0.0	0.0	254.06	0.0	2.27	0.0	94.2	82.1
9	20	0.220	0.153	0.130	0.130	0.209	0.0	0.0	0.0	0.0	0.0	0.0	0.0	252.76	0.0	1.30	0.0	94.8	82.5
9	21	0.191	0.155	0.130	0.130	0.209	0.0	0.0	0.0	0.0	0.0	0.0	0.0	251.31	0.0	1.45	0.0	95.5	82.9
9	22	0.169	0.153	0.130	0.130	0.209	0.0	0.0	0.0	0.0	0.0	0.0	0.0	250.20	0.0	1.11	0.0	96.1	83.3
9	23	0.170	0.153	0.130	0.130	0.209	0.0	0.0	0.0	0.0	0.0	0.0	0.0	250.26	0.0	0.94	0.0	96.1	83.3
9	24	0.154	0.153	0.130	0.130	0.209	0.0	0.0	0.0	0.0	0.0	0.0	0.0	249.44	0.0	0.83	0.0	96.5	83.5
9	25	0.152	0.153	0.130	0.130	0.209	0.0	0.0	0.0	0.0	0.0	0.0	0.0	249.35	0.0	0.09	0.0	96.5	83.5
9	26	0.463	0.177	0.130	0.130	0.209	0.0	0.0	0.0	0.0	0.0	0.0	0.0	270.92	0.0	1.83	0.0	85.6	77.0
9	27	0.409	0.177	0.130	0.130	0.209	0.0	0.0	0.0	0.0	0.0	0.0	0.0	268.20	0.0	2.72	0.0	87.0	77.8
TOTALS												0.0	0.0		19.1	50.7			

KSU MODEL 5 FOR SORGHUM OF 1976

MONTH	POT. EVAP	SOIL EVAP	TRAN EVAP	A EVAP	TOTAL EVAP	RAIN (MM)	RATIO T/EO	TRAN EVAP(2)	TOT. EVAP(2)	RATIO T3/EO(2)	RATIO ET/EO(2)	RUNOFF	DRAINAGE
5	14.51	3.50	0.0	0.0	3.50	0.0	0.0	0.0	3.50	0.0	0.77	0.0	0.0
6	199.06	53.47	31.71	0.33	85.51	184.50	5.12	32.04	85.51	5.12	13.37	11.89	14.70
7	195.37	18.12	177.42	5.51	201.04	28.00	28.78	182.93	201.04	28.78	31.79	0.0	37.13
8	172.60	11.49	117.40	3.96	132.85	19.00	21.59	153.60	165.09	27.38	29.47	0.0	0.0
9	108.00	31.59	7.23	0.43	39.26	57.90	1.50	19.15	50.74	3.82	14.06	0.0	0.0
TOT.	689.54	118.17	333.76	10.23	462.17	289.40	56.98	387.71	505.88	65.10	89.45	11.89	51.83

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  DATE          JOB          ACCNT
29 OCT 76       XPRS0728     ****SR04   J.L.HEILMAN

TIME ON   10.14.56              RESIDENT TIME       3.68 MIN
PRINTED   10.20.38              CLASS A

          .054 MINUTES                .43600 UNITS
         2.499 K-BYTE MINUTES         .09246 UNITS
TOTAL CPU                             .57346 UNITS      $0.58
     (CPU RATE = $1.00/UNIT)

          137 CARDS READ              .09220 UNITS
          907 LINES PRINTED           .45350 UNITS
           30 PAGES PRINTED           .21000 UNITS
          246 DISK  EXCPS             .04920 UNITS
TOTAL I/O                             .79490 UNITS      $0.79
     (I/O RATE = $1.00/UNIT)

                                      TOTAL COST        $1.37
ACCOUNT BALANCE    $578.23

..KANSAS..STATE..UNIVERSITY..COMPUTING..CENTER.....JOB 183.....29 OCT 76..XPRS0728..J.L.HEILMAN.....END.....
..KANSAS..STATE..UNIVERSITY..COMPUTING..CENTER.....JOB 183.....29 OCT 76..XPRS0728..J.L.HEILMAN.....END.....
..KANSAS..STATE..UNIVERSITY..COMPUTING..CENTER.....JOB 183.....29 OCT 76..XPRS0728..J.L.HEILMAN.....END.....
..KANSAS..STATE..UNIVERSITY..COMPUTING..CENTER.....JOB 183.....29 OCT 76..XPRS0728..J.L.HEILMAN.....END.....
..KANSAS..STATE..UNIVERSITY..COMPUTING..CENTER.....JOB 183.....29 OCT 76..XPRS0728..J.L.HEILMAN.....END.....
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KSU MODEL 5 FOR SORGHUM OF 1976

MAXIMUM AVAILABLE WATER (MM).....	330.0000
THETA SUB V (15 BAR).....	0.1300
THETA INITIAL IN 5 FT. PROFILE (MM).....	523.5000
THETA SUB 5 CM. LAYER.....	0.2000
U (MM).....	10.0000
ALPHA (P-T).....	1.2800
SOIL CONSTANT (MM DAY TO -1/2).....	3.5000
X SUB 5 (INIT.WATER CONTENT IN 5 CM. LAYER,WT..	0.1700
FIELD CAPACITY.....	524.9998
RMTS MULTIPLIER.....	0.0
PLANTING DATE.....	JUN 9, 1976
FIELD/LOCATION.....	ASHLAND SORGHUM - III - ACCO 1090

KSU MODEL 5 FOR SORGHUM OF 1976

MO	DAY	MAX TEMP (C)	MIN TEMP (C)	TAU	RNS RAD. (LYS)	SOLAR RAD (LYS)	NET RAD (LYS)	LEAF AREA	COVER	RAIN (MM)	POT. EVAP (MM)	SOIL EVAP (MM)	TRAN EVAP (MM)	A EVAP (MM)	TOTAL EVAP (MM)	THETA (MM)	KS	BMTS	GDD
6	9	30.0	17.9	1.00	414.49	641.0	414.5	0.0	0.0	0.0	7.078	1.450	0.0	0.0	1.450	523.50	1.00	0.0	25.0
6	10	33.3	19.4	1.00	365.20	573.0	365.2	0.0	0.0	0.0	6.531	1.112	0.0	0.0	1.112	522.05	1.00	0.0	51.5
6	11	33.3	20.0	1.00	431.88	665.0	431.9	0.0	0.0	2.00	7.741	0.938	0.0	0.0	0.938	522.94	1.00	0.0	78.5
6	12	35.0	22.2	1.00	463.05	708.0	463.0	0.0	0.0	0.0	8.538	0.826	0.0	0.0	0.826	522.00	1.00	0.0	107.5
6	13	35.0	15.1	1.00	457.25	700.0	457.2	0.0	0.0	0.0	8.231	0.747	0.0	0.0	0.747	521.17	1.00	0.0	131.0
6	14	30.6	22.2	1.00	330.41	529.0	330.4	0.0	0.0	0.30	5.781	0.687	0.0	0.0	0.687	520.73	1.00	0.0	160.0
6	15	23.9	12.8	1.00	392.02	610.0	392.0	0.0	0.0	1.50	6.068	0.639	0.0	0.0	0.639	521.54	1.00	0.0	175.0
6	16	23.4	5.7	1.00	456.52	696.0	456.5	0.0	0.0	26.00	7.397	5.779	0.0	0.0	5.779	525.00	1.00	0.0	192.5
6	17	32.2	13.9	1.00	334.04	599.0	384.0	0.0	0.0	0.0	6.764	5.284	0.0	0.0	5.284	519.22	1.00	0.0	218.5
6	18	22.2	13.3	1.00	478.27	729.0	478.3	0.0	0.0	34.30	7.255	5.668	0.0	0.0	5.668	525.00	1.00	0.0	232.5
6	19	25.0	3.9	1.00	447.10	686.0	447.1	0.0	0.0	0.0	6.903	5.393	0.0	0.0	5.393	519.23	1.00	0.0	246.0
6	20	27.8	3.9	1.00	489.87	745.0	489.9	0.0	0.0	0.0	7.845	3.677	0.0	0.0	3.677	513.94	1.00	0.0	262.0
6	21	28.9	15.0	1.00	445.65	684.0	445.7	0.0	0.0	0.0	7.424	1.450	0.0	0.0	1.450	510.26	1.00	0.0	283.5
6	22	30.0	15.1	1.00	382.60	597.0	382.6	0.0	0.0	0.0	6.489	1.112	0.0	0.0	1.112	508.81	1.00	0.0	307.0
6	23	26.1	15.7	1.00	20.92	98.0	20.9	0.0	0.0	36.80	0.339	0.265	0.0	0.0	0.265	525.00	1.00	0.0	327.5
6	24	26.7	15.6	1.00	469.57	717.0	469.6	0.0	0.0	40.60	7.627	5.958	0.0	0.0	5.958	525.00	1.00	0.0	347.5
6	25	30.0	11.7	1.00	479.72	731.0	479.7	0.0	0.0	0.0	7.991	6.243	0.0	0.0	6.243	519.04	1.00	0.0	367.0
6	26	31.1	19.4	1.00	452.90	694.0	452.9	0.0	0.0	0.0	7.889	3.698	0.0	0.0	3.698	512.80	1.00	0.0	393.5
6	27	33.9	13.9	1.00	321.71	513.0	321.7	0.0	0.0	0.0	5.779	1.450	0.0	0.0	1.450	509.10	1.00	0.0	419.5
6	28	28.3	17.8	1.00	125.29	242.0	125.3	0.0	0.0	11.70	2.097	1.638	0.0	0.0	1.638	519.35	1.00	0.0	443.0
6	29	27.8	17.2	0.98	442.56	692.0	451.5	0.05	0.02	31.00	7.486	5.733	0.166	0.0	5.899	525.00	1.00	0.0	465.5
6	30	26.1	11.7	0.98	475.24	738.0	484.8	0.05	0.02	0.0	7.690	5.889	0.170	0.0	6.060	519.10	1.00	0.0	481.5
TOTALS										184.20	146.942	65.638	0.336	0.0	65.974				

KSU MODEL 5 FOR SORGHUM OF 1976

MO	DAY	MAX TEMP (C)	MIN TEMP (C)	TAU	RNS RAD. (LYS)	SOLAR RAD (LYS)	NET RAD (LYS)	LEAF AREA	COVER	RAIN (MM)	POT. EVAP (MM)	SOIL EVAP (MM)	TRAN EVAP (MM)	A EVAP (MM)	TOTAL EVAP (MM)	THETA (MM)	KS	BMTS	GDD
7	1	26.7	13.3	0.58	419.11	659.0	427.5	0.05	0.02	0.0	6.879	3.161	0.152	0.0	3.313	513.04	1.00	0.0	499.5
7	2	25.0	13.9	0.96	286.17	480.0	297.8	0.10	0.03	0.0	4.803	1.450	0.211	0.0	1.661	509.73	1.00	0.0	521.0
7	3	23.9	17.8	0.96	70.25	170.0	73.1	0.10	0.03	0.0	1.157	1.112	0.051	0.0	1.163	508.07	1.00	0.0	540.5
7	4	28.3	13.3	0.94	366.57	606.0	389.1	0.15	0.05	0.0	6.394	0.938	0.417	0.0	1.355	506.90	1.00	0.0	560.0
7	5	27.8	12.2	0.94	394.56	647.0	418.8	0.15	0.05	0.0	6.803	0.826	0.444	0.0	1.270	505.55	1.00	0.0	578.0
7	6	28.9	11.7	0.92	397.50	663.0	430.4	0.20	0.07	0.0	7.072	0.747	0.609	0.0	1.356	504.28	1.00	0.0	596.5
7	7	32.2	18.9	0.92	321.19	549.0	347.8	0.20	0.07	0.0	6.125	0.687	0.527	0.0	1.214	502.92	1.00	0.0	622.5
7	8	33.3	18.3	0.89	372.34	648.0	419.6	0.30	0.10	0.0	7.471	0.639	0.946	0.095	1.680	501.71	1.00	0.0	648.0
7	9	34.4	21.1	0.87	394.01	694.0	452.9	0.35	0.12	0.0	8.260	0.901	1.208	0.121	1.930	500.03	1.00	0.0	676.0
7	10	32.8	18.9	0.84	380.45	697.0	455.1	0.45	0.15	0.0	8.068	0.558	1.488	0.0	2.056	498.10	1.00	0.0	702.0
7	11	31.7	20.6	0.79	340.14	665.0	431.9	0.60	0.20	0.0	7.606	0.540	1.818	0.0	2.358	496.04	1.00	0.0	729.5
7	12	32.2	20.0	0.76	334.00	678.0	441.3	0.70	0.23	0.0	7.806	0.516	2.135	0.0	2.652	493.68	1.00	0.0	756.5
7	13	22.8	18.9	0.71	315.47	679.6	442.5	0.85	0.28	0.0	7.844	0.495	2.533	0.0	3.028	491.03	1.00	0.0	782.5
7	14	32.2	20.0	0.66	288.09	672.8	437.5	1.05	0.35	0.0	7.740	0.476	2.974	0.0	3.450	488.00	1.00	0.0	809.5
7	15	31.7	19.4	0.60	120.43	347.9	202.0	1.30	0.43	0.0	3.543	0.460	1.610	0.0	2.070	484.55	1.00	0.0	836.0
7	16	27.8	13.3	0.50	233.46	715.5	468.5	1.75	0.58	0.80	7.644	0.445	4.314	0.0	4.759	483.28	1.00	0.0	855.0
7	17	26.7	15.1	0.38	76.51	166.1	70.3	2.45	0.82	4.30	1.144	0.431	0.802	0.0	1.233	482.82	1.00	0.0	875.5
7	18	31.1	17.8	0.31	120.66	607.7	390.4	2.95	0.98	16.30	6.755	1.631	5.124	0.0	6.755	497.89	1.00	0.0	900.5
7	19	31.7	21.1	0.25	93.31	605.3	375.7	3.50	1.00	0.0	6.632	1.237	5.345	0.0	6.632	491.14	1.00	0.0	928.5
7	20	32.8	22.2	0.20	84.90	654.8	417.2	4.00	1.00	0.0	7.493	1.191	6.302	0.0	7.493	484.50	1.00	0.0	957.5
7	21	32.2	21.1	0.17	36.75	414.4	216.0	4.45	1.00	0.0	3.837	0.510	3.327	0.0	3.837	477.01	1.00	0.0	985.5
7	22	33.9	20.0	0.15	61.70	654.4	416.8	4.80	1.00	0.0	7.520	0.870	6.650	0.665	8.185	473.17	1.00	0.0	1012.5
7	23	35.6	21.1	0.13	54.97	666.4	426.9	5.15	1.00	0.0	7.883	0.794	7.095	0.709	8.598	464.99	1.00	0.0	1040.5
7	24	34.4	18.9	0.11	46.34	650.6	413.6	5.50	1.00	0.0	7.479	0.655	6.824	0.682	8.161	456.39	1.00	0.0	1066.5
7	25	35.1	18.3	0.10	38.91	624.0	391.4	5.80	1.00	0.0	7.201	0.559	6.642	0.664	7.865	448.23	1.00	0.0	1092.0
7	26	36.7	21.1	0.08	27.83	548.6	328.3	6.20	1.00	0.0	6.147	0.407	5.740	0.574	6.721	440.36	1.00	0.0	1120.0
7	27	30.0	23.9	0.07	27.53	611.2	380.7	6.60	1.00	0.0	6.660	0.376	6.284	0.0	6.660	433.64	1.00	0.0	1150.5
7	28	32.2	20.0	0.06	22.31	588.6	361.8	7.00	1.00	6.60	6.399	0.303	6.091	0.0	6.399	433.58	1.00	0.0	1177.5
7	29	32.2	17.8	0.05	20.06	612.0	381.3	7.40	1.00	0.0	6.687	0.275	6.412	0.0	6.687	427.18	1.00	0.0	1202.5
7	30	37.8	23.3	0.05	16.65	591.3	364.0	7.75	1.00	0.0	6.969	0.249	6.720	0.672	7.641	420.50	1.00	0.0	1232.5
7	31	31.7	19.4	0.04	13.42	543.6	324.1	8.00	1.00	0.0	5.683	0.184	5.499	0.0	5.683	412.86	1.00	0.0	1259.0
TOTALS										28.00	199.708	23.388	106.293	4.182	133.863				

KSU MODEL 5 FOR SORGHUM OF 1976

MO	DAY	MAX TEMP (C)	MIN TEMP (C)	TAU	PNS RAD. (LYS)	SOLAR RAD (LYS)	NET RAD (LYS)	LEAF AREA	COVER	RAIN (MM)	POT. EVAP (MM)	SOIL EVAP (MM)	TRAN EVAP (MM)	A EVAP (MM)	TOTAL EVAP (MM)	THETA (MM)	KS	BMTS	GDD
8	1	26.7	14.9	0.04	10.52	478.5	269.6	8.15	1.00	0.0	4.441	0.135	4.305	0.0	4.441	407.17	1.00	0.0	1282.0
8	2	26.7	16.1	0.04	12.46	553.3	332.2	8.25	1.00	0.0	5.408	0.151	5.250	0.0	5.408	402.73	1.00	0.0	1302.5
8	3	27.2	10.0	0.04	14.96	633.1	399.0	8.25	1.00	0.0	6.374	0.187	6.188	0.0	6.374	397.32	1.00	0.0	1318.0
8	4	31.7	13.9	0.04	14.38	614.3	383.4	8.25	1.00	0.0	6.709	0.197	6.512	0.0	6.709	390.95	1.00	0.0	1344.0
8	5	31.1	17.2	0.04	7.56	392.4	197.6	8.20	1.00	0.0	3.411	0.102	3.310	0.0	3.411	384.24	1.00	0.0	1368.5
8	6	27.8	17.2	0.04	15.58	623.9	391.3	8.10	1.00	2.00	6.489	0.202	6.287	0.0	6.489	382.83	1.00	0.0	1391.0
8	7	27.8	12.8	0.04	15.97	614.1	383.1	8.00	1.00	0.0	6.237	0.202	6.035	0.0	6.237	376.34	1.00	0.0	1409.5
8	8	32.8	19.9	0.04	16.39	610.6	380.2	7.90	1.00	0.0	6.740	0.227	6.513	0.0	6.740	370.10	1.00	0.0	1435.5
8	9	30.4	19.4	0.05	18.38	636.4	401.8	7.75	1.00	0.0	7.726	0.276	7.449	0.745	8.470	363.36	1.00	0.0	1462.0
8	10	31.7	23.3	0.05	4.99	279.0	102.7	7.60	1.00	0.0	1.828	0.069	1.759	0.0	1.828	354.89	1.00	0.0	1492.0
8	11	36.1	26.7	0.05	8.33	349.3	161.5	7.45	1.00	0.0	3.071	0.124	2.948	0.295	3.366	353.06	1.00	0.0	1525.0
8	12	31.7	18.9	0.06	19.80	580.1	354.6	7.25	1.00	15.70	6.205	0.271	5.934	0.0	6.205	365.40	1.00	0.0	1551.0
8	13	32.2	17.2	0.06	22.10	584.5	358.3	7.00	1.00	0.0	6.269	0.302	5.967	0.0	6.269	359.19	1.00	0.0	1575.5
8	14	29.4	13.9	0.07	18.39	485.3	275.3	6.80	1.00	1.30	4.691	0.245	4.446	0.0	4.691	354.22	1.00	0.0	1601.0
8	15	28.9	13.3	0.07	22.62	537.6	319.1	6.65	1.00	0.0	5.383	0.298	5.090	0.0	5.388	349.53	1.00	0.0	1625.5
8	16	35.0	18.9	0.07	26.11	579.3	354.0	6.55	1.00	0.0	6.442	0.371	6.071	0.607	7.049	344.14	1.00	0.0	1651.5
8	17	34.4	22.2	0.08	27.09	586.6	360.1	6.50	1.00	0.0	6.596	0.383	6.209	0.621	7.217	337.10	1.00	0.0	1680.5
8	18	33.9	21.1	0.08	26.91	583.7	357.7	6.50	1.00	0.0	6.481	0.381	6.100	0.610	7.091	329.88	1.00	0.0	1708.5
8	19	31.1	17.2	0.08	28.10	618.5	386.8	6.50	1.00	0.0	6.678	0.393	6.286	0.0	6.678	322.79	1.00	0.0	1733.0
8	20	32.8	15.6	0.08	27.05	585.9	359.5	6.50	1.00	0.0	6.290	0.370	5.920	0.0	6.290	316.11	1.00	0.0	1756.0
8	21	33.9	19.4	0.08	25.65	563.6	340.8	6.50	1.00	0.0	6.136	0.361	5.775	0.577	6.713	309.92	1.00	0.0	1782.5
8	22	35.0	19.4	0.08	23.20	524.7	308.3	6.50	1.00	0.0	5.623	0.331	5.292	0.529	6.152	303.11	1.00	0.0	1809.0
8	23	33.9	15.6	0.08	24.39	543.6	324.1	6.50	1.00	0.0	5.746	0.338	5.408	0.541	6.286	296.95	1.00	0.0	1832.0
8	24	32.8	20.6	0.08	14.73	390.2	195.7	6.50	1.00	0.0	3.493	0.205	3.091	0.0	3.296	290.67	0.94	0.0	1859.5
8	25	33.3	17.2	0.08	23.93	528.9	311.8	6.45	1.00	0.0	5.528	0.331	4.712	0.471	5.514	287.37	0.91	0.0	1884.0
8	26	37.8	22.2	0.08	27.43	558.6	336.7	6.30	1.00	0.0	6.416	0.403	5.113	0.511	6.033	281.86	0.85	0.0	1913.0
8	27	35.0	23.0	0.09	26.90	527.9	311.0	6.15	1.00	0.0	5.797	0.392	4.271	0.427	5.090	275.82	0.79	0.0	1944.5
8	28	31.7	12.2	0.09	34.04	599.3	370.7	6.00	1.00	0.0	6.316	0.453	4.331	0.0	4.784	270.73	0.74	0.0	1964.5
8	29	33.3	12.2	0.10	35.27	580.2	354.7	5.80	1.00	0.0	6.166	0.479	3.926	0.393	4.798	265.95	0.69	0.0	1984.5
8	30	32.2	13.9	0.11	35.61	543.8	324.3	5.55	1.00	0.0	5.599	0.480	3.286	0.0	3.766	261.15	0.64	0.0	2006.0
8	31	30.6	19.4	0.13	16.83	315.6	133.3	5.20	1.00	0.0	2.307	0.228	1.256	0.0	1.483	257.39	0.60	0.0	2032.5
TOTALS		33.6	18.2							19.00	172.599	8.903	155.037	6.327	170.267				

KSU MODEL 5 FOR SORGHUM OF 1976

MO	DAY	MAX TEMP (C)	MIN TEMP (C)	TAU	RNS RAD. (LYS)	SOLAR RAD (LYS)	NET RAD (LYS)	LEAF AREA	COVER	RAIN (MM)	POT. EVAP (MM)	SOIL EVAP (MM)	TRAN EVAP (MM)	A EVAP (MM)	TOTAL EVAP (MM)	THETA (MM)	KS	BMTS	GDD
9	1	30.6	13.3	0.14	37.28	469.5	252.1	4.90	1.00	0.0	4.426	0.492	2.317	0.0	2.809	255.90	0.59	0.0	2053.5
9	2	32.2	15.6	0.16	52.10	544.7	325.0	4.60	1.00	0.0	5.649	0.707	2.770	0.0	3.478	253.09	0.56	0.0	2076.5
9	3	35.0	19.4	0.18	59.16	540.0	321.1	4.25	1.00	0.0	5.856	0.843	2.634	0.263	3.740	249.62	0.53	0.0	2103.0
9	4	33.9	18.9	0.22	66.58	524.6	308.2	3.85	1.00	0.0	5.536	0.934	2.244	0.224	3.403	245.88	0.49	0.0	2129.0
9	5	37.8	21.1	0.25	76.49	524.4	308.0	3.50	1.00	0.0	5.845	0.630	2.135	0.214	3.029	242.47	0.45	0.0	2157.0
9	6	36.1	22.8	0.27	82.06	513.8	299.2	3.25	1.00	0.0	5.602	1.408	1.860	0.186	3.454	239.44	0.42	0.0	2186.5
9	7	33.3	19.4	0.30	98.38	544.3	324.7	3.00	1.00	0.0	5.807	1.112	1.719	0.172	3.003	235.99	0.39	0.0	2213.0
9	8	27.2	12.8	0.33	27.65	193.1	82.6	2.75	0.92	0.0	1.335	0.474	0.352	0.0	0.827	232.99	0.36	0.0	2231.0
9	9	24.4	12.2	0.37	129.56	552.6	350.4	2.50	0.83	4.80	5.451	0.826	1.541	0.0	2.367	236.96	0.40	0.0	2246.0
9	10	26.7	6.1	0.40	138.84	547.6	346.8	2.30	0.77	0.0	5.408	0.747	1.363	0.0	2.110	234.59	0.37	0.0	2261.0
9	11	31.7	15.1	0.42	131.95	506.1	316.7	2.20	0.73	0.0	5.481	0.687	1.267	0.0	1.954	232.48	0.35	0.0	2284.5
9	12	30.0	13.9	0.43	118.36	445.8	273.0	2.10	0.70	0.0	4.683	0.639	0.993	0.0	1.632	230.53	0.33	0.0	2310.5
9	13	25.6	16.7	0.44	34.89	178.3	78.9	2.05	0.68	5.80	1.270	0.599	0.299	0.0	0.897	234.70	0.37	0.0	2330.5
9	14	29.4	17.8	0.45	125.35	452.5	277.9	2.00	0.67	0.30	4.713	0.568	1.073	0.0	1.641	234.10	0.37	0.0	2355.0
9	15	25.6	18.9	0.45	18.33	125.2	40.6	2.00	0.67	0.0	0.660	0.314	0.143	0.0	0.458	232.45	0.35	0.0	2377.0
9	16	27.2	15.6	0.46	106.99	389.9	232.5	1.95	0.65	22.60	3.802	1.367	1.330	0.0	2.697	254.60	0.58	0.0	2397.5
9	17	30.0	15.0	0.47	123.60	432.4	263.3	1.90	0.63	0.0	4.446	1.631	1.456	0.0	3.086	251.90	0.55	0.0	2420.0
9	18	31.7	17.2	0.48	102.14	366.3	215.4	1.85	0.62	0.0	3.744	1.401	1.135	0.0	2.536	248.82	0.52	0.0	2444.5
9	19	31.7	17.2	0.49	81.64	299.7	167.1	1.80	0.60	0.0	2.905	1.109	0.822	0.0	1.930	246.28	0.49	0.0	2469.0
9	20	26.7	20.0	0.49	81.64	299.7	167.1	1.80	0.60	0.0	2.765	1.055	0.751	0.0	1.806	244.35	0.47	0.0	2493.0
9	21	22.2	13.3	0.50	149.81	483.9	300.6	1.75	0.58	0.0	4.560	1.775	1.168	0.0	2.944	242.54	0.45	0.0	2507.0
9	22	31.1	11.1	0.51	137.64	442.7	270.8	1.70	0.57	0.0	4.562	1.812	1.070	0.0	2.882	239.60	0.42	0.0	2526.0
9	23	25.0	16.7	0.51	140.44	450.3	276.3	1.70	0.57	1.00	4.414	1.052	0.989	0.0	2.041	237.72	0.41	0.0	2545.5
9	24	27.2	9.4	0.52	144.76	454.3	279.2	1.65	0.55	0.0	4.449	1.450	0.927	0.0	2.377	235.68	0.38	0.0	2561.0
9	25	22.8	12.8	0.53	7.63	76.0	5.0	1.60	0.53	0.0	0.076	0.045	0.014	0.0	0.060	233.30	0.36	0.0	2575.0
9	26	22.2	14.4	0.53	81.19	280.9	153.5	1.60	0.53	23.40	2.340	0.967	0.740	0.0	1.707	256.64	0.60	0.0	2590.0
9	27	17.9	11.1	0.54	133.79	411.2	247.9	1.55	0.52	0.0	3.485	1.469	1.045	0.0	2.515	254.93	0.58	0.0	2598.0
TOTALS										57.90	109.267	26.164	34.159	1.059	61.382				

KSU MODEL 5 FOR SORGHUM OF 1976

		THETA VALUES					TRANSPIRATION												
MO	DY	LAYER 1	LAYER 2	LAYER 3	LAYER 4	LAYER 5	LAYER 1	LAYER 2	LAYER 3	LAYER 4	LAYER 5	RNOFF	DRAIN	THETA	TRANS EVAP	TOT. EVAP	KS	DEPL.	DEPL.
		0-5 CM	5-30 CM	30-60 CM	60-90 CM	90-180 CM	0-5 CM	5-30 CM	30-60 CM	60-90 CM	90-180 CM	(MM)	(MM)	0-150 CM	(MM)	(MM)		0-90 CM	0-150 CM
6	9	0.141	0.220	0.290	0.300	0.300	0.0	0.0	0.0	0.0	0.0	0.0	0.0	419.05	0.0	1.45	0.0	37.9	31.8
6	10	0.119	0.220	0.290	0.300	0.300	0.0	0.0	0.0	0.0	0.0	0.0	0.0	417.94	0.0	1.11	0.0	38.5	32.1
6	11	0.140	0.220	0.290	0.300	0.300	0.0	0.0	0.0	0.0	0.0	0.0	0.0	419.00	0.0	0.94	0.0	37.9	31.8
6	12	0.123	0.220	0.290	0.300	0.300	0.0	0.0	0.0	0.0	0.0	0.0	0.0	418.17	0.0	0.83	0.0	38.3	32.1
6	13	0.109	0.220	0.290	0.300	0.300	0.0	0.0	0.0	0.0	0.0	0.0	0.0	417.43	0.0	0.75	0.0	38.7	32.3
6	14	0.101	0.220	0.290	0.300	0.300	0.0	0.0	0.0	0.0	0.0	0.0	0.0	417.04	0.0	0.69	0.0	38.9	32.4
6	15	0.118	0.220	0.290	0.300	0.300	0.0	0.0	0.0	0.0	0.0	0.0	0.0	417.90	0.0	0.64	0.0	38.5	32.1
6	16	0.334	0.247	0.290	0.300	0.300	0.0	0.0	0.0	0.0	0.0	0.15	0.0	437.97	0.0	5.78	0.0	28.3	26.0
6	17	0.279	0.247	0.290	0.300	0.300	0.0	0.0	0.0	0.0	0.0	0.0	0.0	432.69	0.0	5.28	0.0	30.9	27.6
6	18	0.387	0.330	0.290	0.300	0.300	0.0	0.0	0.0	0.0	0.0	2.48	0.0	458.84	0.0	5.67	0.0	17.6	19.7
6	19	0.279	0.330	0.290	0.300	0.300	0.0	0.0	0.0	0.0	0.0	0.0	0.0	453.44	0.0	5.39	0.0	20.4	21.3
6	20	0.205	0.330	0.290	0.300	0.300	0.0	0.0	0.0	0.0	0.0	0.0	0.0	449.77	0.0	3.68	0.0	22.3	22.4
6	21	0.176	0.330	0.290	0.300	0.300	0.0	0.0	0.0	0.0	0.0	0.0	0.0	448.32	0.0	1.45	0.0	23.0	22.9
6	22	0.154	0.330	0.290	0.300	0.300	0.0	0.0	0.0	0.0	0.0	0.0	0.0	447.20	0.0	1.11	0.0	23.6	23.2
6	23	0.495	0.395	0.290	0.300	0.300	0.0	0.0	0.0	0.0	0.0	3.26	0.0	480.48	0.0	0.26	0.0	6.6	13.1
6	24	0.381	0.500	0.322	0.300	0.300	0.0	0.0	0.0	0.0	0.0	4.49	0.0	510.63	0.0	5.96	0.0	-8.7	3.9
6	25	0.256	0.500	0.322	0.300	0.300	0.0	0.0	0.0	0.0	0.0	0.0	0.0	504.39	0.0	6.24	0.0	-5.5	5.3
6	26	0.182	0.350	0.447	0.300	0.300	0.0	0.0	0.0	0.0	0.0	0.0	0.0	500.69	0.0	3.70	0.0	-3.7	6.9
6	27	0.153	0.350	0.447	0.300	0.300	0.0	0.0	0.0	0.0	0.0	0.0	0.0	499.24	0.0	1.45	0.0	-2.9	7.4
6	29	0.354	0.350	0.350	0.397	0.300	0.0	0.0	0.0	0.0	0.0	0.0	0.0	509.30	0.0	1.64	0.0	-8.0	4.3
6	29	0.385	0.438	0.350	0.397	0.300	0.017	0.083	0.066	0.0	0.0	1.51	0.0	532.90	0.17	5.90	1.00	-20.0	-2.9
6	30	0.267	0.438	0.350	0.350	0.316	0.017	0.085	0.068	0.0	0.0	0.0	0.0	522.14	0.17	6.06	1.00	-9.8	0.4
TOTALS												11.9	0.0		0.3	66.0			

KSU MODEL 5 FOR SORGHUM CF 1976

		THETA VALUES					TRANSPIRATION												
MO	DY	LAYER 1	LAYER 2	LAYER 3	LAYER 4	LAYER 5	LAYER 1	LAYER 2	LAYER 3	LAYER 4	LAYER 5	RNOFF	DRAIN	THETA	TRANS EVAP	TOT. EVAP	KS	DEPL.	DEPL.
		0-5 CM	5-30 CM	30-60 CM	60-90 CM	90-180 CM	0-5 CM	5-30 CM	30-60 CM	60-90 CM	90-180 CM	(MM)	(MM)	0-150 CM	(MM)	(MM)		0-90 CM	0-150 CM
7	1	0.203	0.350	0.423	0.350	0.316	0.315	0.076	0.061	0.0	0.0	0.0	0.0	518.83	0.15	3.31	1.00	-8.1	1.4
7	2	0.174	0.349	0.423	0.350	0.316	0.021	0.105	0.084	0.0	0.0	0.0	0.0	517.17	0.21	1.66	1.00	-7.3	1.9
7	3	0.152	0.349	0.350	0.423	0.316	0.005	0.025	0.020	0.0	0.0	0.0	0.0	516.00	0.05	1.16	1.00	-6.7	2.3
7	4	0.132	0.348	0.349	0.423	0.316	0.042	0.208	0.167	0.0	0.0	0.0	0.0	514.65	0.42	1.35	1.00	-6.0	2.7
7	5	0.115	0.347	0.349	0.350	0.340	0.0	0.266	0.177	0.0	0.0	0.0	0.0	506.13	0.44	1.27	1.00	5.7	5.3
7	6	0.101	0.346	0.348	0.350	0.340	0.0	0.365	0.244	0.0	0.0	0.0	0.0	504.77	0.61	1.36	1.00	6.4	5.7
7	7	0.100	0.342	0.347	0.350	0.340	0.0	0.316	0.211	0.0	0.0	0.0	0.0	503.56	0.53	1.21	1.00	7.0	6.1
7	8	0.100	0.337	0.346	0.350	0.340	0.0	0.624	0.416	0.0	0.0	0.0	0.0	501.88	1.04	1.68	1.00	7.9	5.6
7	9	0.100	0.331	0.344	0.350	0.340	0.0	0.798	0.532	0.0	0.0	0.0	0.0	499.95	1.33	1.93	1.00	8.9	7.2
7	10	0.100	0.325	0.342	0.350	0.340	0.0	0.893	0.595	0.0	0.0	0.0	0.0	497.89	1.49	2.06	1.00	9.9	7.8
7	11	0.100	0.319	0.340	0.350	0.340	0.0	1.091	0.727	0.0	0.0	0.0	0.0	495.53	1.82	2.36	1.00	11.1	8.5
7	12	0.100	0.312	0.337	0.350	0.340	0.0	1.281	0.854	0.0	0.0	0.0	0.0	492.88	2.14	2.65	1.00	12.5	9.3
7	13	0.100	0.304	0.333	0.350	0.340	0.0	1.520	1.013	0.0	0.0	0.0	0.0	489.85	2.53	3.03	1.00	14.0	10.2
7	14	0.100	0.293	0.331	0.348	0.339	0.0	0.892	0.744	0.744	0.595	0.0	0.0	486.60	2.97	3.45	1.00	15.5	11.2
7	15	0.100	0.294	0.330	0.346	0.339	0.0	0.483	0.402	0.402	0.322	0.0	0.0	484.64	1.61	2.07	1.00	16.4	11.8
7	16	0.107	0.289	0.326	0.343	0.338	0.0	1.294	1.079	1.079	0.863	0.0	0.0	480.97	4.31	4.76	1.00	17.9	12.9
7	17	0.184	0.283	0.325	0.342	0.338	0.040	0.200	0.200	0.200	0.160	0.0	0.0	484.09	0.80	1.23	1.00	15.3	12.0
7	18	0.462	0.285	0.321	0.338	0.337	0.256	1.281	1.281	1.281	1.025	0.0	0.0	493.97	5.12	6.75	1.00	10.9	9.0
7	19	0.431	0.280	0.317	0.333	0.335	0.767	1.326	1.336	1.336	1.069	0.0	0.0	487.70	5.35	6.63	1.00	13.7	10.9
7	20	0.290	0.296	0.311	0.328	0.334	0.315	1.575	1.575	1.575	1.260	0.0	0.0	480.63	6.30	7.49	1.00	16.9	13.1
7	21	0.276	0.292	0.309	0.325	0.333	0.166	0.832	0.832	0.832	0.665	0.0	0.0	477.01	3.33	3.84	1.00	13.5	14.2
7	22	0.252	0.285	0.303	0.319	0.332	0.366	1.829	1.829	1.829	1.463	0.0	0.0	469.31	7.32	8.18	1.00	22.0	16.5
7	23	0.228	0.277	0.296	0.313	0.330	0.390	1.951	1.951	1.951	1.561	0.0	0.0	461.23	7.80	8.60	1.00	25.5	19.0
7	24	0.207	0.270	0.290	0.306	0.328	0.375	1.877	1.877	1.877	1.501	0.0	0.0	453.57	7.51	8.16	1.00	28.9	21.3
7	25	0.189	0.263	0.284	0.300	0.327	0.365	1.826	1.826	1.826	1.461	0.0	0.0	446.20	7.31	7.87	1.00	32.2	23.5
7	26	0.174	0.256	0.279	0.295	0.325	0.316	1.578	1.578	1.578	1.263	0.0	0.0	439.90	6.31	6.72	1.00	35.0	25.5
7	27	0.161	0.250	0.273	0.290	0.324	0.314	1.571	1.571	1.571	1.257	0.0	0.0	433.65	6.28	6.66	1.00	37.7	27.4
7	28	0.280	0.244	0.268	0.285	0.322	0.305	1.523	1.523	1.523	1.218	0.0	0.0	434.26	6.09	6.40	1.00	37.0	27.2
7	29	0.268	0.237	0.263	0.279	0.321	0.321	1.603	1.603	1.603	1.282	0.0	0.0	428.00	6.41	6.69	1.00	39.7	29.1
7	30	0.256	0.230	0.257	0.273	0.319	0.370	1.848	1.848	1.848	1.478	0.0	0.0	420.85	7.39	7.64	1.00	42.9	31.2
7	31	0.247	0.225	0.252	0.269	0.318	0.275	1.375	1.375	1.375	1.100	0.0	0.0	415.54	5.50	5.68	1.00	45.2	32.9
TOTALS												0.0	0.0		110.5	133.9			

KSU MODEL 5 FOR SORGHUM OF 1976

		THETA VALUES					TRANSPIRATION												
MO	DY	LAYER 1	LAYER 2	LAYER 3	LAYER 4	LAYER 5	LAYER 1	LAYER 2	LAYER 3	LAYER 4	LAYER 5	RNOFF	DRAIN	THETA	TRANS EVAP	TOT. EVAP	KS	DEPL.	DEPL.
		0-5 CM	5-30 CM	30-60 CM	60-90 CM	90-180 CM	0-5 CM	5-30 CM	30-60 CM	60-90 CM	90-180 CM	(MM)	(MM)	0-150 CM	(MM)	(MM)		0-90 CM	0-150 CM
8	1	0.240	0.220	0.248	0.265	0.317	0.215	1.076	1.076	1.076	0.861	0.0	0.0	411.38	4.31	4.44	1.00	47.0	34.1
8	2	0.231	0.215	0.244	0.261	0.316	0.262	1.312	1.312	1.312	1.050	0.0	0.0	406.33	5.25	5.41	1.00	49.2	35.7
8	3	0.222	0.209	0.238	0.255	0.315	0.309	1.547	1.547	1.547	1.238	0.0	0.0	400.36	6.19	6.37	1.00	51.9	37.5
8	4	0.211	0.202	0.223	0.250	0.313	0.326	1.628	1.628	1.628	1.302	0.0	0.0	394.09	6.51	6.71	1.00	54.6	39.4
8	5	0.206	0.199	0.231	0.247	0.312	0.165	0.827	0.827	0.827	0.662	0.0	0.0	390.90	3.31	3.41	1.00	56.0	40.4
8	6	0.235	0.193	0.226	0.242	0.311	0.314	1.572	1.572	1.572	1.257	0.0	0.0	386.83	6.29	6.49	1.00	57.7	41.6
8	7	0.225	0.187	0.220	0.237	0.310	0.302	1.509	1.509	1.509	1.207	0.0	0.0	380.99	6.03	6.24	1.00	60.2	43.4
8	8	0.214	0.180	0.215	0.232	0.308	0.326	1.628	1.628	1.628	1.303	0.0	0.0	374.69	6.51	6.74	1.00	63.0	45.3
8	9	0.201	0.172	0.208	0.225	0.306	0.410	2.049	2.049	2.049	1.639	0.0	0.0	366.76	8.19	8.47	1.00	66.5	47.7
8	10	0.197	0.170	0.207	0.223	0.306	0.088	0.440	0.440	0.440	0.352	0.0	0.0	365.05	1.76	1.83	1.00	67.2	48.2
8	11	0.192	0.167	0.204	0.221	0.305	0.162	0.811	0.811	0.811	0.648	0.0	0.0	361.93	3.24	3.37	1.00	68.6	49.2
8	12	0.489	0.162	0.199	0.216	0.304	0.297	1.484	1.484	1.484	1.187	0.0	0.0	371.79	5.93	6.20	1.00	63.2	46.2
8	13	0.477	0.156	0.194	0.211	0.303	0.298	1.492	1.492	1.492	1.193	0.0	0.0	365.92	5.97	6.27	1.00	65.7	48.0
8	14	0.337	0.183	0.190	0.207	0.302	0.222	1.112	1.112	1.112	0.889	0.0	0.0	362.83	4.45	4.69	1.00	67.0	48.9
8	15	0.326	0.178	0.186	0.203	0.301	0.254	1.272	1.272	1.272	1.018	0.0	0.0	357.78	5.09	5.39	1.00	69.2	50.4
8	16	0.306	0.172	0.181	0.197	0.299	0.334	1.669	1.669	1.669	1.336	0.0	0.0	351.18	6.68	7.05	1.00	72.1	52.5
8	17	0.291	0.166	0.175	0.191	0.298	0.341	1.707	1.707	1.707	1.366	0.0	0.0	344.41	6.83	7.22	1.00	75.1	54.5
8	18	0.277	0.159	0.169	0.186	0.296	0.335	1.677	1.677	1.677	1.342	0.0	0.0	337.77	6.71	7.09	1.00	78.0	56.5
8	19	0.263	0.153	0.164	0.181	0.295	0.314	1.571	1.571	1.571	1.257	0.0	0.0	331.51	6.29	6.68	1.00	80.8	58.4
8	20	0.250	0.147	0.159	0.176	0.293	0.296	1.480	1.480	1.480	1.184	0.0	0.0	325.62	5.92	6.29	1.00	83.4	60.2
8	21	0.236	0.140	0.154	0.170	0.292	0.318	1.588	1.588	1.588	1.270	0.0	0.0	319.33	6.35	6.71	1.00	86.2	62.2
8	22	0.224	0.135	0.149	0.166	0.291	0.291	1.455	1.455	1.455	1.164	0.0	0.0	313.56	5.82	6.15	1.00	88.7	63.9
8	23	0.211	0.130	0.143	0.161	0.289	0.297	1.133	1.841	1.487	1.190	0.0	0.0	307.67	5.95	6.29	1.00	91.3	65.7
8	24	0.203	0.130	0.137	0.158	0.289	0.164	0.0	1.644	0.822	0.658	0.0	0.0	304.40	3.29	3.49	1.00	92.8	66.7
8	25	0.191	0.130	0.130	0.151	0.287	0.283	0.0	2.221	2.030	1.133	0.0	0.0	298.78	5.67	6.00	1.00	95.2	68.4
8	26	0.176	0.130	0.130	0.135	0.286	0.326	0.0	0.0	4.889	1.304	0.0	0.0	292.28	6.52	6.93	1.00	98.1	70.4
8	27	0.163	0.130	0.130	0.130	0.231	0.287	0.0	0.0	1.434	4.011	0.0	0.0	287.50	5.73	6.12	0.98	99.2	71.3
8	28	0.148	0.130	0.130	0.130	0.276	0.274	0.0	0.0	0.0	5.204	0.0	0.0	283.20	5.48	5.93	0.93	99.5	73.1
8	29	0.133	0.130	0.130	0.130	0.270	0.271	0.0	0.0	0.0	5.151	0.0	0.0	279.12	5.42	5.90	0.89	99.9	74.4
8	30	0.124	0.130	0.130	0.130	0.265	0.0	0.0	0.0	0.0	4.349	0.0	0.0	275.74	4.35	4.83	0.85	100.0	75.4
8	31	0.119	0.130	0.130	0.130	0.263	0.0	0.0	0.0	0.0	1.696	0.0	0.0	274.38	1.70	1.92	0.82	100.0	75.8
TOTALS												0.0	0.0		167.7	176.6			

KSU MODEL 5 FOR SORGHUM OF 1976

		THETA VALUES					TRANSPIRATION												
MO	DY	LAYER 1	LAYER 2	LAYER 3	LAYER 4	LAYER 5	LAYER 1	LAYER 2	LAYER 3	LAYER 4	LAYER 5	RNOFF	DRAIN	THETA	TRANS EVAP	TOT. EVAP	KS	DEPL.	DEPL.
		0-5 CM	5-30 CM	30-60 CM	60-90 CM	90-180 CM	0-5 CM	5-30 CM	30-60 CM	60-90 CM	90-180 CM	(MM)	(MM)	0-150 CM	(MM)	(MM)		0-90 CM	0-150 CM
9	1	0.109	0.130	0.130	0.130	0.260	0.0	0.0	0.0	0.0	3.154	0.0	0.0	271.78	3.15	3.65	0.80	100.0	76.6
9	2	0.100	0.129	0.130	0.130	0.255	0.0	0.0	0.0	0.0	3.833	0.0	0.0	268.52	3.83	4.54	0.78	100.0	77.6
9	3	0.100	0.126	0.130	0.130	0.251	0.0	0.0	0.0	0.0	3.919	0.0	0.0	265.07	3.92	4.76	0.74	100.0	78.7
9	4	0.100	0.122	0.130	0.130	0.247	0.0	0.0	0.0	0.0	3.416	0.0	0.0	261.86	3.42	4.35	0.71	100.0	79.6
9	5	0.100	0.119	0.130	0.130	0.244	0.0	0.0	0.0	0.0	3.325	0.0	0.0	258.96	3.33	4.01	0.68	100.0	80.5
9	6	0.100	0.114	0.130	0.130	0.240	0.0	0.0	0.0	0.0	2.964	0.0	0.0	255.57	2.96	4.37	0.65	100.0	81.6
9	7	0.100	0.109	0.130	0.130	0.237	0.0	0.0	0.0	0.0	2.817	0.0	0.0	252.58	2.82	3.93	0.61	100.0	82.5
9	8	0.100	0.107	0.130	0.130	0.237	0.0	0.0	0.0	0.0	0.574	0.0	0.0	251.73	0.57	1.05	0.58	100.0	82.7
9	9	0.177	0.107	0.130	0.130	0.234	0.111	0.0	0.0	0.0	2.110	0.0	0.0	254.18	2.22	3.05	0.57	100.0	82.0
9	10	0.160	0.107	0.130	0.130	0.232	0.109	0.0	0.0	0.0	2.072	0.0	0.0	251.95	2.18	2.93	0.60	100.0	82.7
9	11	0.144	0.107	0.130	0.130	0.230	0.103	0.0	0.0	0.0	1.966	0.0	0.0	249.85	2.07	2.76	0.58	100.0	83.3
9	12	0.130	0.107	0.130	0.130	0.228	0.077	0.0	0.0	0.0	1.576	0.0	0.0	248.08	1.65	2.29	0.55	100.0	83.8
9	13	0.234	0.107	0.130	0.130	0.227	0.021	0.0	0.0	0.0	0.406	0.0	0.0	252.99	0.43	1.03	0.54	100.0	82.3
9	14	0.227	0.107	0.130	0.130	0.226	0.085	0.0	0.0	0.0	1.619	0.0	0.0	251.56	1.70	2.27	0.59	100.0	82.8
9	15	0.220	0.107	0.130	0.130	0.225	0.012	0.0	0.0	0.0	0.221	0.0	0.0	251.08	0.23	0.55	0.57	100.0	82.9
9	16	0.471	0.140	0.130	0.130	0.224	0.065	0.327	0.0	0.0	0.916	0.0	0.0	271.31	1.31	2.68	0.57	90.0	76.8
9	17	0.437	0.139	0.130	0.130	0.223	0.102	0.511	0.0	0.0	1.432	0.0	0.0	268.11	2.05	3.68	0.77	91.1	77.7
9	18	0.290	0.160	0.130	0.130	0.222	0.081	0.405	0.0	0.0	1.135	0.0	0.0	265.47	1.62	3.02	0.74	92.1	78.5
9	19	0.267	0.159	0.130	0.130	0.221	0.059	0.297	0.0	0.0	0.833	0.0	0.0	263.45	1.19	2.30	0.71	92.8	79.2
9	20	0.245	0.158	0.130	0.130	0.220	0.055	0.275	0.0	0.0	0.770	0.0	0.0	261.55	1.10	2.16	0.69	93.6	79.7
9	21	0.208	0.156	0.130	0.130	0.218	0.087	0.433	0.0	0.0	1.211	0.0	0.0	258.45	1.73	3.51	0.67	94.7	80.7
9	22	0.170	0.154	0.130	0.130	0.217	0.081	0.404	0.0	0.0	1.132	0.0	0.0	255.40	1.62	3.43	0.64	95.9	81.6
9	23	0.167	0.153	0.130	0.130	0.216	0.074	0.372	0.0	0.0	1.043	0.0	0.0	254.20	1.49	2.54	0.61	96.1	82.0
9	24	0.137	0.151	0.130	0.130	0.215	0.072	0.360	0.0	0.0	1.009	0.0	0.0	251.65	1.44	2.89	0.60	97.1	82.8
9	25	0.136	0.151	0.130	0.130	0.215	0.001	0.006	0.0	0.0	0.016	0.0	0.0	251.59	0.02	0.07	0.57	97.1	82.8
9	26	0.480	0.171	0.130	0.130	0.214	0.035	0.177	0.0	0.0	0.496	0.0	0.0	273.48	0.71	1.68	0.57	85.8	76.1
9	27	0.449	0.170	0.130	0.130	0.213	0.072	0.358	0.0	0.0	1.002	0.0	0.0	270.91	1.43	2.90	0.79	86.8	76.9
TOTALS												0.0	0.0		50.2	76.4			

KSU MODEL 5 FOR SORGHUM OF 1976

MONTH	POT. EVAP	SOIL EVAP	TRAN EVAP	A EVAP	TOTAL EVAP	RAIN (MM)	RATIO T/EO	TRAN EVAP(2)	TOT. EVAP(2)	RATIO T3/EO(2)	RATIO ET/EO(2)	RUNOFF	DRAINAGE
6	146.94	65.64	0.34	0.0	65.97	184.20	0.04	0.34	65.97	0.04	10.29	11.89	0.0
7	199.71	23.39	106.29	4.18	133.86	28.00	17.00	110.48	133.86	17.00	21.65	0.0	0.0
8	172.60	8.90	155.04	6.33	170.27	19.00	28.76	167.73	176.63	29.96	31.57	0.0	0.0
9	109.27	26.16	34.16	1.06	61.38	57.90	8.23	50.19	76.36	11.74	19.47	0.0	0.0
TOT.	628.52	124.09	295.83	11.57	431.49	289.10	54.03	328.73	452.83	58.74	82.98	11.89	0.0

EVAPORATION FROM BARE SOIL SURFACES AND WATER-USE EFFICIENCY OF GRAIN SORGHUM AS AFFECTED BY PLANTING DATES AND SOIL TYPES

by

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AN ABSTRACT OF A MASTER'S THESIS

submitted in partial fulfillment of the

requirements for the degree

MASTER OF SCIENCE

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1977

Different planting dates and soil types may affect the water-use efficiency (WUE) of crops by altering yield and/or evapotranspiration (ET). Effects on ET may be due to evaporation from the soil surface and transpiration from plant surfaces. In order to estimate ET using the model developed by Kanemasu et al. (1976) for different soil types, soil factors U and c which quantify the drying rate of soil must be known. U is the cumulative evaporation during the energy-limiting stage and c is the least squares slope of evaporation rate versus time$^{\frac{1}{2}}$ during the soil-limiting stage of soil surface evaporation.

Laboratory and greenhouse experiments were performed for 9 Kansas soils to determine percentage sand, silt and clay, moisture content percentage by weight (θ_m) at -1/3 bar and -15 bar water potential, U and c. Hydrometer method for mechanical analysis was used to determine particle-size distribution and pressure-plate method was used to determine θ_m. U and c were obtained from weight losses from soil columns in a greenhouse experiment.

Field experiments were also conducted to determine the WUE of sorghum [Sorghum bicolor (L.) Moench] as affected by 3 different planting dates on Muir silty clay loam at Manhattan and a single planting date on Carwile sand at St. John, Kansas. Rate of dry matter accumulation and grain yield were obtained at Manhattan and only grain yield was obtained at St. John.

Results of the laboratory and greenhouse experiments indicated that particle size composition and percentage water-holding capacity (WHC) influenced the values of U and c obtained. U and c were relatively lower for sandy soil and higher for soil with greater percentage silt and clay. The values of U ranged from 5 to 18.7 mm and c from 1.68 to

3.73 mm $day^{-\frac{1}{2}}$. For loamy soils, U and c may be obtained from the equations:

$$U = 5.515(\%\ clay) + 6.236(\%\ silt) + 5.890(\%\ sand) - 584.8$$

and

$$c = 0.374(\%\ clay) + 0.424(\%\ silt) + 0.386(\%\ sand) - 36.8.$$

Results of field experiments show that at Manhattan the early planted sorghum had the lowest grain yield and medium planted sorghum had the highest grain and dry matter yield. Sorghum grown on Carwile sand had the highest grain WUE of 0.176 mg $cm^{-2}\ mm^{-1}$. These data suggest that WUE of sorghum was affected by date of planting and soil types.