DEVELOPMENT AND ANALYSIS OF AN EVAPOTRANSPIRATION MODEL FOR CORN [*Zea mays* (L.)]

by

WESLEY DEAN ROSENTHAL

B. S., University of Nebraska, 1974

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

1976

Approved by:

Edward T. Kanemasu
Major Professor

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ACKNOWLEDGEMENTS

I would like to thank Ed Kanemasu for the valuable ideas and guidance in organizing the experiment at Manhattan and Scandia. A special thanks to Bob Raney, Jim Scharplaz, Tan Tai Chen, and Debbie Norgard for maintainence and data collection at the field at Scandia. Loyd Stone provided tensiometer data at Scandia, neutron data at Manhattan, and helpful ideas. Jim Vollintine provided the drafting of the figures.

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CHAPTER 1

INTRODUCTION

Optimum agricultural production in Kansas requires consumption of large quantities of water. In 1965, 2.90 billion cubic meters, or 71% of the total amount used in the state was allocated for agricultural purposes. By the turn of the century, agricultural consumption is expected to increase to 13.4 billion cubic meters, or 88% of the total water used (Kansas Water Resources Board, 1972).

Over 95% of the water used in agriculture is allocated for irrigation. That percentage is expected to increase in the future, with the largest increase to occur in the northwest and south-central counties, where an increase of ten times the quantity consumed in 1965 is expected by 2020 (Kansas Water Resources Board, 1972).

With the rapid growth in irrigation, many areas of Kansas are being depleted of ground water. For example, in certain areas, the water table has dropped as much as 30 m since the 1940's. In Wichita, Greeley, Wallace, and Scott counties, the situation is so serious that possibilities exist for a complete water shortage by 2000 (Kansas Water Resources Board, 1967). Due to the drop in water tables, more energy must be expended to obtain the same quantity of water.

In other areas of Kansas, excessive amounts of water cause a large amount of soluble nutrients, such as nitrates and salts, to be leached from the profile; therefore, excessive irrigation increases operational costs by forcing the farmer to apply more fertilizer (Kansas Water Resources Board, 1967).

Prevention of water shortages and excessive nutrient leaching is accomplished through water conservation practices. One procedure gaining wide acceptance is irrigation scheduling (Jensen, Robb, and Franzoy, 1970). That procedure schedules water at the proper time and amounts necessary to fill the root zone and satisfy the leaching requirement; therefore, irrigation scheduling necessitates a determination of the amount of moisture within the soil profile.

The rate of change in soil moisture is affected by four factors: (1) precipitation or irrigation, (2) evapotranspiration, (3) runoff, and (4) drainage (Veihmeyer, 1964). Soil moisture depletion or accumulation can be expressed as

$$\Delta\theta = P - ET - R - D \qquad [1]$$

where $\Delta\theta$ is the daily (i.e., 24 hours) soil moisture change [$mm(day)^{-1}$]; P is the daily amount of total precipitation or irrigation [$mm(day)^{-1}$]; ET is the evapotranspiration rate [$mm(day)^{-1}$]; R is the daily amount of surface runoff [$mm(day)^{-1}$]; and D is the daily drainage rate into or out of the soil profile [$mm(day)^{-1}$] (Jensen, 1973). When the sum of P and soil moisture content is greater than the total moisture storage capacity, or when the rate of P is too high, water may be lost from the profile as drainage or runoff, respectively. In many cases, D and R are assumed constant or negligible; therefore, P and ET are the primary factors contributing to soil moisture variations (Chang, 1968). Precipitation can be routinely determined by a rain gauge, thus, ET rates are required for estimations of $\Delta\theta$.

Evapotranspiration rates (ET) can be estimated either directly or empirically, with empirical models receiving greater emphasis in recent years. Empirical models usually have fewer restrictions or instrumentation, fewer measurements and lower operational costs. To illustrate, one empirical model is employed in Idaho to schedule irrigation on an operational basis at a cost of less than \$1.00(acre)$^{-1}$(year)$^{-1}$ (Jensen et al., 1970).

Kanemasu, Stone, and Powers (1976) developed an ET model requiring a minimum number of daily inputs: solar (or net) radiation, precipitation, leaf-area index (or percent cover), and maximum and minimum temperatures. The model has proven to estimate daily ET rates from soybeans and sorghum within 2 mm of lysimetric estimates (Kanemasu et al., 1976).

The purpose of our study was to evaluate parameters required in the computerized model for corn and test the model by comparing soil moisture estimates, as determined by the model, with neutron attenuation estimates.

CHAPTER 2

REVIEW OF LITERATURE

Many empirical and direct procedures calculate ET rates using meteorological variables and physical properties of the soil (Veihmeyer, 1964). The major meteorological variables influencing ET rates include wind speed, temperature, humidity, and solar radiation. The amount of water available to the plant and the movement of water depend upon soil properties (e.g., bulk density, texture, structure, and porosity) (Taylor and Ashcroft, 1972). The potential evapotranspiration rate (PET), as defined by Penman (1948), is the rate of water lost from a "short, green crop, completely shading the ground, of uniform height and never short of water". Consequently, PET is dependent only on meteorological variables.

2.1 *Direct Methods*

Procedures or instrumentation used to estimate ET rates directly include lysimeters, energy balance-Bowen ratio equations and aerodynamic equations.

2.1-1 Lysimeters

A lysimeter consists of a block of soil, hydrologically isolated from the surrounding soil, which may be planted to vegetation. Evapotranspiration rates are determined from weight changes in the block (Tanner, 1967). Measurements of water loss to within 0.25 mm enable lysimeters to estimate hourly or daily ET rates (Rosenberg, Hart, and Brown, 1968). Regardless of their accuracy, the soil moisture content within the lysimeter may differ from the surrounding soil due to a lack of adequate drainage at the bottom of the lysimeter. Some lysimeters are equipped with suction tubes at lower levels that absorb excessive amounts of water, thus correcting the drainage deficiency (Tanner, 1967). In addition, condensation around the outside of the lysimeter may cause a decrease in the estimated ET rate (Tanner, 1967).

2.1-2 Aerodynamic Equation

Two major vertical fluxes, resulting from turbulent diffusion near the round, are (1) momentum, τ_m, and (2) water vapor, LE_v. The fluxes are calculated from

$$\tau_m = \rho K_m (\partial u/\partial z) \quad [2a]$$
$$LE_v = -\rho K_v (\partial q/\partial z) \quad [2b]$$

where ρ is the density of the atmosphere $[g(cm)^{-3}]$; z is the vertical distance between two points (cm); u is the windspeed $[cm(sec)^{-1}]$; q is the specific humidity $[g(kg)^{-1}]$; L is the latent heat of vaporization $[cal(g)^{-1}]$; E_v is the quantity of water lost $[ly(min)^{-1}]$; and K_m and K_v are eddy diffusivities for momentum and water vapor, respectively $[cm^2(sec)^{-1}]$ (Rosenberg et al., 1968). K_m is determined from the equation

$$K_m = ku_* z \quad [3]$$

where k is the von Karmon constant (0.4), and u_* is the friction velocity $[cm(sec)^{-1}]$. The friction velocity is given as

$$u_* = \sqrt{\tau_o/\rho} \quad [4]$$

where τ_o is the shearing stress at the ground surface $[dynes(cm)^{-2}]$. Horizontal wind speed is calculated by combining equations [2a], [3], and [4], and integrating (Rosenberg et al, 1968):

$$u = (u_*/k)[\ln(z/z_o)] \quad [5]$$

The variable, z_o, is the aerodynamic roughness parameter (cm), and is dependent on crop height and morphology. By using equations [2a], [2b], and [5], and assuming $K_m = K_v$, water vapor flux during neutral conditions is estimated from

$$LE_v = \frac{\rho k^2 (q_2 - q_1)(u_2 - u_1)}{[\ln(z/z_o)]^2} \qquad [6]$$

where subscripts 1 and 2 represent two levels above the ground (Rosenberg et al, 1968).

Pruitt, Morgan, and Lourence (1973) and Holzman (1943) report significant variations in the K_v/K_m ratio under diabatic conditions. The ratio increases to 1.4 during strongly unstable conditions and decreases to 0.7 during extremely stable conditions. Stability corrections are taken into account in equations developed by Deacon and Swinbank (1958), Williams (1961), and Pasquill (1950).

Since the aerodynamic equation [6] involves the precise determination of wind speed and humidity gradients, elaborate equipment are required in the measurements (Veihmeyer, 1964). Representative gradient measurements of the boundary layer above the crop requires a large amount of fetch surrounding the instruments (Rosenberg et al., 1968).

2.1-3 <u>Energy Balance-Bowen Ratio Equations</u>

The energy balance equation can be expressed as

$$R_{ni} = LE_v + G + A_s \qquad [7]$$

where R_{ni} is net radiation $[ly(min)^{-1}]$; G is the amount of energy used to heat the soil $[ly(min)^{-1}]$; and A_s is the amount of energy used to heat the atmosphere $[ly(min)^{-1}]$ (Taylor and Ashcroft, 1972). The amount of energy in canopy storage and photosynthesis is assumed to be negligible.

The Bowen ratio, β (dimensionless), is defined as

$$\beta = A_s/LE_v \qquad [8]$$

Assuming that $K_s = K_v$, equation [8] becomes

$$\beta = \frac{\Delta T(P_a)C_P}{\Delta e(L)\varepsilon} \qquad [9]$$

where ε is the ratio of water vapor and air molecular weights (0.622); P_a is atmospheric pressure (mb); C_p is the specific heat of the atmosphere at a constant pressure $[0.24\ \mathrm{cal}(g)^{-1}(°C)^{-1}]$; and ΔT and Δe are differences of temperature and pressure at two different heights, respectively. Evapotranspiration $[\mathrm{ly}(\mathrm{min})^{-1}]$ is calculated from the equation

$$LE_v = \frac{R_{ni} - G}{(1 + \beta)L} = \frac{R_{ni} - G}{1 + [\Delta T(P_a)C_P/\Delta e(\varepsilon)]} \qquad [10]$$

(Rosenbert et al., 1968).

The error in estimating ET is much less than the error in β, if the assumption $K_s = K_v$ is incorrect; therefore, no adjustments need to be made for lapse and inversion conditions. The determination of β requires accurate estimates of temperature and vapor pressure gradients; however, the specifications for fetch and atmospheric stability are less stringent for the Bowen ratio (Rosenberg et al., 1968).

2.2 Empirical Equations

Empirical equations are used to estimate PET and actual ET rates. Actual ET rates are usually calculated from PET rates by multiplying PET by a crop coefficient. The coefficient depends on crop maturity and the amount of water available to the plants. As the amount of soil moisture decreases, the transpiration rate and crop coefficient decreases (Jensen et al., 1970). Therefore, computation of the crop coefficient is required for each situation (Blaney and Criddle, 1950).

2.2-1 Penman Equation

Penman (1948) predicts daily (i.e., 24 hour) potential ET rates directly by combining the energy budget and aerodynamic equations. The equation is

$$PET = \frac{sR_n + \gamma E_a}{s + \gamma} \qquad [11]$$

where PET is the potential ET rate [mm(day)$^{-1}$]; s is the slope of the saturation vapor pressure curve for water at the mean daily temperature (mb(°C)$^{-1}$]; R_n is the daily net radiation [mm(day)$^{-1}$]; E_a is the aerodynamic term; and γ is the psychrometric constant (mb(°C)$^{-1}$]. The aerodynamic term is given by

$$E_a = 0.35(e_a - e_d)[1 + u_2 \times 10^{-2}] \qquad [12]$$

where e_a and e_d are saturation vapor pressures (mb) at the daily mean temperature and dew point, respectively (Chang, 1968). Depending on the daily mean temperature, the energy term, R_n, usually contributes more to the PET rate than the aerodynamic term (Stanhill, 1962).

Jensen (1973) reports from his evaluation of 16 models that equation [11] has the lowest root mean square value for differences between estimated and measured monthly ET rates.

2.2-2 Thornthwaite Equation

Thornthwaite (1948) developed an equation which estimates potential ET rates by using air temperature as the only variable

$$PET = 1.6\ (10 \times T_m/I)^a \qquad [13]$$

PET is the adjusted (i.e., thirty twelve-hour days) monthly potential ET rate [mm(month)$^{-1}$]; T_m is the monthly mean temperature (°C); I is the sum of the twelve monthly heat indices, or

$$I = \sum_1^{12} i = \sum_1^{12} (T_m/5)^{1.514} \qquad [14]$$

and a is determined from

$$a = 6.75 \times 10^{-7} I^3 - 7.71 \times 10^{-5} I^2 + 1.79 \times 10^{-2} I + 0.49 \qquad [15]$$

The most important advantage in using equation [13] is the simplicity. However, Pelton, King, and Tanner (1960) find temperature and potential ET not to be directly related; the annual maximum ET rate lags behind the maximum temperature by several weeks, thus causing serious errors in the estimation of ET.

2.2-3 Jensen-Haise Equation

Jensen and Haise (1970) developed a relationship which is applied extensively in western areas of the U. S. by several irrigation services. Daily potential ET rates are estimated from the equation

$$PET = \frac{(T_d - T_x)R_s}{68 + 13C_H} \qquad [16]$$

where PET is the daily potential ET rate (ly(day)$^{-1}$]; T_d is the mean daily air temperature (°C); T_x is a constant for a given area (°C); and C_H is a humidity index (dimensionless). The humidity index, C_H, is determined from

$$C_H = \frac{50 \text{ mb}}{e_2 - e_1} \qquad [17]$$

where e_2 and e_1 are the saturation vapor pressures at mean maximum and minimum air temperatures, respectively, during the warmest month (mb).

In reporting the accuracies of various empirical ET forms, Jensen (1973) finds that in arid to semi-arid regions, equation [16] is the most accurate; however, outside of this region, estimates become unreliable.

2.2-4 Priestley-Taylor Equation

Priestley and Taylor (1972) estimate maximum daily ET from water saturated surfaces with the equation

$$ET_{max} = \alpha[s/(s + \gamma)](R_n + G) \qquad [18]$$

where α is a constant dependent upon the crop and climate (dimensionless), and G is the daily soil heat flux [mm(day)$^{-1}$].

Tanner and Jury (1976) use equation [18] to estimate actual ET rates within 1 mm of the lysimetric estimates. They conclude that the Priestley-Taylor equation is as reliable as Penman's equation for several climates.

2.3 Actual ET Models

2.3-1 Blaney-Criddle Equation

The most widely employed model in western areas of the country is given by Blaney and Criddle (1950). The equation is

$$ET = C_m(T_m \times P_s/100) \qquad [19]$$

where ET is the monthly ET rate $[mm(month)^{-1}]$; C_m is the crop coefficient (dimensionless), T_m is the mean monthly temperature (°F); and P_s is the monthly percentage of the maximum amount of annual sunshine. The crop coefficient is dependent upon crop height and cover.

Jensen (1973) concludes from his evaluation of several ET models that equation [19] is the fourth most accurate in estimating ET for coastal regions.

2.3-2 Regression Equations

In recent years, regression equations of the form

$$ET = C_1 PET + C_2 \qquad [20]$$

have been used to estimate actual ET rates from potential ET rates. C_1 and C_2 are constants (dimensionless), PET is the daily potential ET rate $[mm(day)^{-1}]$, and ET is the daily evapotranspiration rate $[mm(day)^{-1}]$. If many years of compiled meteorological data are available for reliable calculations of C_1 and C_2, ET estimates can be very accurate, compared with the actual ET rate ($R^2 = 0.98$) (Hargreaves, 1974).

2.3-3 Ritchie Equation

Recently, Ritchie (1972) devised a daily actual ET model for row crops which can be applied throughout the growing season by separating actual ET rates into evaporation and transpiration rates. He has shown model estimates to be within ±1 mm of the measured daily ET rates (Ritchie, 1972). Description of the model is given in Chapter 3.

2.4 Common Disadvantages

All of the previously discussed models have similar deficiencies. A common deficiency is a lack of an advective component, which causes an underestimation of ET rates (Abdel-Aziz, 1964; Pruitt, 1960; Rosenberg, 1974; Tanner and Jury, 1976; Kanemasu, Stone, and Powers, 1975). Empirical models estimate ET rates accurately only if properly calibrated for a specific location (Pruitt and Jensen, 1955; Jensen, 1973).

In order to schedule irrigation properly, the model must accurately calculate daily estimates of ET; however, some of the models (e.g., the Penman, Thornthwaite, and Blaney and Criddle models) are designed to primarily estimate monthly ET rates (i.e., the daily estimates tend to be unreliable) (Gilbert and van Bavel, 1954).

Any of the more complex models (e.g., the Penman and regression models) require large amounts of data, which may be unavailable at many weather stations (Hargreaves, 1974; Jensen, 1973). For example, Hargreaves reported accurate regression equations from at least 15 years of compiled meteorological data.

CHAPTER 3

AN EVALUATION OF THE EVAPOTRANSPIRATION MODEL

3.1 Introduction

Empirical evapotranspiration (ET) models differ in the number of required meteorological measurements (Ritchie, 1972; Kanemasu, Stone, and Powers, 1976; Jensen, 1970; Blaney and Criddle, 1950). Several use wind speed and vapor pressure gradients, which are not routinely measured by the National Weather Service. Various other models are accurate only in certain geographical regions (Jensen, 1973). A model, requiring minimum measurements and accurately estimating daily ET rates, potentially could be used in scheduling irrigation and apportioning water within hydrologic projects.

Kanemasu et al. (1976) and Tanner and Ritchie (1974)[1] developed a model requiring minimum daily measurements: solar (or net) radiation, precipitation, leaf-area index (or percent cover), and maximum and minimum air temperatures. The meteorological measurements can be obtained at the field site or from weather stations. Leaf-area indices must be measured or estimated from leaf-growth models (Arkin, Vanderlip, and Ritchie, 1976; Higgins, Haun, and Koch, 1964). The model has estimated daily ET rates from soybeans [Glycine max. (L.) Merr.] and sorghum [Sorghum bicolor (L.) Moench] with 2 mm the maximum deviation from lysimetric estimates (Kanemasu et al., 1976).

Our study was to evaluate parameters required by a computerized model for corn [Zea mays (L.)] and to test the model by comparing soil

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[1]Tanner, C. B. and J. T. Ritchie. 1974. "Evapotranspiration empiricisms and modeling". Agron. Abstr. and mimeo report by authors.

water estimates, as determined by the model, with neutron attenuation estimates.

3.2 Methods and Materials

The study was conducted at the Scandia Irrigation Experiment Field, 5 km northwest of Scandia, Kansas, and the Evapotranspiration Research Field, 14 km southwest of Manhattan, Kansas.

In a Crete silt loam (fine, montmorillonitic, mesic, typic Argiustoll) at Scandia, corn (cv. 'Dekalb XL72A') was planted May 1, 1975, in rows 75 cm apart at a harvest population of 70,000 plants $(ha)^{-1}$. Plots, 30- x 9-m, were arranged into three repetitions of three furrow irrigation treatments (irrigating at 40%, 60%, 80% depletion of the maximum available water in the 150-cm profile), and fertilized at 224 kg $N(ha)^{-1}$ (Fig. 5). However, because of the time lag involved between applying water and determining the amount of available water in the 150-cm profile, we irrigated the 40% depletion treatment at greater water depletion percentages, and the 60% and 80% treatments at lower water depletion percentages than intended. Neutron attenuation measurements were taken at each 15-cm increment through 150-cm. Initial soil water contents for the model were gravimetrically determined at planting. Tensiometers were placed in each plot at 150-cm and 180-cm depths and read semiweekly. Three randomly selected plants were chosen weekly from each plot for leaf-area and growth-stage determinations. Leaf area was estimated from measurements of maximum length and width of each leaf. Solar radiation (R_s), total precipitation (P), and maximum (T_{max}) and minimum (T_{min}) air temperatures were measured daily. Plots were harvested for grain on September 23.

In a Muir silt loam (fine-silty, mixed, mesic, pachic Haplustoll) at Manhattan, the same corn variety was planted April 28, 1975 in rows 75 cm apart at a harvest population of 63,000 plants$(ha)^{-1}$. The field was arranged into three 20- x 30-cm plots, and fertilized at 224 kg $N(ha)^{-1}$. At the center of each plot, neutron attenuation measurements were taken at each 15-cm increment down through 150-cm. One net radiometer and two linear net radiometers (Swissteco Pty. Ltd., Melbourne, Australia) were located near the center of the field. The net radiometer was placed 1 m above the crop canopy; the linear net radiometers (1-m long), 5 cm above the ground and normal to the row. One linear net radiometer was centered in the row; the other, between the rows. During the day, net radiation measurements were recorded every 20 min on a data acquisition system. Leaf area and growth stages were determined every 7-10 days from three randomly selected plants within each plot. Leaf area was determined by an optical area meter (Lambda Instr. Corp., Lincoln, Nebraska) and correlated with the maximum length and width of each leaf, which resulted in the equation

$$LA = 0.73\sum_{i=1}^{n}(L_i \times W_i) \qquad [21]$$

where L_i and W_i are the maximum length and width of each leaf, respectively, LA is the total plant leaf area and n is the number of leaves per plant. The coefficient in equation [21] (0.73) is identical to the results by McKee (1964). LAI was determined from equation [21] and plant population. Measurements of P, T_{max}, T_{min}, and R_s were obtained daily. To provide a uniform stand, water was applied on April 29, and May 7 and 9 (18, 10, 6 mm, respectively). Plots were harvested for grain September 16.

3.2-1 Model Development

A detailed description of the model is given by Kanemasu et al. (1976). The model partitions daily ET rates into transpiration (T) and evaporation (E_s).

Daily maximum evapotranspiration (ET_{max}) during predominantly non-advective conditions is estimated by a modified form of the Priestley and Taylor (1972) equation (G is assumed negligible)

$$ET_{max} = \alpha[s/(s + \gamma)]R_n \qquad [22]$$

From previous studies (Kanemasu et al., 1976; Tanner and Jury, 1976) we chose $\alpha = 1.35$.

Since R_n estimates are not usually available, a relationship between R_n and R_s is determined at Manhattan for Scandia data analysis. The set of equations used are

$R_n = 0.861(R_s) - 103.92$	for LAI<3.0	[23a]
$R_n = 0.848(R_s) - 144.49$	for LAI>3.0	[23b]
$R_n = 0.766(R_s) - 99.89$	for LAI>3.0 and after blister stage	[23c]

where R_n and R_s are given in $ly(day)^{-1}$.

Evaporation from the soil surface is composed of two stages: the constant- (E_{s1}) and falling-rate (E_{s2}) stages (Ritchie, 1972). When the soil surface is moist, E_{s1} is in the constant rate stage and proceeds at the potential evaporation rate, which is given by

$$E_{s1} = \tau[s/(s + \gamma)]R_n \qquad [24]$$

where τ is the ratio of net radiation reaching the ground (R_{ns}) to R_n and is a function of leaf area index (Fig. 1). For comparison, Fig. 1 also shows Ritchie's (1972) relationship.

Evaporation proceeds at the potential rate until a critical value (U) of the cumulative amount of water has been lost from the soil; thereafter, E_s enters into the falling rate stage, given by

$$E_{s2} = ct^{\frac{1}{2}} - c(t - 1)^{\frac{1}{2}} \qquad [25]$$

where c is a constant dependent on soil hydraulic properties; and t is the number of days since the initiation of E_{s2}.

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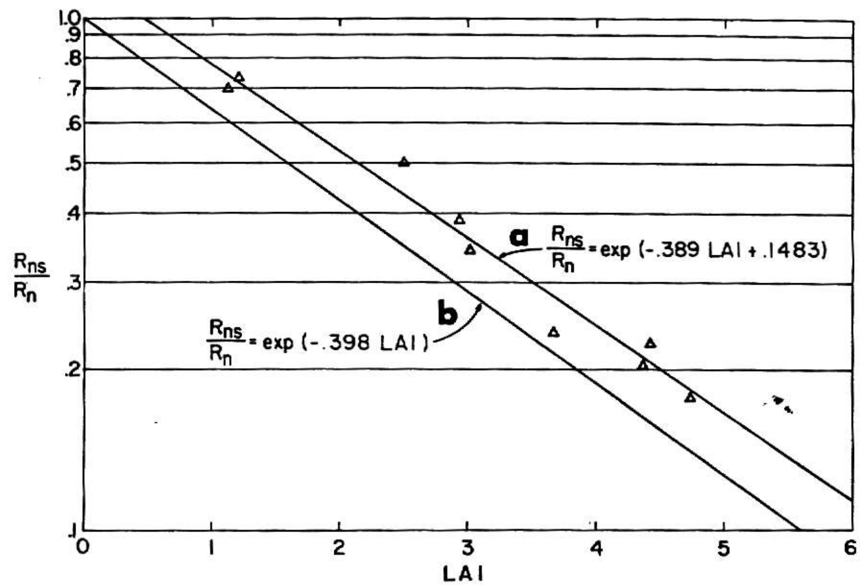

Fig. 1. Relationship between τ (or R_{ns}/R_n) and LAI, as determined at (a) Manhattan and (b) by Ritchie (1972).

Between the constant- and falling-rate stages is a one day transitional stage, where $E_s = 0.6E_{s1}$ (Ritchie, 1972).

At the Evapotranspiration Research site, U and c are estimated by a weighing lysimeter as 10 mm and 3.5 mm(day) , respectively (Kanemasu et al., 1976). As a weighing lysimeter is not available at Scandia, the soil parameters are evaluated by measuring daily water loss from a soil-filled container 13 cm deep with exposed surface area of 184 cm^2. The parameters, U and c, are 11.0 mm and 3.6 mm(day) , respectively.

Transpiration rates depend on the amounts of available soil water in the root zone. The maximum amount of available water in the 150-cm profile (θ_{max}) is gravimetrically determined in the field at Scandia, and from desorption curves for the soil at Manhattan; θ_{max} is 335 mm and 183 mm for Manhattan and Scandia, respectively (Table 3).

When soil water is not limiting, T depends on LAI or the percentage of the ground shaded by the crop. The set of equations adopted for estimating cover percentage is

$\text{cover } \% = (\frac{LAI}{3.0})100\%$	for LAI<3.0	[26a]
cover % = 100%	for LAI>3.0	[26b]
cover 5 = 40%	for LAI>1.8 and after silking stage	[26c]

For less than 50% cover,

$$T = \alpha_v(1 - \tau)[s/(s + \gamma)]R_n \quad [27]$$

where $\alpha_v = (\alpha - 0.5)/0.5$. For greater than 50% cover,

$$T = (\alpha - \tau)[s/(s + \gamma)]R_n \quad [28]$$

For a number of soils and crops, Tanner and Ritchie (1974)[1] determined the critical amount of available soil water affecting transpiration to be $0.3\theta_{max}$. After the soil water content has depleted to $0.3\theta_{max}$,

$$T = \frac{\theta_{av}}{0.3\theta_{max}} \alpha_v(1 - \tau)[s/(s + \gamma)]R_n \quad [29a]$$

or,

$$T = \frac{\theta_{av}}{0.3\theta_{max}} (\alpha - \tau)[s/(s + \gamma)]R_n \quad [29b)$$

where θ_{av} is the actual amount of available soil water.

Under advective conditions, actual ET is greater than ET_{max} (Rosenberg et al., 1968). To estimate the advective contribution (A), we used the equation given by Kanemasu et al. (1976) for sorghum

$$A = 0.1T \quad \text{for } T_{max} > 33°C \quad [30]$$

Calculating A, T, and E_s gives

$$ET = E_s + T + A \quad [31]$$

3.3 Results and Discussion

Fig. 2 shows the growth stages, as defined by Hanway (1971) and seasonal trends in LAI at Manhattan and Scandia. LAI for the 60% and 80% depletion treatments are, respectively, 15% and 33% smaller than the LAI for the 40% treatment during latter growth stages. Since differences between total amounts of applied water for each irrigation treatment are small (within 3 cm) (Table 1), the differences in LAI likely result from different irrigation dates. LAI differences between Manhattan and Scandia can be attributed to the lower plant population at Manhattan.

No significant differences in the cumulative amounts of E_s, T, and ET (cumulative advection is negligible compared to E_s, T, and ET) were observed between irrigation treatments; therefore, only the 60% treatment at Scandia is shown in Fig. 3a. At crop maturity, T, E_s, and A comprise 78% (483 mm), 18% (114 mm) and 4% (22 mm) of the cumulative ET loss, respectively. Cumulative T, E_s, and ET at Manhattan are shown in Fig. 3b. Cumulative T, E_s, and A comprise 63% (351 mm), 34% (189 mm), and 3% (17 mm) of the cumulative ET loss, respectively. Differences in

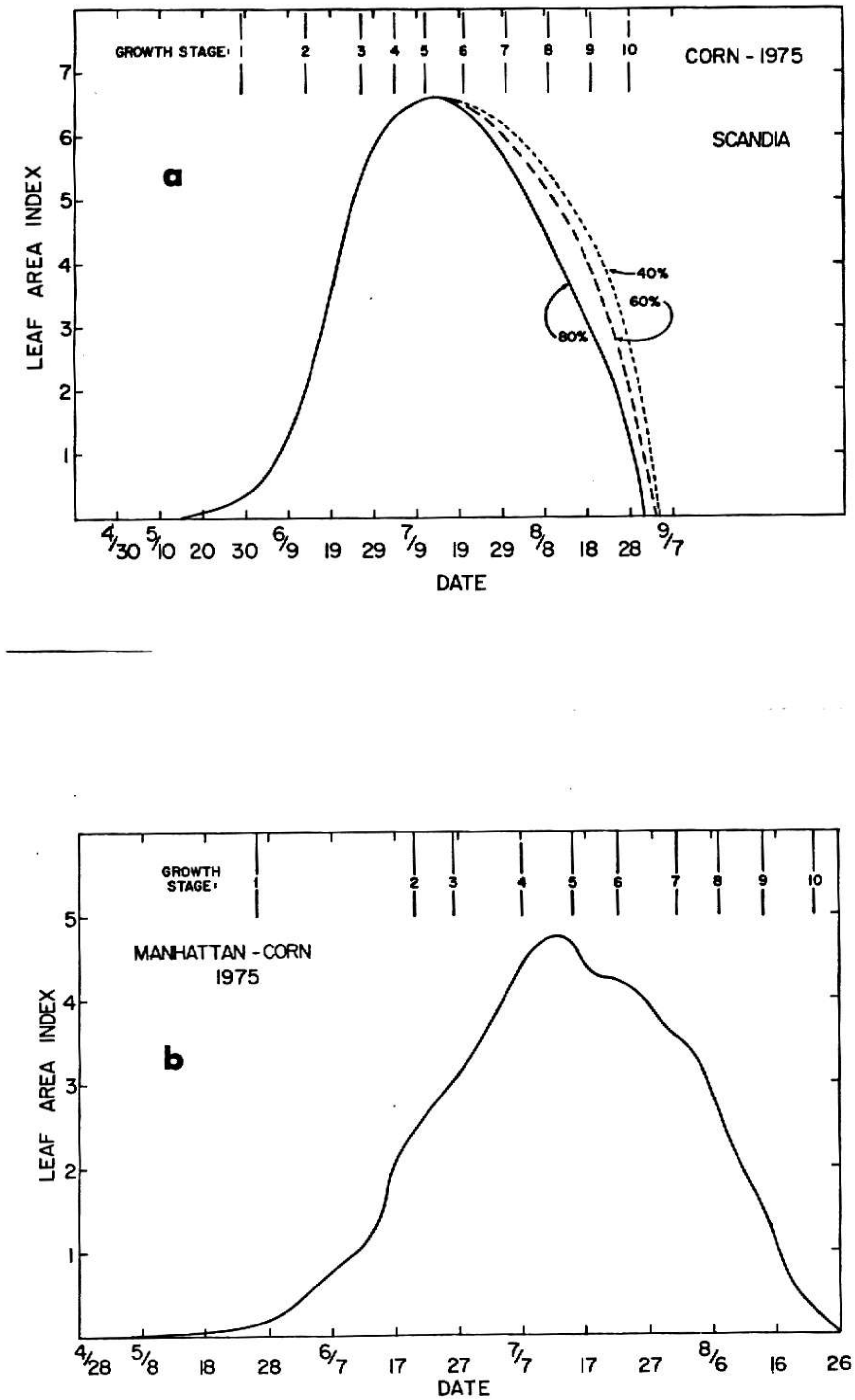

Fig. 2. Seasonal variations of LAI and growth stages for (a) Scandia and (b) Manhattan.

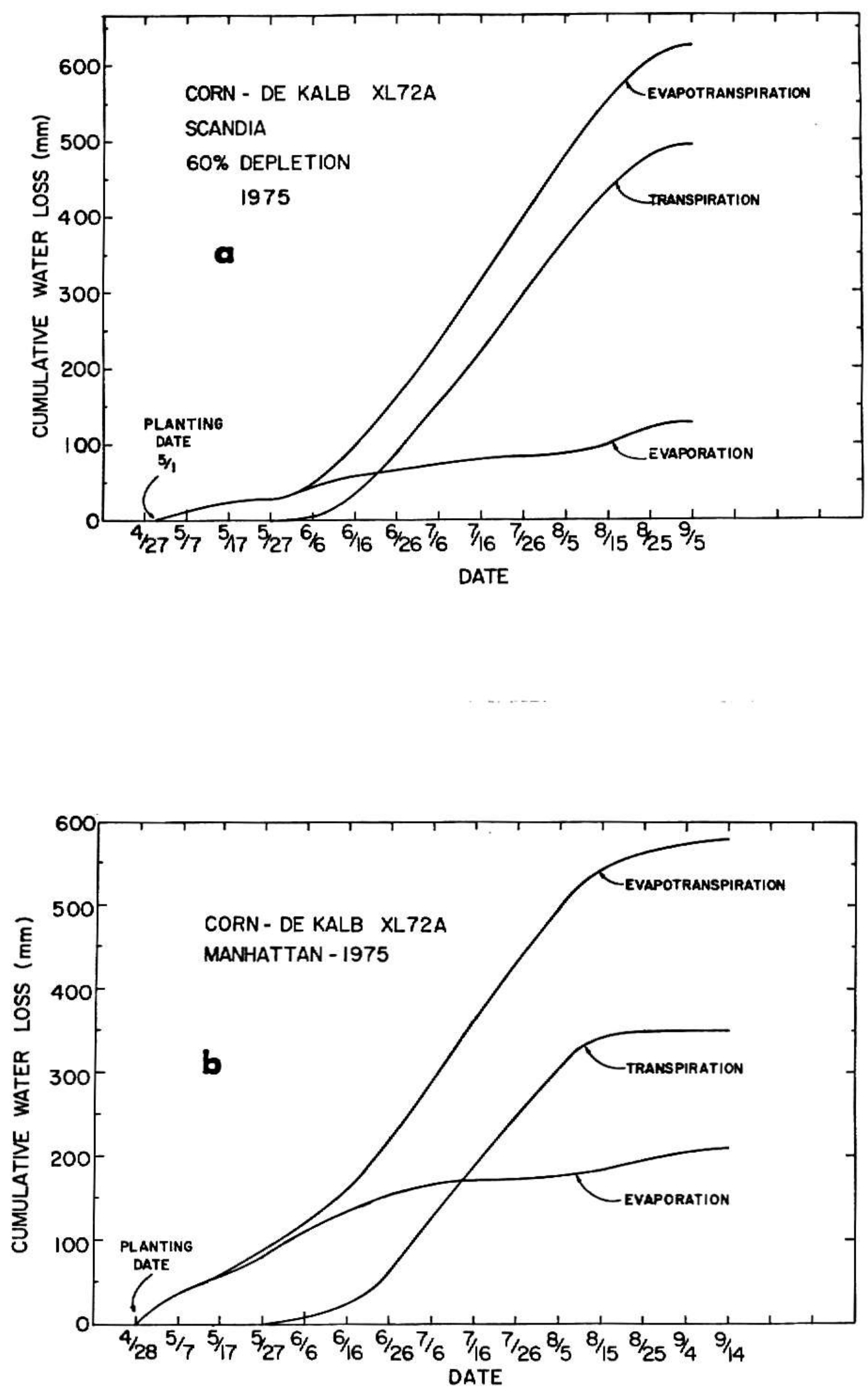

Fig. 3. Cumulative E_s, T, and ET at (a) Scandia and (b) Manhattan.

ET between Scandia and Manhattan result primarily from the longer period of 100% cover at Scandia (Fig. 2).

Tensiometer data (Fig. 6) indicate negligible water flow in the 150- to 180-cm layer, thus justifying the assumption of negligible drainage. Therefore soil water estimates depend on daily ET rates and precipitation.

Fig. 4 shows comparisons of soil water estimates from the model and neutron attenuation measurements at Manhattan and Scandia. Through most of the growing season, the model estimated soil water within 6% of the neutron attenuation results. Overestimating soil water by the model after denting stage is caused by underestimating green LAI, which would reflect an underestimation of transpiration. Leaf area measurements were made on green tissue, so estimates of transpiring surfaces could be in error during senesence.

Water availability during the silking stage (Fig. 4) appears to be critical in grain yield (Robins, 1967). During silking stage, the available water depletion at Manhattan averaged 48%; the available water depletion for the 40% treatment at Scandia averaged 36%; the 60% treatment, 47%; and the 80% treatment, 56%. Therefore the depletion levels during silking follow the grain yields.

Table 1 shows the water use efficiency (yield/ET) for the four treatments. The treatment with the highest yield and ET (40% depletion) had the highest efficiency in water use. In this study, yields appear to control water use efficiency and ET was relatively conservative.

Results from Scandia and Manhattan indicate the model, developed by Kanemasu et al. (1976) and Tanner and Ritchie (1974)[1], estimates ET rates from corn within 6% of the neutron attenuation results. With such accuracy, the model has potential in scheduling irrigation on corn. Inputs required by the model can be obtained at the field or from nearby

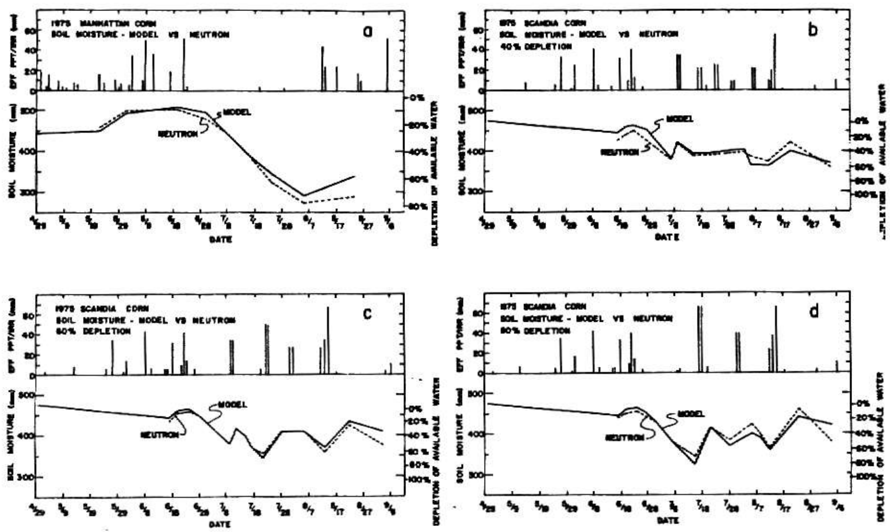

Fig. 4. Effective precipitation (or irrigation) and comparisons of soil water contents within the 150-cm profile as estimated by the model and by neutron attenuation methods.

Table 1. 1975 Corn (DeKalb XL72A) yield, total effective irrigation, and water use efficiency at Manhattan and Scandia.

Location	Treatment	Total Effective Irrigation (cm)	Yield (kg/ha)	Cumulative ET (cm)*	$\frac{\text{Yield}}{\text{ET}}$ $[kg(ha)^{-1}(cm)^{-1}]$
Manhattan		3.4	5,172	55.9	92.6
Scandia	40% depletion	25.5	10,333	62.1	166.4
	60% depletion	28.5	7,675	61.9	124.0
	80% depletion	27.6	3,036	60.7	50.0

*Cumulative ET at physiological maturity.

National Weather Service stations; therefore, the model can be applied on a regional basis.

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GLOSSARY

SYMBOLS		UNIT
c	= coefficient for soil evaporation during stage 2 drying	$[mm(day)^{-\frac{1}{2}}]$
e_a	= saturation vapor pressure at daily mean temperature	$[mb(°C)^{-1}]$
e_d	= saturation vapor pressure at dew point	$[mb(°C)^{-1}]$
i	= monthly heat index	$(°C)^{1.514}$
k	= von Karmon constant	(0.4)
n	= total number of leaves per plant	(dimensionless)
s	= slope of the saturation vapor pressure curve	$[mb(°C)^{-1}]$
t	= time since the threshold of stage 2 evaporation	(days)
u	= horizontal windspeed	$[cm(sec)^{-1}]$
u_2	= horizontal windspeed at two meters	$[cm(sec)^{-1}]$
z	= height above the ground	(cm)
z_o	= aerodynamic roughness parameter	(cm)
A	= daily advective contribution	$[mm(day)^{-1}]$
A_s	= sensible heat flux	$[cal(cm)^{-2}(min)^{-1}]$
C_H	= humidity index	(dimensionless)
C_m	= crop coefficient	(dimensionless)
C_p	= atmospheric specific heat at constant pressure	$(0.24\ cal(g)^{-1}(°C)^{-1}]$
$C_{1,2}$	= regression constants	(dimensionless)
D	= daily drainage out of the 150-cm profile	$[mm(day)^{-1}]$
E_s	= daily evaporation rate	$[mm(day)^{-1}]$
E_v	= water vapor flux	$[g(cm)^{-2}(min)^{-1}]$
ET	= daily evapotranspiration rate	$[mm(day)^{-1}]$
ET_{max}	= maximum daily evapotranspiration rate	$[mm(day)^{-1}]$
G	= soil heat flux	$[cal(cm)^{-2}(min)^{-1}]$

I	= annual heat index	$(°C)^{1.514}$
L	= latent heat of vaporization	$[cal(g)^{-1}]$
L_L	= maximum length of one leaf	(cm)
LA	= total leaf area	$(cm)^2$
LAI	= leaf area index for one plant	(dimensionless)
P	= total amount of precipitation	(mm)
P_a	= atmospheric pressure	(mb)
P_s	= monthly percentage of the maximum amount of annual sunshine	(dimensionless)
PET	= daily potential evapotranspiration rate	$[mm(day)^{-1}]$
R	= surface runoff	(mm)
R_n	= daily net radiation above the canopy	$[mm(day)^{-1}]$
R_{ni}	= instantaneous net radiation above the canopy	$[cal(cm)^{-2}(min)^{-1}]$
R_{ns}	= daily net radiation below the canopy	$[mm(day)^{-1}]$
R_s	= daily solar radiation	$[mm(day)^{-1}]$
T	= daily transpiration rate	$[mm(day)^{-1}]$
T_d	= daily mean temperature	(°C)
T_m	= monthly mean temperature	(°C)
T_{max}	= daily maximum temperature	(°C)
T_{min}	= daily minimum temperature	(°C)
T_x	= constant for determining evapotranspiration rates from the Jensen-Haise equation	(dimensionless)
U	= upper limit of cumulative soil evaporation during stage 1 drying	(mm)
W_L	= maximum width of one leaf	(cm)
α	= coefficient for determining maximum evapotranspiration and transpiration from a cover greater than 50%	(dimensionless)
α_v	= coefficient for determining transpiration from a cover less than 50%	(dimensionless)
β	= Bowen ratio	(dimensionless)

γ = psychrometric constant [$mb(°C)^{-1}$]

ε = ratio of molecular weights of water vapor to air (0.622)

θ = soil moisture content in the 150-cm profile (mm)

θ_{av} = available water in the 150-cm profile (mm)

θ_{max} = maximum amount of available water in the 150-cm profile (mm)

ρ = atmospheric density [$g(cm)^{-3}$]

τ = ratio of net radiation below to above the density (dimensionless)

τ_m = momentum flux [$cal(cm)^{-2}(min)^{-1}$]

τ_o = shearing stress [$dynes(cm)^{-2}$]

APPENDICES

APPENDIX A

Soil and Plant Characteristics

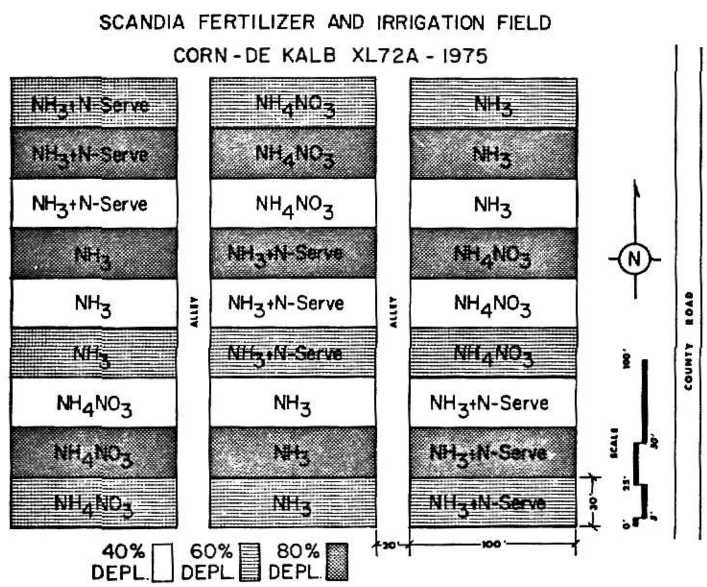

Fig. 5. Plot arrangement at Scandia, Kansas. Three different fertility treatments [NH_4NO_3, NH_3 + N-serve (a nitrification inhibitor] irrigated at three available soil moisture depletions (40%, 60%, and 80% depletion) and replicated three times.

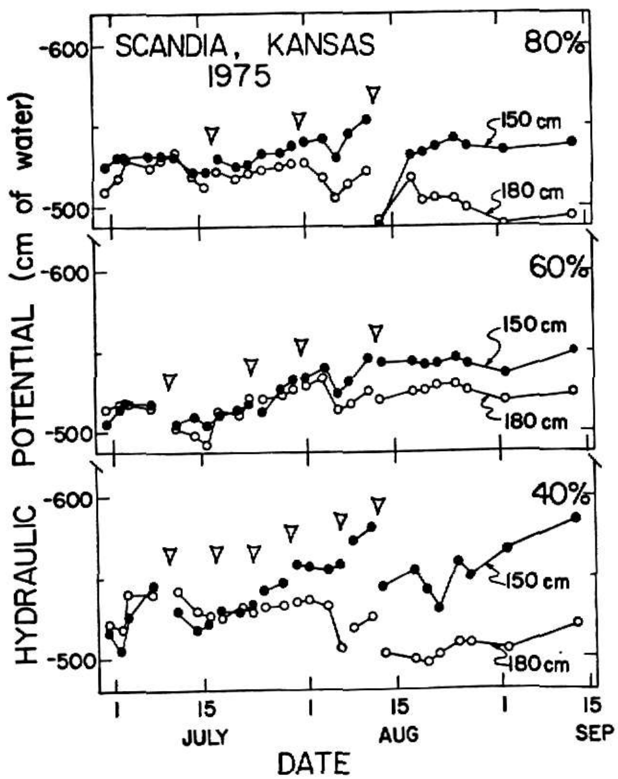

Fig. 6. Seasonal trends of hydraulic potential (150- and 180-cm depths) for the 40%, 60%, and 80% depletion treatments at Scandia (∇ indicate irrigation).

TABLE 2

GROWTH STAGES FOR CORN AT MANHATTAN AND SCANDIA - 1975

Growth Stage*	Date: Manhattan	Date: Scandia
1	5-26	5-29
2	6-20	6-13
3	6-26	6-26
4 (Tassel)	7- 7	7- 4
5 (Silking)	7-15	7-11
6 (Blister)	7-22	7-20
7 (Dough)	8- 1	7-30
8	8- 7	8- 9
9 (Dent)	8-15	8-19
10 (Maturity)	8-22	8-28
Harvest	9-16	9-23

*Hanway, J. J. 1971. How a corn plant develops. Iowa State Univ. Ext. Report No. 48. 17 p.

TABLE 3

SOIL PARAMETERS AS DETERMINED AT MANHATTAN AND SCANDIA

Parameter	Manhattan	Scandia
θ (Field Capacity)	533.4 mm	470.9 mm
θ (Permanent Wilting Point)	197.6 mm	288.0 mm
Maximum amount of available water	335.8 mm	182.9 mm
θ (70% depletion of available water)	298.3 mm	342.9 mm

TABLE 4
IRRIGATION DATES AND EFFECTIVE AMOUNTS
OF IRRIGATION AT SCANDIA AND MANHATTAN - 1975

Location	Treatment	Date	Growth Stage	Effective Irrigation (cm)#
Scandia	40% treatment	7/9 - 7/10	5	7.3
		7/17 - 7/18	6	4.7
		7/23 - 7/24	6.5	5.0
		7/29 - 7/30	7	1.9
		8/6 - 8/7	7.5	3.5
		8/12 - 8/13	8.5	3.1*
			Total =	25.5
Scandia	60% treatment	7/9 - 7/10	5	6.9
		7/23 - 7/24	6.5	10.2
		7/31 - 8/1	7	5.5
		8/12 - 8/13	8.5	5.9*
			Total =	28.5
Scandia	80% treatment	7/17 - 7/18	6	13.2
		7/31 - 8/1	7	8.0
		8/12 - 8/13	8.5	6.4*
			Total =	27.6
Manhattan		4/29	0	1.8
		5/7	0.5	1.0
		5/9	0.5	0.6
			Total =	3.4

#Effective irrigation was estimated from neutron results and ET estimates.
*Includes rainfall on 8/13.

APPENDIX B

Listing of the Program

```
$JCB            WCR,PAGES=30
C         KSU MODEL 3: SOIL EVAPORATION MODEL.
C
C         INPUT CARDS.
C
C         1.   TITLE CARD.  APPEARS AT THE TOP OF EACH
C              OUTPUT PAGE.  80 COLUMNS OF INFORMATION.
C
C              LOCATION, IN FIELD OF 32. (2 SEPARATE CARDS). (4A4).
C         2.   CROP DATA.  DATE SPECIFIED AS OCT 4, 1974 IN FIELD OF 32,
C
C         3.   VARIABLE FORMAT.  SPECIFIES FORMAT OF INPUT
C              FOR MODEL.  INPUT CARD #7.
C
C         4.   PARAMETERS FOR RUN.  FIELDS OF F10.0.
C
C         5.   THE MONTH DAY AND YEAR OF START OF DATA.
C              SPECIFIED AS 02/14/75.  (I2,1X,I2,1X,I2)
C
C         6.   THE LAST MONTH OF DATA SPECIFIED.  I2.
C
C         7.   CFLAG FOR SORGHUM=1; SOYBEAN=2; WHEAT=3; CORN=4. (I2).
C
C         8.   THETA  VALUES FOR EACH LAYER.  THETA MAX
C              VALUE  FOR EACH LAYER. (10F8.0).
C
C         9.   NUMBER REPRESENTING SUBSCRIPT USED IN ARRAY FOR THIS PASS.  I1
C
C         10.   CHECK FOR ADDITIONAL OUTPUT. 1 IF NO. 2 IF YES. I2
C
C         11.  COEFFICIENTS USED IN BIO METERLOGICAL TIME SCALE
C              (SUBROUTINE (CLOKER)).  5 CARDS.  FOR WHEAT ONLY.
C
C         12.  MULTIPLIER USED IN BMTS (CLCKER).
C
C         13.   INPUT DATA CARDS SR,MAXT,MINT,LAI,COVER,RAIN,DL
C
C
      DIMENSION COFF(5,8)
      INTEGER DAY,YR,SCYSOR,CAL(12)/31,28,31,30,31,30,31,31,30,31,30,31
     1/,BLANK/' '/,ASTRK/' '/,TITLE(20),FLAG, DISC /1/,CD(5)/5*0/,DAYT
      REAL MXH2O,MAXT,MINT,LAI
      REAL THEVAL(5),TVAL(5),ZVAL(5)/50.,250.,2*300.,900./,
     1CVAL(5),THEMAX(5),CAI(3),COVERN(3)
      REAL THEMIN(5)
      REAL KVAL2(5)/.05,.25,.25,.25,.2/, KVAL1(5) /.1,.5,.4,2*0./
      REAL*8 FRMT(10)
      INTEGER PLANT(8),LOC(8)
      REAL THETT,TAU,RNS
      REAL RAINCL,RAINEW
      REAL TACC,MULT,TDAY,TX,TN,DL
      INTEGER K
C
C             INITIALIZE
C
  999 ESTOT=0.0
      DRAIN=C.0
      RAINCL=0.0
      RUNOFF=0.0
      TTOT=0.0
```

```
      RNTOT=0.0
      EOTOT=0.0
      ETTOT=0.0
      EST=0.C
      ATCT=C.0
      ETOLD=0.0
      CCUNT=2.0
      DAYT=C
      TACC=0.0
      K=1.
C
C              READ IN INPUT
C              OUTPUT HEADINGS
C
      READ(5,1,END=1000) TITLE
    1 FORMAT (20A4)
      READ(5,1) PLANT
      READ(5,1) LOC
      READ(5,100)FRMT
  100 FORMAT (10A8)
      READ (5,2) MXH2O,TV,TIN,T5,U,ALPHA,CNST,X5
    2 FORMAT(8F10.0)
      WRITE (6,3)TITLE
    3 FORMAT ('1',20X,20A4)
      WRITE (6,4)MXH2C,TV,TIN,T5,U,ALPHA,CNST,X5
    4 FORMAT('0',19X,'MAXIMUM AVAILABLE WATER (MM)..................',
     1  F10.4,//,20X,'THETA SUB V (15 BAR)...........................',
     2  F10.4,//,20X,'THETA INITIAL IN 5 FT. PROFILE (MM)............',
     3  F10.4,//,20X,'THETA SUB 5 CM. LAYER..........................',
     4  F10.4,//,20X,'U (MM).........................................',
     5  F10.4,//,20X,'ALPHA (P-T)....................................',
     6  F10.4,//,20X,'SOIL CONSTANT (MM DAY TO -1/2).................',
     7  F10.4,//,20X,'X SUB 5 (INIT.WATER CONTENT IN 5 CM. LAYER,WT..',
     8  F10.4)
      WRITE(6,12)PLANT
   12 FORMAT('0',19X,'PLANTING DATE..............................',
     X'..',20A4)
      WRITE(6,13) LOC
   13 FORMAT('0',19X,'FIELD/LOCATION.............................',
     X'..',20A4)
      TI=TIN
      ALPHAV=(ALPHA-.5)*2
      CK=.3*MXH2O+TV*1520.0
      READ (5,5) MO,DAY,YR
    5 FORMAT (I2,1X,I2,1X,I2)
      KDAY=DAY
      READ (5,5) KMO
      IF(KMC.LT.MC)KMO=KMO+12
      MMO=MC
      READ(5,5)SCYSOR
      READ(5,101) THEVAL,THEMAX,THEMIN
  101 FORMAT (15F5.0)
C
C     FOR MORE THAN ONE FIELD CN DATA CARD DECK USE
C     READ(5,102) L
C 102 FORMAT (I1)
C
      READ (5,102) L
  102 FORMAT(I1)
      READ (5,5) LAYCHK
```

```
      FLAG=0
      IF (T5.LE.X5)FLAG=1
C
C              TOP CF LCCP OF ANALYSIS.
C
      DO 10 MMM=MO,KMO
      WRITE (6,3)TITLE
      WRITE (6,6)
    6 FORMAT (/////////,9X,'MAX    MIN    TAU    RNS     SOLAR    NET   ',
     1'LEAF',15X,'POT.     SCIL     TRAN        A      TOTAL',10X,'STRESS',/,
     2' MO  CAY TEMP   TEMP',8X,'RAD.     RAD     RAD    AREA COVER  ',
     3'RAIN     EVAP     EVAP      EVAP     EVAP     EVAP    THETA',4X,'DAY',
     43X,'BMTS',/,9X,'(C)     (C)',8X,'(LYS)     (LYS)   (LYS)        ',
     58X,'(MM)      ','(MM)     (MM)      (MM)     (MM)     (MM)    (MM)',/)
      LIM=CAL(MMO)
      DO 8 JJJ=DAY,LIM
C
C     FOR MORE THAN CNE FIELD CN DATA CARD DECK USE
C     READ(5,FRMT,END=15) SR,MAXT,MINT,CAI,COVERN,RAIN,DL
C     COVER=CCVERN(L)
C     LAI=CAI(L)
C
      READ(5,FRMT,END=15) SR,MAXT,MINT,CAI,COVERN,RAIN
      COVER=COVERN(L)
      LAI=CAI(L)
      IF(COVER.GT.0.0)CAYT=CAYT+1
C
C              IF TEMPURATURE IS IN DEGREES F,
C              PLACE CCNVERSIONS T=(T-32.0)*5./9. FOR
C              MIN AND MAX HERE.
C
      MAXT=(MAXT-32.0)*5./9.
      MINT=(MINT-32.0)*5./9.
      RAIN=RAIN*10.0
      RAINEW=RAIN+RAINCL
      RAINOL=RAIN
      IF (RAINEW.LT.U) GO TO 23
      FLAG=0
      EST=0.0
      COUNT=2.C
   23 TMP=(3*MAXT+MINT)/4.0
      SSD=DELTA(TMP)
C
C              CALL OF SUBROUTINE TO CALCULATE POT EVAP.
C
      CALL POTEVA(LAI,SCYSOR,RN,SR,ALPHA,SSD,EC,CAYT)
      TI=TI-ETCLD+RAIN
C
C             .IF POT EVAP IS . ZERO ALL EVAP ARE ZERO
C
      IF (EO.GT.0.0) GC TC 24
      EO=0.0
      ES=0.0
      A=0.0
      T =0.0
      GO TO 31
C
C              CALL TRANSPIRATION SUBROUTINE
C
   24 ASTRK=BLANK
```

```
          CALL TRANS(TI,MXH2C,TV,ASTRK,LAI,T,ALPHA,RN,SSD,COVER,RNS,ALPHAV,
         1CK,DRY,DAYT,SCYSOR)
C
C                   CALL SOIL EVAPORATION SUBROUTINE.
C
          CALL EVAP(FLAG,LAI,RN,EST,ES,U,CNST,COUNT,SSD,DRY,COVER,DAYT,RNS,
         1SCYSOR)
          TAU=RNS
          RNS=TAU*RN
C
C                   CALCULATION OF A EVAPORATICN
C
          IF(SOYSOR-3) 25,26,27
       25 IF(SOYSOR-2) 27,29,29
C
C                         FOR SCYBEAN
C
       29 IF(MAXT.GE.31.0) GO TO 31
          GO TO 30
C
C                         FOR WHEAT
C
       26 IF(MAXT.GE.27.0) GO TO 32
          GO TO 30
C
C                         FOR SORGHUM OR CORN
C
       27 IF(MAXT.GE.33.0) GC TO 32
       30 A=0.0
          GO TO 33
       31 A=.25*T
          GO TC 33
       32 A=.1*T
       33 IF(MAXT.LT.-3.0) FS=T=A=0.0
*EXTENSION*  CTHER CCMPILERS MAY NCT ALLOW MULTIPLE ASSIGNMENT STATEMENTS
*EXTENSION*  OTHER COMPILERS MAY NOT ALLOW MULTIPLE ASSIGNMENT STATEMENTS
          IF(SCYSCR-3) 34,35,34
       35 TX=MAXT
          TN=MINT
          TX=((9./5.)*TX)+32.
          TN=((9./5.)*TN)+32.
C
C                   CALL BIC METERLOGICAL TIME SCALE SUBROUTINE
C
          CALL CLOKER(COEF,TN,TX,DL,TDAY,K)
C
C                   CUMMALATIVE SUMS FOR BMTS
C
          TACC=TACC+TDAY*MULT
          IF(TACC.GE.K.AND.K.LT.5.) K=K+1
C
C                   CUMMALATIVE SUMS
C
       34 ET=FS+T+A
          ATOT=ATOT+A
          ETOLD=ET
          ETTOT=ETTOT+ET
          ESTOT=ESTOT+ES
          TTCT=TTCT+T
          EOTOT=EOTOT+EO
```

```
      RNTOT=RNTOT+RAIN
C
C             OUTPUT LINE
C
      WRITE (6,7)MMO,JJJ,MAXT,MINT,TAU,RNS,SR,RN,LAI,COVER,RAIN,EO,ES,
     1T,A,ET,TI,ASTRK,TACC
    7 FORMAT (' ',I2,I4,F6.1,F6.1,F6.2,F7.2,F7.1,F7.1,F6.2,F6.2,F7.2,
     15F8.3,F8.2,4X,A1,3X,F5.3)
      T=T+A
      WRITE (DISC) ES,T,RAIN,LAI
    8 CONTINUE
      MMC=MMC+1
      IF(MMC.GT.12) MMC=MMC-12
      CAY=1
C
C             OUTPUT AND INITIALIZE AT END OF MONTH
C
      WRITE (6,9) RNTOT,EOTOT,ESTOT,TTOT,ATOT,ETTOT
    9 FORMAT ('0TOTALS',51X,F7.2,5F8.3)
      ETTOT=0.0
      ATOT=0.0
      ESTOT=0.0
      EOTOT=0.0
      TTOT=C.0
      RNTOT=C.0
   10 CONTINUE
      GO TO 20
C
C             FOR END IN MID MONTH
C
   15 WRITE (6,9) RNTOT,EOTOT,ESTOT,TTOT,ATOT,ETTOT
 20   ENDFILE DISC
      IF (LAYCHK.EQ.1) GO TO 1000
      REWIND DISC
      DO 666 I=1,5
 666  CVAL(I)=THEMAX(I)*.3/ZVAL(I)+THEMIN(I)
C
C             LOOP TO CALCULATE LAYER CONTENTS.
C
      MMC=MC
      DO 110 MMM=MC,KMC
      WRITE (6,3) TITLE
      WRITE (6,108)
      LIM=CAL(MMC)
      DO 109 JJJ=KDAY,LIM
      READ (DISC,END=1000) EO,T,RAIN,LAI
      CALL DISTR(I,ZVAL,TVAL,THEVAL,KVAL1,KVAL2,THEMAX,CVAL,LAI)
      RUNOFF=0.0
      DRAIN=0.0
      CALL DAY1 (THEVAL,ZVAL,DRAIN,CD,THEMAX)
 131  IF (RAIN.EQ.0.)GO TO 132
      CALL DAYO(THEVAL,RAIN,ZVAL,RUNOFF,CD,THEMAX)
 132  CALL MOIST(THEVAL,EO,TVAL,ZVAL,THEMIN)
      THETT=THEVAL(1)*50
      THETT=(THEVAL(2)*250)+THETT
      THETT=(THEVAL(3)*300)+THETT
      THETT=(THEVAL(4)*300)+THETT
      THETT=(THEVAL(5)*600)+THETT
      WRITE (6,107) MMC,JJJ,THEVAL,TVAL,RUNOFF,DRAIN,THETT
 109  CONTINUE
```

```
      MMC=MMC+1
      IF(MMO.GT.12) MMC=MMO-12
      KDAY=1
  110 CONTINUE
  107 FORMAT (3X,I2,I5,1X,12F9.4,F10.4)
  108 FORMAT (/////,27X,'THETA VALUES',32X,'TRANSPIRATION',//,1X,
     1'MONTH  DAY',10(4X,'LAYER'),3X,'RUNOFF  DRAINAGE',3X,'THETA',/,
     2 9X,2(8X,'1',8X,'2',8X,'3',8X,'4',8X,'5'),//,14X,'0-5CM ',
     3'   5-30CM  30-60CM   60-90CM  90-180CM  0-5CM   5-30CM ',
     4'  30-60CM 60-90CM  90-180CM ',20X,'0-150CM',//)
 1000 RETURN
      END

      SUBROUTINE POTEVA(LAI,CFLAG,RN,SR,ALPHA,SSD,EO,DAYT)
C
C              SUBROUTINE:  CALCULATION OF POT. EVAP.
C
      INTEGER CFLAG,DAYT
      REAL LAI
      IF(CFLAG-3)5,6,7
    5 IF (LAI.LT.3.0) GO TO 3
      IF (CFLAG-1) 1,1,2
C
C              FOR SORGHUM
C
    1 RN=.8368*SR-130.78
      GO TO 4
C
C              FOR SOYBEAN
C
    2 RN=.8049*SR-135.97
      GO TO 4
    3 RN=.7248*SR-50.11
      GO TO 4
C
C             FOR WHEAT
C
    6 RN=.8678*SR-163.56
      IF(DAYT.LE.168)RN=.9593*SR-213.10
      IF(DAYT.GT.202) RN=.9258*SR-157.4208
      GO TO 4
C
C             FOR CORN
C
    7 IF (LAI.GE.3.0) GO TO 8
      RN=.8608*SR-103.92
      GO TO 4
    8 RN=.848*SR-144.49
      IF (DAYT.GT.84) RN=.766*SR-99.84
    4 EO=ALPHA*SSD*RN/58.3
      RETURN
      END

      SUBROUTINE TRANS(TI,MXH2O,TV,ASTRK,LAI,T,ALPHA,RN,SSD,COVER,TAU,
     1ALPHAV,CK,DRY,DAYT,SOYSOR)
C
C              SUBROUTINE:  CALCULATION OF TRANSPIRATION
C
      REAL LAI,MXH2O,KS
      INTEGER MARK/'*'/,ASTRK,SOYSOR,DAYT
```

```
      IF (SOYSOR-3) 9,9,10
   10 DRY=LAI
      TAU=EXP(-.389*DRY+0.1438)
      IF (LAI.LE.0.38) TAU=1
      IF (TI.GE.CK) GO TO 11
      ASTRK=MARK
      IF (LAI.LE.3.0) GO TO 11
      GO TO 12
    5 TAU=EXP(-.398*LAI)
      IF(COVER.GT.LAI) TAU= .852
      IF (TI.GE.CK) GO TO 1
      ASTRK=MARK
      IF (LAI.LE.1.35) GO TO 1
C
C              STRESS DAY
C
   12 TAVAIL=TI-(TV*1520.0)
      KS=TAVAIL/(0.3*MXH2O)
      IF (SCYSOR-3) 13,13,14
   14 T=KS*(ALPHAV*(1.0-TAU)*SSD*RN/58.3)
      GO TO 8
   11 IF (CCVER.GE.0.5) GC TO 16
      T=ALPHAV*(1.0-TAU)*SSD*RN/58.3
      GO TO 8
   16 T=(ALPHA-TAU)*SSD*RN/58.3
      IF (DAYT.GT.90.AND.LAI.LT.3.67) TAU=.270
      GO TO 8
   13 T=KS*(ALPHAV*(1.0-(EXP(-.398*LAI))))*SSD*RN/58.3
      GO TO 8
C
C              CHECK CCVER
C
    1 IF (SOYSCR.NE.3.0) GO TO 2
      IF (COVER.GE.0.5.AND.LAI.GT.1.35) GO TO 6
      GO TO 4
    2 IF (SCYSCR.NE.2.0) GC TO 3
      IF (COVER.GE.0.5.AND.LAI.GT.3.0) GC TO 5
      GO TO 4
    3 IF (COVER.GE.0.5.AND.LAI.GT.3.0) GC TO 6
    4 T=ALPHAV*(1.0-(EXP(-.398*LAI)))*SSD*RN/58.3
      GO TO 8
    5 TAU=.1
      GC TO 7
    6 TAU=.2
    7 T=(ALPHA-TAU)*SSD*RN/58.3
    8 RETURN
      END

      SUBROUTINE EVAP(FLAG,LAI,RN,EST,ES,U,CNST,COUNT,SSD,DRY,COVER,
     1DAYT,TAU,SCYSOR)
C
C              SUBROUTINE:  CALCULATION OF SOIL EVAP.
C
      REAL LAI
      INTEGER FLAG,CAYT,SOYSOR
      IF (SCYSCR-3) 2,2,5
    5 TAU=EXP(-.389*DRY+0.1438)
      IF (LAI.LE.0.38) TAU=1
      IF (DAYT.GT.90.AND.LAI.LT.3.67) TAU=.270
C
```

```
C                SWITCH AS TC WHICH SCIL EVAPORATICN FORMULA
C                TO USE
C
      2 IF (FLAG-1) 1,3,3
      1 FS=TAL*SSD*RN/58.3
        EST=EST+ES
        IF (EST.LE.U) GO TO 4
        FLAG=2
        ES=ES*0.6
        GO TO 4
      3 ES=CNST*(SCRT(COUNT)-SQRT(CCUNT-1.0))
        COUNT=COUNT+1.0
      4 RNS=TAU*RN/58.3
        IF (RNS.LT.ES) ES=RNS
        RETURN
        END

        FUNCTICN DELTA(T)
        DELTA=0.0155416*T - 0.000005*T**3 + 0.0000001*T**4 + 0.40408273
        RETURN
        END
C       .............................................................
C          SUBROUTINE     CLCKER
C
C          PURPOSE     CALCULATE PART OF BIO-TIME TODAY,BAIER MODEL
C
C          DESCRIPTICN OF PARAMETERS
C                   COEF:     COEFFICIENT TO CALCULATE TIME
C                   TN:       MIN TEMP
C                   TX:       MAX TEMP
C                   DL:       DAY LENGTH
C                   TACC:     TOTAL CF TIME PARTS
C                   TDAY:     TODAYS TIME PART
C                   K:        INDEX INTC COEF
C
C       .............................................................
C

        SUBROUTINE CLOKER (COEF,TN,TX,DL,TDAY,K)
        REAL COEF(5,8),TN,TX,TDAY,DL,V1,V2,V3
        INTEGER K
C
C       FIND DAYLENGTH CCNTRIBUTION TO BIO-TIME
C
        V1=COEF(K,2)*(DL-COEF(K,1))+COEF(K,3)*(DL-COEF(K,1))**2
        IF(V1.LT.0.) V1=0.0
C
C       FIND MAX TEMP CONTRIBUTION TO BIO-TIME
C
        V2=COEF(K,5)*(TX-CCEF(K,4))+COEF(K,6)*(TX-COEF(K,4))**2
        IF (V2.LT.0.0.OR.TX.LT.23.64) V2=0.0
C
C         FIND MIN TEMP CCNTRIBUTION TO BIC-TIME
C
        V3=COEF(K,7)*(TN-CCEF(K,4))+COEF(K,8)*(TN-COEF(K,4))**2
        IF(V3.LT.0.0) V3=0.0
C
C       TODAYS CCNTRIBUTICN TO BIO-TIME
C
        TDAY=V1*(V2+V3)
```

```
      RETURN
      END
C
      SUBROUTINE DAY1(THEVAL,ZVAL,DRAIN,CD,THEMAX)
C
C               SUBROUTINE TO CONTROL DRAINAGE.
C
      INTEGER CD(5)
      DIMENSION THEVAL(5),ZVAL(5),TADD(5),THEMAX(5)
      DRAIN=0.0
      DO 4 I=1,5
      TADD(I)=0.0
      TADD(I)=DRAIN/ZVAL(I)
      TCK=THEVAL(I)+TADD(I)
      IF (TCK.LE..5) GO TO 1
      DRAIN=(TCK-.5)*ZVAL(I)
      GO TO 2
    1 DRAIN=0.0
    2 IF (THEVAL(I).LE.THEMAX(I)) GO TO 4
      IF (CD(I).LT.2) GO TO 3
      CD(I)=1
      GO TO 4
    3 DRAIN=(THEVAL(I)-THEMAX(I))*ZVAL(I)+DRAIN
      THEVAL(I)=THEMAX(I)
      CD(I)=0
    4 CONTINUE
      DO 6 I=2,5
      IF (TADD(I).EQ.0) GO TO 6
      CD(I)=2
      THEVAL(I)=THEVAL(I)+TADD(I)
      IF (THEVAL(I).GT..5) THEVAL(I)=.50
    6 CONTINUE
      RETURN
      END

      SUBROUTINE DAY0(THEVAL,RAIN,ZVAL,RUNOFF,CD,THEMAX)
C
C               SUBROUTINE TO CONTROL A RAIN.
C
      DIMENSION THEVAL(5),ZVAL(5),THEMAX(5)
      INTEGER CD(5)
      R=RAIN
      DO 5 I=1,4
      CK=(.5-THEVAL(I))*ZVAL(I)
      IF (R.LT.CK) GO TO 6
      THEVAL(I)=.5
      CD(I)=2
      R=R-CK
    5 CONTINUE
      RUNOFF=R
      GO TO 7
    6 RUNOFF=0.0
      THEVAL(I)=THEVAL(I)+(R/ZVAL(I))
      IF (THEVAL(I).GT.THEMAX(I)) CD(I)=2
    7 RETURN
      END

      SUBROUTINE DISTR(T,ZVAL,TVAL,THEVAL,KVAL1,KVAL2,THEMAX,CK,LAI)
C
```

```
C             SUBROUTINE TO CALCULATE THE TRANSPIRATION IN EACH LAYER.
C
      DIMENSION IFL(5),ZVAL(5),TVAL(5),THEVAL(5),KVAL1(5),KVAL2(5),
     1THEMAX(5),CK(5)
      REAL KVAL1,KVAL2,LAI
      DO 1 I=1,5
      IFL(I)=0
      CKVAL=CK(I)
      IF (THEVAL(I).LE.CKVAL) IFL(I)=1
    1 CONTINUE
      IF (LAI.GT.1) GO TO 3
      DO 2 I=1,5
    2 TVAL(I)=T*KVAL1(I)
      GO TO 5
    3 DO 4 I=1,5
    4 TVAL(I)=T*KVAL2(I)
    5 DO 6 I=1,5
      IF (IFL(I).EQ.1) TVAL(I)=THEVAL(I)/THEMAX(I)*TVAL(I)
    6 CONTINUE
      RETURN
      END

      SUBROUTINE MOIST(THEVAL,EVAP,TVAL,ZVAL,THEMIN)
C
C             SUBROUTINE TO CALCULATE THE SOIL CONTENT IN EACH LAYER.
C
      DIMENSION THEVAL(5),TVAL(5),ZVAL(5),THEMIN(5)
      ELEFT=EVAP
      T=0.0
      DO 7 I=1,5
      T=(T+TVAL(I))/ZVAL(I)
      THETA=THEVAL(I)
      ELEFT=ELEFT/ZVAL(I)
      IF (ELEFT.EQ.0.0) GO TO 2
      TCK=THETA-THEMIN(I)
      IF (TCK.LT.ELEFT) GO TO 1
      THETA=THETA-ELEFT
      ELEFT=0.0
      GO TO 2
    1 ELEFT=ELEFT-TCK
      THETA=THEMIN(I)
      ELEFT=ELEFT*ZVAL(I)
    2 TCK=THETA-THEMIN(I)
      IF (TCK.LT.T) GO TO 3
      THETA=THETA-T
      T=0.0
      GO TO 4
    3 T=(T-TCK)*ZVAL(I)
      THETA=THEMIN(I)
    4 THEVAL(I)=THETA
      IF (I.EQ.1) GO TO 7
      THETA=THEVAL(I-1)
      T=T/ZVAL(I-1)
      TCK=THETA-THEMIN(I-1)
      IF (TCK.LT.T) GO TO 5
      THETA=THETA-T
      T=0.0
      GO TO 6
    5 T=(T-TCK)*ZVAL(I-1)
      THETA=THEMIN(I-1)
```

```
 6    THEVAL(I-1)=THETA
 7    CONTINUE
      IF (THEVAL(1).GT.THEMIN(1)) GO TO 8
      IF (THEVAL(2).GT.THEMIN(2)) GO TO 8
      IF (THEVAL(3).GT.THEMIN(3)) GO TO 8
      IF (THEVAL(4).GT.THEMIN(4)) GO TO 8
      THEVAL(5)=THEVAL(5)-((EVAP+TVAL(1)+TVAL(2)+TVAL(3)+
     1TVAL(4))/ZVAL(5))
    8 RETURN
      END

$ENTRY
```

APPENDIX C

Manhattan Data

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KSU MODEL 3  ASHLAND CORN 1975
MAXIMUM AVAILABLE WATER (MM)....................  335.2800
THETA SUB V (15 BAR)............................    0.1300
THETA INITIAL IN 5 FT. PROFILE (MM)............  473.4299
THETA SUB 5 CM. LAYER...........................    0.2000
U (MM)..........................................   10.0000
ALPHA (P-T).....................................    1.3500
SOIL CONSTANT (MM DAY TO -1/2)..................    3.5000
X SUB 5 (INIT.WATER CONTENT IN 5 CM. LAYER,WT..    0.1190
PLANTING DATE...................................APR 28, 1975
FIELD/LOCATION..................................ASHLAND CORN VAR. XL72A
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KSL MODEL 3 ASHLAND CORN 1975

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)	STRESS DAY	BMTS
4	29	18.7	11.1	1.00	463.55	659.7	463.5	0.00	0.00	18.00	6.977	5.168	0.000	0.000	5.168	491.43		0.000
4	30	14.4	6.9	1.00	455.77	650.2	455.8	0.00	0.00	0.00	6.241	4.623	0.000	0.000	4.623	486.26		0.000
TOTALS										18.00	13.218	9.791	0.000	0.000	9.791			

Burroughs FORM B14110

KSU MODEL 3 ASHLAND CORN 1975

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)	STRESS DAY	BMTS
5	1	21.1	1.8	1.00	297.56	466.4	297.6	0.00	0.00	0.00	4.427	3.279	0.000	0.000	3.279	481.64		0.000
5	2	21.7	11.7	1.00	166.80	314.5	166.8	0.00	0.00	1.78	2.629	1.947	0.000	0.000	1.947	480.14		0.000
5	3	21.7	8.3	1.00	474.62	672.1	474.6	0.00	0.00	16.76	7.360	5.452	0.000	0.000	5.452	494.95		0.000
5	4	28.3	10.6	1.00	469.20	665.8	469.2	0.00	0.00	0.25	8.035	5.952	0.000	0.000	5.952	489.75		0.000
5	5	26.1	14.4	1.00	371.59	552.4	371.6	0.00	0.00	0.00	6.289	2.795	0.000	0.000	2.795	483.80		0.000
5	6	28.9	20.0	1.00	323.73	456.8	323.7	0.00	0.00	0.00	5.805	1.450	0.000	0.000	1.450	481.00		0.000
5	7	27.8	8.3	1.00	499.67	701.2	499.7	0.01	0.00	10.00	8.420	6.237	0.000	0.000	6.237	489.55		0.000
5	8	23.9	6.1	1.00	452.93	646.9	452.9	0.01	0.00	0.00	7.669	5.681	0.000	0.000	5.681	483.31		0.000
5	9	26.1	13.3	1.00	385.19	566.2	385.2	0.01	0.00	6.00	6.488	2.884	0.000	0.000	2.884	483.63		0.000
5	10	25.6	12.8	1.00	322.00	494.8	322.0	0.02	0.01	0.00	5.377	1.450	0.000	0.000	1.450	480.75		0.000
5	11	23.3	11.7	1.00	340.51	516.3	340.5	0.02	0.01	1.27	5.488	1.112	0.000	0.000	1.112	480.57		0.000
5	12	21.6	8.3	1.00	406.45	592.9	406.4	0.02	0.01	0.00	6.294	0.938	0.000	0.000	0.938	479.46		0.000
5	13	14.9	10.1	1.00	406.45	54.3	-57.2	0.03	0.01	7.62	0.000	0.000	0.000	0.000	0.000	486.14		0.000
5	14	22.2	7.9	1.00	390.52	574.4	390.5	0.03	0.01	5.08	6.068	4.510	0.000	0.000	4.510	491.22		0.000
5	15	20.7	3.8	1.00	506.65	709.3	506.6	0.03	0.01	0.00	7.569	3.364	0.000	0.000	3.364	486.71		0.000
5	16	23.4	3.1	1.00	492.36	692.7	492.4	0.04	0.01	0.00	7.632	1.450	0.000	0.000	1.450	483.34		0.000
5	17	25.0	3.9	1.00	510.00	713.2	510.0	0.04	0.01	0.00	8.118	1.112	0.000	0.000	1.112	481.89		0.000
5	18	28.1	11.9	1.00	464.55	660.4	464.6	0.05	0.02	0.00	7.979	0.938	0.000	0.000	0.938	480.78		0.000
5	19	27.6	13.3	1.00	452.85	646.3	452.8	0.05	0.02	0.00	7.938	0.826	0.000	0.000	0.826	479.84		0.000
5	20	24.6	19.8	1.00	280.86	447.0	280.9	0.05	0.02	0.00	4.771	0.747	0.000	0.000	0.747	479.02		0.000
5	21	28.0	14.9	1.00	450.52	644.1	450.5	0.06	0.02	0.00	7.326	0.687	0.000	0.000	0.687	478.27		0.000
5	22	22.1	10.0	1.00	259.51	422.2	259.5	0.06	0.02	0.00	4.253	0.639	0.000	0.000	0.639	477.58		0.000
5	23	24.5	10.0	1.00	371.76	552.6	371.8	0.06	0.02	16.51	6.043	4.477	0.000	0.000	4.477	493.45		0.000
5	24	24.8	15.1	1.00	414.11	601.8	414.1	0.07	0.02	0.00	6.913	5.120	0.000	0.000	5.120	488.98		0.000
5	25	19.1	11.2	1.00	344.38	520.8	344.4	0.07	0.02	8.64	5.213	3.862	0.000	0.000	3.862	492.50		0.000
5	26	25.6	4.9	1.00	403.35	589.3	403.3	0.07	0.02	0.00	6.504	2.890	0.000	0.000	2.890	488.63		0.000
5	27	22.1	7.8	1.00	374.60	555.9	374.6	0.08	0.03	0.00	5.829	1.450	0.000	0.000	1.450	485.74		0.000
5	28	18.1	14.0	1.00	69.70	201.7	69.7	0.14	0.05	10.67	1.054	0.781	0.000	0.000	0.781	494.96		0.000
5	29	18.1	14.5	1.00	27.78	153.0	27.8	0.19	0.06	1.52	0.421	0.312	0.000	0.000	0.312	495.70		0.000
5	30	17.3	10.5	1.00	237.99	397.2	238.0	0.24	0.08	5.08	3.491	2.586	0.000	0.000	2.586	500.47		0.000
5	31	20.1	3.8	1.00	357.81	536.4	357.8	0.30	0.10	0.00	5.296	3.923	0.000	0.000	3.923	497.88		0.000
TOTALS										91.18	177.220	78.851	0.000	0.000	78.851			

KSU MODEL 3 ASHLAND CORN 1975

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)	STRESS DAY	BMTS
6	1	19.1	6.8	1.00	155.29	347.6	195.3	0.37	0.12	0.00	2.890	2.141	0.000	0.000	2.141	493.96		0.000
6	2	23.6	3.3	0.97	495.98	715.2	511.7	0.45	0.15	3.81	8.176	3.522	0.317	0.000	3.839	495.63		0.000
6	3	26.6	10.0	0.93	432.92	660.2	464.4	0.55	0.18	35.56	7.762	5.360	0.662	0.000	6.022	527.35		0.000
6	4	27.9	17.5	0.90	272.76	474.1	304.2	0.65	0.22	0.00	5.334	3.543	0.694	0.000	4.237	521.33		0.000
6	5	30.6	13.6	0.88	469.48	738.5	531.8	0.69	0.23	0.00	9.486	6.203	1.399	0.000	7.603	517.09		0.000
6	6	30.3	13.7	0.87	372.56	620.6	430.3	0.74	0.25	0.00	7.651	2.944	1.293	0.000	4.237	509.49		0.000
6	7	26.9	16.9	0.85	444.67	726.7	521.6	0.78	0.26	9.65	9.012	1.450	1.674	0.000	3.124	514.90		0.000
6	8	24.9	17.5	0.84	68.54	215.6	81.7	0.82	0.27	55.89	1.379	0.857	0.279	0.000	1.137	567.67		0.000
6	9	24.4	16.3	0.82	286.96	527.3	350.0	0.88	0.29	0.00	5.842	3.548	1.325	0.000	4.873	566.53		0.000
6	10	17.0	13.9	0.82	280.96	99.0	-18.7	0.94	0.31	0.00	0.000	0.000	0.000	0.000	0.000	561.66		0.000
6	11	23.7	11.0	0.77	387.61	702.9	501.1	1.03	0.34	36.83	8.095	4.638	2.309	0.000	6.947	598.49		0.000
6	12	26.9	10.0	0.75	408.42	756.0	546.8	1.12	0.37	0.00	9.176	5.076	2.925	0.000	8.001	591.54		0.000
6	13	32.1	14.2	0.71	330.03	658.6	463.0	1.24	0.41	0.00	8.430	4.451	3.049	0.000	7.500	583.54		0.000
6	14	29.1	20.0	0.67	156.69	392.5	233.9	1.40	0.47	0.00	4.205	1.252	1.749	0.000	3.000	576.04		0.000
6	15	27.8	11.0	0.62	328.02	735.7	529.4	1.60	0.53	0.00	9.024	1.450	4.882	0.000	6.332	573.04		0.000
6	16	24.1	17.3	0.62	328.02	113.0	-6.6	1.75	0.58	0.00	0.000	0.000	0.000	0.000	0.000	566.71		0.000
6	17	26.3	16.5	0.54	189.45	527.7	350.3	1.95	0.65	19.05	6.148	2.463	3.685	0.000	6.148	585.76		0.000
6	18	28.0	17.2	0.50	63.79	267.7	126.5	2.13	0.71	0.00	2.219	0.829	1.390	0.000	2.219	579.61		0.000
6	19	30.0	23.2	0.46	143.22	476.8	308.2	2.34	0.78	0.00	5.672	1.952	3.720	0.000	5.672	577.39		0.000
6	20	30.3	23.3	0.45	175.36	569.5	396.3	2.40	0.80	0.00	7.180	2.414	4.766	0.000	7.180	571.72		0.000
6	21	26.8	19.5	0.42	186.92	631.8	439.9	2.57	0.86	0.00	7.863	2.475	5.389	0.000	7.863	564.54		0.000
6	22	27.8	16.0	0.41	140.81	521.0	344.6	2.67	0.89	76.20	5.997	1.816	4.182	0.000	5.997	632.87		0.000
6	23	29.0	17.9	0.39	166.16	613.7	424.4	2.78	0.93	1.52	7.554	2.191	5.363	0.000	7.554	628.40		0.000
6	24	32.2	19.7	0.38	153.63	594.6	407.9	2.88	0.96	0.00	7.599	2.120	5.479	0.000	7.599	620.84		0.000
6	25	31.2	20.3	0.37	170.82	655.9	460.7	2.92	0.97	0.00	8.501	2.335	6.166	0.000	8.501	613.24		0.000
6	26	30.0	21.5	0.36	124.40	580.1	347.4	3.01	1.00	0.00	6.351	1.684	4.666	0.000	6.351	604.74		0.000
6	27	29.2	20.6	0.34	92.60	491.2	272.0	3.14	1.00	0.00	4.908	1.237	3.670	0.000	4.908	598.39		0.000
6	28	32.8	21.0	0.32	139.46	678.6	431.0	3.27	1.00	0.00	8.127	1.169	6.179	0.000	7.348	593.48		0.000
6	29	32.2	20.1	0.31	112.62	600.4	364.6	3.39	1.00	0.00	6.804	1.450	5.247	0.000	6.697	586.13		0.000
6	30	30.8	20.5	0.29	98.23	564.9	334.5	3.52	1.00	0.00	6.152	1.112	4.814	0.000	5.926	579.44		0.000
TOTALS										238.51	187.537	71.683	87.273	0.000	158.956			

KSU MODEL 3 ASHLAND CORN 1975

MO	DAY	MAX TEMP (C)	MIN TEMP (C)	TAU	RNS RAD. (LYS)	SOLAR RAD (LYS)	NET RAD (LYS)	LEAF AREA	COVER	RAIN (MM)	PCT. EVAP (MM)	SOIL EVAP (MM)	TRAN EVAP (MM)	A EVAP (MM)	TOTAL EVAP (MM)	THETA (MM)	STRESS DAY	BMTS
7	1	32.2	21.4	0.28	101.91	600.9	365.1	3.65	1.00	0.00	6.847	0.938	5.431	0.000	6.369	573.51		0.000
7	2	31.3	18.2	0.27	107.37	647.5	404.6	3.78	1.00	0.00	7.413	0.826	5.956	0.000	6.782	567.14		0.000
7	3	33.3	18.8	0.25	98.63	631.4	390.9	3.91	1.00	0.00	7.352	0.747	5.978	0.598	7.323	560.36		0.000
7	4	34.1	13.8	0.24	115.16	734.4	478.3	4.03	1.00	0.00	9.380	0.687	7.461	0.746	8.894	553.04		0.000
7	5	34.9	20.1	0.23	103.43	703.2	451.8	4.16	1.00	0.00	8.704	0.639	7.228	0.723	8.590	544.14		0.000
7	6	34.8	20.0	0.22	92.68	672.6	425.9	4.29	1.00	0.00	8.191	0.601	6.870	0.687	8.158	535.55		0.000
7	7	35.0	16.0	0.21	77.70	613.3	375.6	4.42	1.00	0.00	7.128	0.568	6.035	0.604	7.207	527.39		0.000
7	8	34.9	20.0	0.20	85.46	682.8	434.5	4.55	1.00	0.00	8.367	0.540	7.148	0.715	8.403	520.19		0.000
7	9	29.9	19.3	0.19	54.71	515.4	292.6	4.68	1.00	0.00	5.295	0.516	4.561	0.000	5.078	511.78		0.000
7	10	29.5	15.4	0.18	87.32	734.1	478.0	4.74	1.00	0.00	8.475	0.495	7.329	0.000	7.824	506.71		0.000
7	11	27.0	14.8	0.18	85.49	726.6	471.7	4.76	1.00	0.00	8.088	0.476	7.002	0.000	7.478	498.88		0.000
7	12	25.3	10.5	0.18	80.43	691.6	442.0	4.75	1.00	0.00	7.279	0.460	6.297	0.000	6.757	491.40		0.000
7	13	23.1	8.8	0.18	78.59	673.8	426.9	4.72	1.00	0.00	7.237	0.445	6.250	0.000	6.695	484.65		0.000
7	14	31.0	12.2	0.19	72.67	630.5	390.2	4.69	1.00	0.00	6.954	0.431	5.995	0.000	6.426	477.95		0.000
7	15	33.7	20.4	0.19	82.27	683.2	434.9	4.65	1.00	0.00	8.269	0.418	7.110	0.711	8.239	471.53		0.000
7	16	34.7	21.8	0.19	77.98	647.1	404.3	4.60	1.00	0.00	7.821	0.407	6.703	0.670	7.781	463.29		0.000
7	17	34.9	23.4	0.20	81.73	662.3	417.1	4.56	1.00	0.00	8.141	0.396	6.959	0.696	8.051	455.51		0.000
7	18	35.0	24.9	0.20	75.88	616.6	378.4	4.50	1.00	0.00	7.437	0.387	6.332	0.633	7.352	447.45		0.000
7	19	35.0	22.7	0.20	82.73	647.5	404.6	4.45	1.00	0.00	7.883	0.377	6.689	0.669	7.735	440.10		0.000
7	20	33.0	21.7	0.21	70.41	568.6	337.7	4.40	1.00	2.54	6.401	0.369	5.412	0.541	6.322	434.91		0.000
7	21	33.0	21.0	0.21	71.31	564.4	334.1	4.34	1.00	0.00	6.316	0.361	5.317	0.532	6.210	428.58		0.000
7	22	35.8	21.5	0.22	80.90	605.4	368.9	4.27	1.00	0.00	7.222	0.354	6.048	0.605	7.007	422.37		0.000
7	23	34.8	22.2	0.22	57.39	473.0	256.6	4.22	1.00	0.00	4.978	0.347	4.154	0.415	4.916	415.37		0.000
7	24	31.0	18.8	0.23	108.77	722.1	467.9	4.12	1.00	0.00	8.562	0.340	7.087	0.000	7.427	410.45		0.000
7	25	29.2	10.0	0.24	106.26	690.8	441.3	4.03	1.00	0.00	7.624	0.334	6.265	0.000	6.598	403.02		0.000
7	26	33.8	15.5	0.25	102.60	659.4	414.7	3.96	1.00	0.00	7.744	0.328	6.324	0.632	7.285	396.43		0.000
7	27	38.0	19.3	0.26	104.93	653.3	409.5	3.87	1.00	0.00	8.158	0.322	6.609	0.661	7.593	389.14		0.000
7	28	37.8	19.2	0.27	110.47	659.4	414.7	3.77	1.00	0.00	8.238	0.317	6.612	0.661	7.590	381.55		0.000
7	29	36.3	18.8	0.27	89.08	552.6	324.1	3.69	1.00	2.29	6.315	0.312	5.030	0.503	5.844	376.25		0.000
7	30	33.8	21.2	0.28	91.77	553.6	325.0	3.62	1.00	0.00	6.206	0.307	4.908	0.491	5.705	370.40		0.000
7	31	32.6	22.0	0.29	108.54	608.0	371.1	3.53	1.00	0.00	7.009	0.302	5.491	0.000	5.793	364.70		0.000
TOTALS										4.83	230.732	14.346	192.593	12.493	219.432			

KSU MODEL 3 ASHLAND CORN 1975

MO	DAY	MAX TEMP (C)	MIN TEMP (C)	TAU	FNS RAD. (LYS)	SOLAR RAD (LYS)	NET RAD (LYS)	LEAF AREA	COVER	RAIN (MM)	PCT. EVAP (MM)	SOIL EVAP (MM)	TRAN EVAP (MM)	A EVAP (MM)	TOTAL EVAP (MM)	THETA (MM)	STRESS DAY	BPTS
8	1	32.9	22.0	0.30	75.84	469.1	253.3	3.47	1.00	0.00	4.796	0.298	3.732	0.000	4.030	358.90		0.000
8	2	30.6	21.3	0.31	98.46	540.1	313.9	3.35	1.00	0.00	5.774	0.294	4.432	0.000	4.726	354.87		0.000
8	3	33.3	11.6	0.33	134.41	666.3	410.5	3.24	1.00	0.00	7.504	0.290	5.684	0.568	6.543	350.15		0.000
8	4	36.1	13.7	0.34	142.47	672.5	415.3	3.12	1.00	0.00	7.912	0.286	5.902	0.590	6.778	343.61		0.000
8	5	35.1	18.9	0.36	146.26	591.6	405.3	2.99	1.00	0.00	7.790	0.282	5.707	0.571	6.560	336.83		0.000
8	6	32.2	20.7	0.39	140.45	550.6	370.0	2.86	1.00	0.00	6.921	0.278	4.975	0.000	5.253	330.27		0.000
8	7	34.9	21.0	0.40	169.15	607.2	418.8	2.70	1.00	0.00	8.095	0.275	5.673	0.567	6.515	325.01		0.000
8	8	37.3	22.8	0.27	111.93	602.3	414.5	2.50	1.00	0.00	8.304	0.272	5.618	0.562	6.452	318.50		0.000
8	9	37.4	23.0	0.27	106.28	576.0	393.6	2.30	1.00	0.00	7.901	0.268	5.139	0.514	5.921	312.05		0.000
8	10	38.3	20.8	0.27	110.69	597.0	410.0	2.11	1.00	0.00	8.246	0.265	5.142	0.514	5.922	306.12		0.000
8	11	40.1	23.0	0.27	119.78	636.1	443.6	1.90	1.00	0.00	9.201	0.262	5.443	0.544	6.250	300.20		0.000
8	12	38.0	24.4	0.27	110.09	554.4	407.7	1.75	0.40	43.18	8.290	1.658	4.337	0.434	6.429	337.13		0.000
8	13	25.2	19.2	0.27	7.41	152.6	27.4	1.55	0.40	22.86	0.469	0.094	0.217	0.000	0.311	353.56		0.000
8	14	27.4	19.9	0.27	58.68	373.2	217.3	1.36	0.40	0.00	3.825	0.765	1.540	0.000	2.305	353.25		0.000
8	15	29.4	18.3	0.27	87.13	495.6	322.7	1.23	0.40	0.00	5.782	1.156	2.071	0.000	3.227	350.95		0.000
8	16	33.9	17.5	0.27	98.42	544.2	364.5	1.06	0.40	0.00	6.869	1.374	2.037	0.204	3.615	347.72		0.000
8	17	29.2	19.1	0.27	56.87	365.4	210.6	0.91	0.40	23.37	3.777	0.755	0.902	0.000	1.657	367.48		0.000
8	18	30.3	18.3	0.27	98.77	545.7	365.8	0.76	0.40	0.00	6.626	1.325	1.175	0.000	2.501	365.82		0.000
8	19	30.2	18.6	0.27	101.16	556.0	374.7	0.62	0.40	0.00	6.786	1.357	0.793	0.000	2.150	363.32		0.000
8	20	35.6	24.7	0.27	81.41	471.0	301.5	0.46	0.40	0.00	5.964	1.193	0.259	0.026	1.478	361.17		0.000
8	21	35.3	24.4	0.27	105.74	575.7	391.6	0.36	0.40	0.00	7.710	1.542	0.000	0.000	1.542	359.69		0.000
8	22	36.1	25.0	0.27	109.90	593.6	407.1	0.23	0.40	0.00	8.109	1.622	0.000	0.000	1.622	358.15		0.000
8	23	36.1	24.8	0.27	111.62	601.0	413.4	0.14	0.40	0.00	8.229	1.646	0.000	0.000	1.646	356.53		0.000
8	24	36.6	26.0	0.27	102.00	559.6	377.8	0.05	0.40	0.00	7.601	0.912	0.000	0.000	0.912	354.88		0.000
8	25	20.7	15.8	0.27	102.00	9.6	-95.7	0.00	0.40	16.51	0.000	0.000	0.000	0.000	0.000	370.48		0.000
8	26	29.8	12.3	0.27	60.24	379.9	223.1	0.00	0.40	0.00	3.928	0.786	0.000	0.000	0.786	370.48		0.000
8	27	33.3	19.5	0.27	63.70	394.8	235.9	0.00	0.40	0.00	4.449	0.890	0.000	0.000	0.890	369.69		0.000
8	28	27.1	20.5	0.27	23.93	223.7	88.6	0.00	0.40	10.67	1.558	0.312	0.000	0.000	0.312	379.47		0.000
8	29	29.1	13.3	0.27	104.37	569.8	386.6	0.00	0.40	7.11	6.901	1.380	0.000	0.000	1.380	386.27		0.000
8	30	32.2	19.0	0.27	92.98	520.8	344.4	0.00	0.40	0.00	6.398	1.280	0.000	0.000	1.280	384.89		0.000
8	31	33.3	21.1	0.27	86.29	492.0	315.6	0.00	0.40	0.00	6.065	1.213	0.000	0.000	1.213	383.61		0.000
TOTALS										123.70	191.780	24.329	70.780	5.094	100.204			

KSU MODEL 3 ASHLAND CORN 1975

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)	STRESS DAY	BPTS
9	1	38.3	19.3	0.27	105.39	574.2	390.4	0.00	0.40	0.00	7.804	1.561	0.000	0.000	1.561	382.40		0.000
9	2	35.2	22.0	0.27	99.79	550.1	369.6	0.00	0.40	0.00	7.199	1.440	0.000	0.000	1.440	380.83		0.000
9	3	32.3	26.2	0.27	65.86	404.1	243.9	0.00	0.40	0.00	4.668	0.934	0.000	0.000	0.934	379.40		0.000
9	4	30.3	20.2	0.27	77.95	456.1	288.7	0.00	0.40	0.00	5.269	1.054	0.000	0.000	1.054	378.46		0.000
9	5	21.3	18.8	0.27	42.62	304.1	157.8	0.00	0.40	64.77	2.557	0.511	0.000	0.000	0.511	442.18		0.000
9	6	25.2	12.2	0.27	104.58	570.7	387.3	0.00	0.40	0.00	6.418	1.284	0.000	0.000	1.284	441.67		0.000
9	7	31.0	16.0	0.27	100.75	554.2	373.1	0.00	0.40	0.00	6.753	1.351	0.000	0.000	1.351	440.38		0.000
9	8	30.0	16.9	0.27	80.27	466.1	297.3	0.00	0.40	0.00	5.335	1.067	0.000	0.000	1.067	439.03		0.000
9	9	30.6	17.2	0.27	48.78	330.6	180.7	0.00	0.40	0.00	3.270	0.654	0.000	0.000	0.654	437.96		0.000
TOTALS										64.77	49.271	9.854	0.000	0.000	9.854			

Burroughs FORM H14110

KSL MODEL 3 ASHLAND CCRN 1975

		THETA VALLES					TRANSPIRATION							
MCNTH	DAY	LAYER 1	LAYER 2	LAYER 3	LAYER 4	LAYER 5	LAYER 1	LAYER 2	LAYER 3	LAYER 4	LAYER 5	RUNOFF	DRAINAGE	THETA
		0-5CM	5-30CM	30-60CM	60-90CM	90-180CM	0-5CM	5-30CM	30-60CM	60-90CM	90-180CM			0-150CM
4	29	0.3966	0.3592	C.3533	0.3650	0.268C	C.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	485.9314
4	30	0.3042	0.3592	0.3533	0.3650	0.2680	0.0000	0.0000	0.0000	0.0000	0.000C	0.0000	0.0000	481.3081

KSU MODEL 3 ASHLAND CORN 1975

MONTH	DAY	THETA VALUES LAYER 1 0-5CM	LAYER 2 5-30CM	LAYER 3 30-60CM	LAYER 4 60-90CM	LAYER 5 90-180CM	TRANSPIRATION LAYER 1 0-5CM	LAYER 2 5-30CM	LAYER 3 30-60CM	LAYER 4 60-90CM	LAYER 5 90-180CM	RUNOFF	DRAINAGE	THETA 0-150CM
5	1	0.2336	0.3500	0.3577	0.3533	0.2730	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	476.5291
5	2	0.2352	0.3500	0.3577	0.3533	0.2730	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	476.3616
5	3	0.3910	0.3641	0.3500	0.3577	0.2741	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	487.3362
5	4	0.2769	0.3641	0.3500	0.3577	0.2741	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	481.6340
5	5	0.2210	0.3500	0.3617	0.3500	0.2767	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	478.0723
5	6	0.1920	0.3500	0.3617	0.3500	0.2767	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	476.6223
5	7	0.2673	0.3500	0.3500	0.3617	0.2767	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	480.3850
5	8	0.1537	0.3500	0.3500	0.3617	0.2767	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	474.7046
5	9	0.2160	0.3500	0.3500	0.3500	0.2806	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	476.6467
5	10	0.1870	0.3500	0.3500	0.3500	0.2806	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	475.1970
5	11	0.1901	0.3500	0.3500	0.3500	0.2806	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	475.3547
5	12	0.1714	0.3500	0.3500	0.3500	0.2806	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	474.4167
5	13	0.3238	0.3500	0.3500	0.3500	0.2806	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	482.0369
5	14	0.3352	0.3500	0.3500	0.3500	0.2806	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	482.6069
5	15	0.2679	0.3500	0.3500	0.3500	0.2806	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	479.2429
5	16	0.2349	0.3500	0.3500	0.3500	0.2806	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	477.7932
5	17	0.2167	0.3500	0.3500	0.3500	0.2806	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	476.6809
5	18	0.1979	0.3500	0.3500	0.3500	0.2806	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	475.7429
5	19	0.1814	0.3500	0.3500	0.3500	0.2806	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	474.9167
5	20	0.1664	0.3500	0.3500	0.3500	0.2806	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	474.1697
5	21	0.1527	0.3500	0.3500	0.3500	0.2806	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	473.4829
5	22	0.1399	0.3500	0.3500	0.3500	0.2806	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	472.8435
5	23	0.3806	0.3500	0.3500	0.3500	0.2806	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	484.8770
5	24	0.2782	0.3500	0.3500	0.3500	0.2806	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	479.7566
5	25	0.3737	0.3500	0.3500	0.3500	0.2806	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	484.5349
5	26	0.3159	0.3500	0.3500	0.3500	0.2806	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	481.6443
5	27	0.2869	0.3500	0.3500	0.3500	0.2806	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	480.1946
5	28	0.4844	0.3501	0.3500	0.3500	0.2806	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	490.0837
5	29	0.4933	0.3530	0.3500	0.3500	0.2806	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	491.2917
5	30	0.4483	0.3721	0.3500	0.3500	0.2806	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	493.7859
5	31	0.3698	0.3721	0.3500	0.3500	0.2806	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	489.8630

KSU MODEL 3 ASHLAND CORN 1975

MONTH	DAY	THETA VALUES LAYER 1 0-5CM	LAYER 2 5-30CM	LAYER 3 30-60CM	LAYER 4 60-90CM	LAYER 5 90-180CM	TRANSPIRATION LAYER 1 0-5CM	LAYER 2 5-30CM	LAYER 3 30-60CM	LAYER 4 60-90CM	LAYER 5 90-180CM	RUNOFF	DRAINAGE	THETA 0-150CM
6	1	0.3072	0.3540	0.3684	0.3500	0.2806	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	487.7222
6	2	0.3123	0.3533	0.3680	0.3500	0.2806	0.0317	0.1584	0.1267	0.0000	0.0000	0.0000	0.0000	487.6934
6	3	0.3915	0.4534	0.3519	0.3680	0.2806	0.0662	0.3311	0.2649	0.0000	0.0000	0.0000	0.0000	517.2312
6	4	0.3192	0.4520	0.3510	0.3680	0.2806	0.0694	0.3470	0.2776	0.0000	0.0000	0.0000	0.0000	512.9941
6	5	0.1924	0.3472	0.4331	0.3510	0.2866	0.1399	0.6997	0.5598	0.0000	0.0000	0.0000	0.0000	503.5923
6	6	0.1309	0.3446	0.4314	0.3510	0.2366	0.1293	0.6463	0.5170	0.0000	0.0000	0.0000	0.0000	499.3555
6	7	0.2936	0.3413	0.3478	0.4314	0.2869	0.0626	0.8371	0.6697	0.0000	0.0000	0.0000	0.0000	505.8894
6	8	0.4923	0.4994	0.3474	0.4314	0.2869	0.0279	0.1395	0.1116	0.0000	0.0000	5.8891	0.0000	554.7537
6	9	0.4087	0.4968	0.3456	0.3500	0.3140	0.1325	0.6623	0.5299	0.0000	0.0000	0.0000	0.0000	541.7405
6	10	0.3500	0.3617	0.4751	0.3500	0.3140	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	543.8726
6	11	0.4049	0.4767	0.4731	0.3481	0.3135	0.1155	0.5773	0.5773	0.5773	0.4618	0.0000	0.0000	573.9092
6	12	0.3005	0.4738	0.3476	0.4688	0.3129	0.1462	0.7312	0.7312	0.7312	0.5850	0.0000	0.0000	566.1028
6	13	0.2084	0.3470	0.4482	0.4662	0.3122	0.1524	0.7622	0.7622	0.7622	0.6097	0.0000	0.0000	558.8064
6	14	0.1816	0.3452	0.4467	0.3485	0.3505	0.0874	0.4372	0.4372	0.4372	0.3497	0.0000	0.0000	544.2991
6	15	0.1478	0.3403	0.3459	0.4412	0.3495	0.2441	1.2205	1.2205	1.2205	0.9764	0.0000	0.0000	538.2927
6	16	0.1478	0.3403	0.3459	0.4412	0.3495	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	538.2927
6	17	0.4471	0.3424	0.3429	0.3469	0.3791	0.1843	0.9214	0.9214	0.9214	0.7371	0.0000	0.0000	542.3176
6	18	0.4291	0.3410	0.3417	0.3458	0.3787	0.0695	0.3475	0.3475	0.3475	0.2780	0.0000	0.0007	540.1919
6	19	0.3072	0.3531	0.3386	0.3427	0.3492	0.1860	0.9300	0.9300	0.9300	0.7440	0.0000	25.8697	517.5210
6	20	0.2542	0.3483	0.3346	0.3387	0.3481	0.2383	1.1914	1.1914	1.1914	0.9531	0.0000	0.0000	510.6589
6	21	0.1993	0.3429	0.3301	0.3342	0.3469	0.2694	1.3471	1.3471	1.3471	1.0777	0.0000	0.0000	503.1548
6	22	0.4595	0.4958	0.3267	0.3307	0.3460	0.2091	1.0455	1.0455	1.0455	0.8364	21.9002	0.0000	551.7356
6	23	0.4407	0.4905	0.3222	0.3263	0.3448	0.2682	1.3408	1.3408	1.3408	1.0726	0.0000	0.0000	546.0591
6	24	0.3528	0.3445	0.4347	0.3217	0.3436	0.2740	1.3698	1.3698	1.3698	1.0958	0.0000	0.0000	538.8252
6	25	0.2971	0.3469	0.4295	0.3165	0.3422	0.3083	1.5416	1.5416	1.5416	1.2332	0.0000	0.0000	530.7349
6	26	0.2588	0.3423	0.3461	0.3922	0.3412	0.2333	1.1666	1.1666	1.1666	0.9333	0.0000	0.0000	524.6953
6	27	0.2304	0.3386	0.3431	0.3851	0.3404	0.1835	0.9176	0.9176	0.9176	0.7341	0.0000	0.0000	520.0320
6	28	0.2008	0.3324	0.3379	0.3449	0.3520	0.3090	1.5448	1.5448	1.5448	1.2358	0.0000	0.0000	509.1829
6	29	0.1666	0.3272	0.3335	0.3405	0.3509	0.2624	1.3119	1.3119	1.3119	1.0495	0.0000	0.0000	502.8357
6	30	0.1395	0.3223	0.3295	0.3365	0.3489	0.2407	1.2034	1.2034	1.2034	0.9627	0.0000	0.7731	496.7151

Burroughs FORM K1410

KSU MODEL 3 ASHLAND CORN 1975

MONTH	DAY	THETA VALUES LAYER 1 0-5CM	LAYER 2 5-30CM	LAYER 3 30-60CM	LAYER 4 60-90CM	LAYER 5 90-180CM	TRANSPIRATION LAYER 1 0-5CM	LAYER 2 5-30CM	LAYER 3 30-60CM	LAYER 4 60-90CM	LAYER 5 90-180CM	RUNOFF	DRAINAGE	THETA 0-150CM
7	1	0.1300	0.3140	0.3250	0.3319	0.3477	0.2716	1.3578	1.3578	1.3578	1.0862	0.0000	0.0000	490.7080
7	2	0.1300	0.3043	0.3200	0.3270	0.3464	0.1106	1.4890	1.4890	1.4890	1.1912	0.0000	0.0000	484.5103
7	3	0.1300	0.2942	0.3145	0.3215	0.3449	0.1221	1.6440	1.6440	1.6440	1.3152	0.0000	0.0000	477.8320
7	4	0.1300	0.2827	0.3077	0.3147	0.3431	0.1524	2.0517	2.0517	2.0517	1.6413	0.0000	0.0000	469.7434
7	5	0.1300	0.2716	0.3011	0.3080	0.3413	0.1477	1.9876	1.9876	1.9876	1.5901	0.0000	0.0000	461.9333
7	6	0.1300	0.2610	0.2948	0.3017	0.3397	0.1404	1.8894	1.8894	1.8894	1.5115	0.0000	0.0000	454.5168
7	7	0.1300	0.2516	0.2853	0.2962	0.3382	0.1233	1.6597	1.6597	1.6597	1.3278	0.0000	0.0000	447.9612
7	8	0.1300	0.2410	0.2827	0.2896	0.3364	0.1460	1.9657	1.9657	1.9657	1.5726	0.0000	0.0000	440.3293
7	9	0.1300	0.2341	0.2789	0.2858	0.3354	0.0847	1.1404	1.1404	1.1404	0.9123	0.0000	0.0000	435.6992
7	10	0.1300	0.2242	0.2728	0.2797	0.3338	0.1361	1.8321	1.8321	1.8321	1.4657	0.0000	0.0000	428.5945
7	11	0.1300	0.2148	0.2670	0.2739	0.3322	0.1300	1.7505	1.7505	1.7505	1.4004	0.0000	0.0000	421.8027
7	12	0.1300	0.2062	0.2617	0.2687	0.3308	0.1170	1.5744	1.5744	1.5744	1.2595	0.0000	0.0000	415.6636
7	13	0.1300	0.1977	0.2565	0.2635	0.3295	0.1161	1.5625	1.5625	1.5625	1.2500	0.0000	0.0000	409.5818
7	14	0.1300	0.1895	0.2515	0.2585	0.3281	0.1113	1.4987	1.4997	1.4987	1.1990	0.0000	0.0000	403.7441
7	15	0.1300	0.1794	0.2450	0.2519	0.3264	0.1452	1.9553	1.9553	1.9553	1.5642	0.0000	0.0000	396.2717
7	16	0.1300	0.1699	0.2388	0.2458	0.3248	0.1369	1.8434	1.8434	1.8434	1.4747	0.0000	0.0000	389.2144
7	17	0.1300	0.1601	0.2325	0.2394	0.3230	0.1422	1.9138	1.9138	1.9138	1.5310	0.0000	0.0000	381.9138
7	18	0.1300	0.1511	0.2267	0.2336	0.3215	0.1294	1.7413	1.7413	1.7413	1.3931	0.0000	0.0000	375.2454
7	19	0.1300	0.1416	0.2205	0.2275	0.3199	0.1366	1.8395	1.8395	1.8395	1.4716	0.0000	0.0000	368.2317
7	20	0.1712	0.1357	0.2156	0.2225	0.3185	0.1106	1.4884	1.4884	1.4884	1.1907	0.0000	0.0000	365.0332
7	21	0.1581	0.1300	0.2106	0.2176	0.3172	0.2925	1.4623	1.4623	1.4623	1.1698	0.0000	0.0000	359.2129
7	22	0.1444	0.1300	0.2030	0.2121	0.3158	0.3327	0.6178	1.6633	1.6633	1.3307	0.0000	0.0000	353.6951
7	23	0.1329	0.1300	0.1977	0.2083	0.3147	0.2285	0.4243	1.1423	1.1423	0.9138	0.0000	0.0000	349.8020
7	24	0.1300	0.1300	0.1878	0.2024	0.3132	0.3544	0.6581	1.7719	1.7719	1.4175	0.0000	0.0000	343.9607
7	25	0.1300	0.1300	0.1791	0.1972	0.3118	0.1163	0.5817	1.5661	1.5661	1.2529	0.0000	0.0000	338.9612
7	26	0.1300	0.1300	0.1697	0.1914	0.3102	0.1292	0.6460	1.7392	1.7392	1.3914	0.0000	0.0000	333.4521
7	27	0.1300	0.1300	0.1598	0.1853	0.3086	0.1350	0.6751	1.8176	1.8176	1.4541	0.0000	0.0000	327.7153
7	28	0.1300	0.1300	0.1500	0.1792	0.3070	0.1351	0.6754	1.8184	1.8184	1.4547	0.0000	0.0000	321.9814
7	29	0.1675	0.1300	0.1437	0.1746	0.3058	0.1027	0.5137	1.3831	1.3831	1.1065	0.0000	0.0000	319.8391
7	30	0.1560	0.1300	0.1375	0.1701	0.3046	0.2699	0.5013	1.3496	1.3496	1.0797	0.0000	0.0000	315.3420
7	31	0.1444	0.1300	0.1313	0.1656	0.3034	0.2745	0.5099	1.3727	1.3727	1.0981	0.0000	0.0000	310.7778

KSU MODEL 3 ASHLAND CORN 1975

MONTH	DAY	THETA VALUES LAYER 1 0-5CM	LAYER 2 5-30CM	LAYER 3 30-60CM	LAYER 4 60-90CM	LAYER 5 90-180CM	TRANSPIRATION LAYER 1 0-5CM	LAYER 2 5-30CM	LAYER 3 30-60CM	LAYER 4 60-90CM	LAYER 5 90-180CM	RUNOFF	DRAINAGE	THETA 0-150CM
8	1	0.1347	0.1300	0.1300	0.1594	0.3025	0.1866	0.3466	0.9331	0.9331	0.7465	0.0000	0.0000	307.5828
8	2	0.1300	0.1300	0.1300	0.1521	0.3015	0.2216	0.4116	0.4116	1.1081	0.9865	0.0000	0.0000	304.5454
8	3	0.1300	0.1300	0.1300	0.1416	0.3002	0.1161	0.5806	0.5806	1.5632	1.2506	0.0000	0.0000	300.5813
8	4	0.1300	0.1300	0.1300	0.1309	0.2987	0.1206	0.6028	0.6028	1.6230	1.2984	0.0000	0.0000	296.4807
8	5	0.1300	0.1300	0.1300	0.1300	0.2941	0.1166	0.5830	0.5830	1.5695	1.2556	0.0000	0.0000	293.4688
8	6	0.1300	0.1300	0.1300	0.1300	0.2911	0.0924	0.4620	0.4620	0.4620	0.9950	0.0000	0.0000	291.6343
8	7	0.1300	0.1300	0.1300	0.1300	0.2873	0.1159	0.5795	0.5795	0.5795	1.2481	0.0000	0.0000	289.3828
8	8	0.1300	0.1300	0.1300	0.1300	0.2836	0.1148	0.5739	0.5739	0.5739	1.2361	0.0000	0.0000	287.1533
8	9	0.1300	0.1300	0.1300	0.1300	0.2802	0.1050	0.5249	0.5249	0.5249	1.1306	0.0000	0.0000	285.1006
8	10	0.1300	0.1300	0.1300	0.1300	0.2767	0.1050	0.5252	0.5252	0.5252	1.1312	0.0000	0.0000	283.0491
8	11	0.1300	0.1300	0.1300	0.1300	0.2731	0.1112	0.5560	0.5560	0.5560	1.1975	0.0000	0.0000	280.8899
8	12	0.4651	0.2269	0.1300	0.1300	0.2711	0.0886	0.4430	0.4430	0.4430	0.9542	0.0000	0.0000	320.6533
8	13	0.4979	0.3112	0.1300	0.1300	0.2710	0.0109	0.0543	0.0202	0.0202	0.0434	0.0000	0.0000	343.2986
8	14	0.4811	0.3096	0.1300	0.1300	0.2704	0.0770	0.3850	0.1430	0.1430	0.3080	0.0000	0.0000	341.6755
8	15	0.3249	0.3338	0.1300	0.1300	0.2695	0.1035	0.5177	0.1923	0.1923	0.4142	0.0000	0.0000	335.3652
8	16	0.2951	0.3315	0.1300	0.1300	0.2685	0.1120	0.5602	0.2081	0.2081	0.4482	0.0000	0.0000	336.7429
8	17	0.4831	0.3822	0.1300	0.1300	0.2684	0.0902	0.4508	0.1339	0.0000	0.0000	0.0000	0.0000	358.7275
8	18	0.4542	0.3799	0.1300	0.1300	0.2682	0.1175	0.5877	0.1746	0.0000	0.0000	0.0000	0.0000	356.5806
8	19	0.3213	0.3693	0.1545	0.1300	0.2682	0.0753	0.3565	0.1178	0.0000	0.0000	0.0000	0.0000	354.6296
8	20	0.2969	0.3687	0.1541	0.1300	0.2682	0.0285	0.1426	0.1141	0.0000	0.0000	0.0000	0.0000	353.1516
8	21	0.2660	0.3500	0.1657	0.1300	0.2682	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	351.6096
8	22	0.2336	0.3500	0.1697	0.1300	0.2682	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	349.9880
8	23	0.2007	0.3500	0.1697	0.1300	0.2682	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	348.3420
8	24	0.1324	0.3500	0.1697	0.1300	0.2682	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	347.4299
8	25	0.5000	0.3525	0.1697	0.1300	0.2682	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	363.9399
8	26	0.4843	0.3525	0.1657	0.1300	0.2682	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	363.1543
8	27	0.3322	0.3769	0.1718	0.1300	0.2682	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	362.2644
8	28	0.4938	0.3860	0.1718	0.1300	0.2682	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	372.6228
8	29	0.4724	0.4132	0.1718	0.1300	0.2682	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	378.3525
8	30	0.4468	0.4132	0.1718	0.1300	0.2682	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	377.0730
8	31	0.3257	0.3694	0.2245	0.1300	0.2682	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	375.8599

KSL MODEL 3 ASHLAND CORN 1975

MONTH	DAY	THETA VALUES LAYER 1	LAYER 2	LAYER 3	LAYER 4	LAYER 5	TRANSPIRATION LAYER 1	LAYER 2	LAYER 3	LAYER 4	LAYER 5	RUNOFF	DRAINAGE	THETA
		0-5CM	5-30CM	30-60CM	60-90CM	90-180CM	0-5CM	5-30CM	30-60CM	60-90CM	90-180CM			0-150CM
9	1	0.2945	0.3694	0.2245	0.1300	0.2682	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	374.2991
9	2	0.2657	0.3500	0.2406	0.1300	0.2682	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	372.8594
9	3	0.2471	0.3500	0.2406	0.1300	0.2682	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	371.9258
9	4	0.2260	0.3500	0.2406	0.1300	0.2682	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	370.8721
9	5	0.4858	0.5000	0.2406	0.1300	0.2682	0.0000	0.0000	0.0000	0.0000	0.0000	13.5692	0.0000	421.5613
9	6	0.4641	0.5000	0.2406	0.1300	0.2682	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	420.2778
9	7	0.3230	0.3728	0.3846	0.1300	0.2682	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	424.6323
9	8	0.3016	0.3728	0.3846	0.1300	0.2682	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	423.5652
9	9	0.2886	0.3500	0.3650	0.1646	0.2682	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	422.9111

CORE USAGE   OBJECT CODE= 22384 BYTES,ARRAY AREA= 684 BYTES,TOTAL AREA AVAILABLE= 174128 BYTES

DIAGNOSTICS   NUMBER OF ERRORS= 0, NUMBER OF WARNINGS= 0, NUMBER OF EXTENSIONS= 2

COMPILE TIME= 1.65 SEC,EXECUTION TIME= 3.94 SEC, WATFIV - JUL 1973 V1L4 20.05.42 WEDNESDAY 24 MAR 76

APPENDIX D

Scandia - 40% Depletion
Treatment Data

KSU MODEL 3 FOR SCANDIA CORN 1975

MAXIMUM AVAILABLE WATER (MM).....................	182.8800
THETA SUB V (15 BAR)..........................	0.1890
THETA INITIAL IN 5 FT. PROFILE (MM)............	477.8501
THETA SUB 5 CM. LAYER.........................	0.2470
U (MM)..	9.2200
ALPHA (P-T)...................................	1.3500
SOIL CONSTANT (MM DAY TO -1/2).................	2.7330
X SUB 5 (INIT.WATER CONTENT IN 5 CM. LAYER,WT..	0.1490
PLANTING DATE................................	MAY 1,1975
FIELD/LOCATION...............................	SCANDIA CORN NH3

KSU MODEL 3 FOR SCANDIA CORN 1975

MO	DAY	MAX TEMP (C)	MIN TEMP (C)	TAU	RNS RAD. (LYS)	SOLAR RAD (LYS)	NET RAD (LYS)	LEAF AREA	COVER	RAIN (MM)	PCT. EVAP (MM)	SOIL EVAP (MM)	TRAN EVAP (MM)	A EVAP (MM)	TOTAL EVAP (MM)	THETA (MM)	STRESS DAY	BMTS
5	1	18.9	1.7	1.00	424.35	613.7	424.4	0.00	0.00	0.00	6.090	4.511	0.000	0.000	4.511	477.85		0.000
5	2	17.2	8.3	1.00	424.35	613.7	424.4	0.00	0.00	0.51	6.145	4.552	0.000	0.000	4.552	473.85		0.000
5	3	20.0	5.0	1.00	424.35	613.7	424.4	0.00	0.00	0.00	6.310	2.904	0.000	0.000	2.804	469.30		0.000
5	4	26.1	8.3	1.00	424.35	613.7	424.4	0.00	0.00	0.00	6.996	1.132	0.000	0.000	1.132	466.49		0.000
5	5	26.7	11.7	1.00	424.35	613.7	424.4	0.00	0.00	0.00	7.150	0.869	0.000	0.000	0.869	465.36		0.000
5	6	26.7	17.8	1.00	455.08	649.4	455.1	0.00	0.00	0.00	7.868	0.732	0.000	0.000	0.732	464.49		0.000
5	7	23.9	5.0	1.00	432.62	623.3	432.6	0.00	0.00	0.00	6.815	0.645	0.000	0.000	0.645	463.76		0.000
5	8	27.8	3.3	1.00	492.53	692.9	492.5	0.00	0.00	0.00	8.120	0.583	0.000	0.000	0.583	463.11		0.000
5	9	26.1	5.0	1.00	159.92	306.5	159.9	0.00	0.00	0.00	2.598	0.536	0.000	0.000	0.536	462.53		0.000
5	10	26.1	10.6	1.00	159.92	306.5	159.9	0.00	0.00	0.00	2.662	0.499	0.000	0.000	0.499	461.99		0.000
5	11	22.8	9.4	1.00	159.92	306.5	159.9	0.00	0.00	0.00	2.532	0.469	0.000	0.000	0.469	461.49		0.000
5	12	22.8	8.3	1.00	159.92	306.5	159.9	0.00	0.00	0.00	2.519	0.444	0.000	0.000	0.444	461.03		0.000
5	13	15.6	12.2	1.00	159.92	306.5	159.9	0.00	0.00	8.13	2.302	0.422	0.000	0.000	0.422	468.71		0.000
5	14	27.2	10.0	1.00	402.66	588.5	402.7	0.00	0.00	0.00	6.785	0.403	0.000	0.000	0.403	468.29		0.000
5	15	26.7	4.4	1.00	514.99	719.0	515.0	0.00	0.00	0.00	8.407	0.387	0.000	0.000	0.387	467.89		0.000
5	16	23.9	5.0	1.00	475.66	673.3	475.7	0.02	0.01	0.00	7.493	0.372	0.000	0.000	0.372	467.50		0.000
5	17	27.2	7.2	1.00	475.66	673.3	475.7	0.04	0.01	0.00	7.919	0.359	0.000	0.000	0.359	467.13		0.000
5	18	29.4	11.7	1.00	475.66	673.3	475.7	0.05	0.02	0.00	8.300	0.347	0.000	0.000	0.347	466.77		0.000
5	19	33.9	7.8	1.00	475.66	673.3	475.7	0.07	0.02	0.00	8.624	0.336	0.000	0.000	0.336	466.42		0.000
5	20	34.4	20.6	1.00	447.59	640.7	447.6	0.09	0.03	0.00	8.591	0.327	0.000	0.000	0.327	466.09		0.000
5	21	32.8	13.3	1.00	425.13	614.6	425.1	0.11	0.04	0.00	7.776	0.318	0.000	0.000	0.318	465.76		0.000
5	22	28.3	18.9	1.00	187.29	338.3	187.3	0.13	0.04	0.00	3.320	0.309	0.000	0.000	0.309	465.44		0.000
5	23	27.2	15.6	1.00	447.59	640.7	447.6	0.15	0.05	0.00	7.721	0.302	0.000	0.000	0.302	465.13		0.000
5	24	28.9	9.4	1.00	421.34	610.2	421.3	0.17	0.06	0.00	7.234	0.295	0.000	0.000	0.295	464.83		0.000
5	25	27.2	11.7	1.00	421.34	610.2	421.3	0.20	0.07	5.84	7.150	0.288	0.000	0.000	0.288	470.37		0.000
5	26	22.2	8.3	1.00	421.34	610.2	421.3	0.23	0.08	0.00	6.585	0.282	0.000	0.000	0.282	470.09		0.000
5	27	30.0	5.6	1.00	421.34	610.2	421.3	0.25	0.08	33.53	7.218	5.346	0.000	0.000	5.346	503.33		0.000
5	28	24.4	13.3	1.00	245.31	405.7	245.3	0.28	0.09	0.00	4.044	2.996	0.000	0.000	2.996	497.99		0.000
5	29	22.2	13.9	1.00	245.31	101.2	-16.8	0.31	0.10	0.00	0.000	0.000	0.000	0.000	0.000	494.99		0.000
5	30	15.6	11.1	1.00	245.31	109.9	-9.3	0.33	0.11	0.00	0.000	0.000	0.000	0.000	0.000	494.99		0.000
5	31	19.4	5.0	1.00	170.42	318.7	170.4	0.35	0.12	0.00	2.512	1.861	0.000	0.000	1.861	494.99		0.000
TOTALS										48.01	177.786	32.726	0.000	0.000	32.726			

KSU MODEL 3 FOR SCANDIA CORN 1975

MO	DAY	MAX TEMP (C)	MIN TEMP (C)	TAU	RNS RAD. (LYS)	SOLAR RAD (LYS)	NET RAD (LYS)	LEAF AREA	CCVER	RAIN (MM)	POT. EVAP (MM)	SOIL EVAP (MM)	TRAN EVAP (MM)	A EVAP (MM)	TOTAL EVAP (MM)	THETA (MM)	STRESS DAY	BMTS
6	1	23.9	9.4	1.00	170.42	318.7	170.4	0.38	0.13	0.76	2.740	2.030	0.000	0.000	2.030	493.89		0.000
6	2	26.7	7.2	0.98	166.46	318.7	170.4	0.43	0.14	17.02	2.817	2.038	0.082	0.000	2.120	503.88		0.000
6	3	28.3	11.1	0.96	407.27	614.6	425.1	0.48	0.16	0.00	7.299	5.180	0.386	0.000	5.566	506.76		0.000
6	4	28.9	18.9	0.91	313.37	518.9	342.7	0.60	0.20	0.00	6.118	2.486	0.660	0.000	3.146	501.19		0.000
6	5	28.3	13.3	0.86	431.25	701.6	500.0	0.75	0.25	0.00	8.665	1.132	1.501	0.000	2.633	498.05		0.000
6	6	29.4	13.9	0.82	356.10	623.3	432.6	0.87	0.29	0.00	7.618	0.869	1.697	0.000	2.565	495.41		0.000
6	7	27.8	15.0	0.78	332.68	614.6	425.1	1.00	0.33	0.00	7.367	0.732	2.017	0.000	2.750	492.85		0.000
6	8	19.4	13.3	0.75	152.48	357.9	204.2	1.12	0.37	41.91	3.139	1.737	1.001	0.000	2.738	532.01		0.000
6	9	27.2	14.4	0.71	145.52	357.9	204.2	1.24	0.41	0.00	3.505	1.851	1.268	0.000	3.119	529.27		0.000
6	10	22.8	10.6	0.68	105.33	301.3	155.4	1.37	0.46	5.08	2.474	1.242	1.004	0.000	2.246	531.23		0.000
6	11	23.9	9.4	0.64	264.23	597.2	410.1	1.50	0.50	0.00	6.596	3.147	3.448	0.000	6.596	528.99		0.000
6	12	29.3	9.4	0.61	322.07	736.4	530.0	1.65	0.55	0.00	9.036	2.441	4.968	0.000	7.409	522.39		0.000
6	13	31.7	13.3	0.58	278.06	675.5	477.6	1.76	0.59	0.00	8.620	1.132	4.902	0.000	6.034	514.98		0.000
6	14	21.7	17.8	0.52	222.19	618.9	428.8	2.06	0.69	0.00	6.948	0.869	4.282	0.000	5.150	508.95		0.000
6	15	27.2	11.1	0.46	198.48	618.9	428.8	2.35	0.78	3.56	7.260	0.732	4.771	0.000	5.503	507.36		0.000
6	16	30.0	15.0	0.41	202.86	692.9	492.5	2.65	0.88	3.81	8.771	0.645	6.095	0.000	6.741	505.66		0.000
6	17	26.7	17.2	0.37	178.46	684.2	485.0	2.94	0.98	0.00	8.367	0.583	6.087	0.000	6.670	498.92		0.000
6	18	28.9	15.0	0.33	58.09	379.6	177.4	3.24	1.00	31.75	3.117	0.756	2.361	0.000	3.117	524.00		0.000
6	19	30.0	15.0	0.29	97.23	562.4	332.4	3.53	1.00	0.00	5.920	1.283	4.638	0.000	5.920	520.89		0.000
6	20	32.2	22.2	0.26	98.04	614.6	376.7	3.83	1.00	0.00	7.090	1.367	5.723	0.000	7.090	514.97		0.000
6	21	29.4	18.3	0.24	81.18	571.1	339.8	4.05	1.00	9.65	6.092	1.078	5.014	0.000	6.092	517.53		0.000
6	22	27.2	15.6	0.22	118.21	806.0	539.0	4.27	1.00	19.20	9.293	1.510	7.787	0.000	9.298	530.63		0.000
6	23	28.3	16.1	0.20	53.56	484.1	266.0	4.49	1.00	3.71	4.663	0.695	3.968	0.000	4.663	525.05		0.000
6	24	36.7	18.9	0.18	84.62	710.3	457.8	4.71	1.00	0.00	8.963	1.227	7.736	0.774	9.736	520.38		0.000
6	25	31.1	18.9	0.17	71.14	666.8	421.0	4.94	1.00	0.00	7.717	0.966	6.751	0.000	7.717	510.65		0.000
6	26	28.9	18.9	0.16	27.52	379.6	177.4	5.16	1.00	2.79	3.167	0.364	2.803	0.000	3.167	505.72		0.000
6	27	29.4	15.0	0.14	48.39	571.1	339.8	5.38	1.00	0.00	6.011	0.634	5.377	0.000	6.011	502.55		0.000
6	28	32.3	20.0	0.13	37.67	510.2	288.2	5.60	1.00	0.00	5.411	0.524	4.887	0.000	5.411	496.54		0.000
6	29	31.7	20.0	0.12	59.37	753.8	494.7	5.82	1.00	0.00	9.169	0.815	8.354	0.000	9.169	491.13		0.000
6	30	32.8	18.9	0.11	67.92	867.0	590.7	5.93	1.00	0.00	11.045	0.941	10.104	0.000	11.045	481.96		0.000
TOTALS										139.24	195.004	41.006	119.671	0.774	161.451			

KSU MODEL 3 FOR SCANDIA CORN 1975

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)	STRESS DAY	BMTS
7	1	32.8	20.0	0.11	13.86	318.7	125.8	6.04	1.00	0.00	2.362	0.193	2.169	0.000	2.362	470.91		0.000
7	2	32.2	18.3	0.11	63.13	875.7	598.1	6.15	1.00	0.00	11.085	0.867	10.219	0.000	11.085	468.55		0.000
7	3	33.3	17.8	0.10	33.62	562.4	332.4	6.26	1.00	0.00	6.229	0.467	5.762	0.576	6.805	457.47		0.000
7	4	33.3	18.3	0.10	37.36	614.6	376.7	6.31	1.00	0.00	7.074	0.520	6.554	0.655	7.729	450.66		0.000
7	5	35.0	18.9	0.10	43.31	701.6	450.5	6.39	1.00	0.00	8.646	0.616	8.031	0.803	9.449	442.93		0.000
7	6	35.6	20.6	0.09	42.64	701.6	450.5	6.43	1.00	0.00	8.761	0.369	8.146	0.815	9.329	433.48		0.000
7	7	33.3	17.8	0.09	38.93	666.8	421.0	6.49	1.00	0.00	7.888	0.668	7.348	0.735	8.750	424.15		0.000
7	8	33.9	17.8	0.09	39.30	675.5	428.3	6.51	1.00	0.00	8.079	0.674	7.530	0.753	8.957	415.40		0.000
7	9	33.9	17.2	0.09	18.03	405.7	199.5	6.55	1.00	36.60	3.756	0.251	3.504	0.350	4.106	443.05		0.000
7	10	27.2	16.1	0.09	42.69	736.4	480.0	6.59	1.00	36.00	8.299	0.547	7.752	0.000	8.299	474.94		0.000
7	11	28.3	14.4	0.09	39.82	704.5	452.9	6.62	1.00	0.00	7.885	0.514	7.372	0.000	7.885	466.64		0.000
7	12	25.6	13.3	0.09	39.36	704.5	452.9	6.65	1.00	0.00	7.577	0.488	7.089	0.000	7.577	458.76		0.000
7	13	26.9	11.1	0.09	38.70	704.5	452.9	6.68	1.00	0.00	7.831	0.498	7.333	0.000	7.831	451.18		0.000
7	14	31.1	8.3	0.09	36.15	666.8	421.0	6.68	1.00	0.00	7.396	0.471	6.925	0.000	7.396	443.35		0.000
7	15	33.9	17.8	0.09	37.42	684.2	435.7	6.68	1.00	0.00	8.218	0.523	7.695	0.770	8.988	435.95		0.000
7	16	34.4	20.6	0.09	36.93	675.5	428.3	6.67	1.00	0.00	8.222	0.525	7.696	0.770	8.991	426.96		0.000
7	17	33.3	21.1	0.09	52.18	875.7	598.1	6.64	1.00	23.50	11.355	0.734	10.622	1.062	12.418	441.47		0.000
7	18	35.0	22.8	0.09	26.63	527.6	302.9	6.62	1.00	23.50	5.904	0.384	5.519	0.552	6.456	452.55		0.000
7	19	40.0	20.6	0.09	36.50	659.1	413.6	6.61	1.00	0.00	8.482	0.555	7.928	0.793	9.275	446.10		0.000
7	20	30.6	19.4	0.09	36.64	659.1	413.6	6.60	1.00	4.80	7.548	0.495	7.053	0.000	7.548	441.62		0.000
7	21	32.2	18.9	0.09	22.44	466.7	251.3	6.58	1.00	0.00	4.667	0.309	4.359	0.000	4.667	434.07		0.000
7	22	35.0	19.4	0.09	36.06	632.0	391.4	6.50	1.00	0.00	7.530	0.514	7.016	0.702	8.232	429.41		0.000
7	23	33.3	20.0	0.09	41.13	692.9	443.1	6.48	1.00	25.00	8.376	0.576	7.800	0.780	9.156	446.17		0.000
7	24	28.3	13.9	0.10	42.43	692.9	443.1	6.40	1.00	25.00	7.856	0.557	7.298	0.000	7.856	462.02		0.000
7	25	31.1	11.7	0.10	42.55	684.2	435.7	6.35	1.00	0.00	7.760	0.551	7.198	0.000	7.760	454.16		0.000
7	26	35.0	14.4	0.10	28.69	510.2	288.2	6.30	1.00	0.00	5.435	0.401	5.034	0.503	5.939	446.40		0.000
7	27	37.8	17.8	0.10	59.22	858.3	583.3	6.25	1.00	0.00	11.520	0.866	10.654	1.065	12.586	440.46		0.000
7	28	36.7	18.3	0.10	42.81	658.1	413.6	6.20	1.00	0.00	8.078	0.619	7.459	0.746	8.824	427.38		0.000
7	29	35.0	18.3	0.11	46.17	684.2	435.7	6.14	1.00	9.50	8.345	0.655	7.690	0.769	9.114	428.55		0.000
7	30	34.4	18.9	0.11	44.06	649.4	406.2	6.08	1.00	9.50	7.746	0.622	7.123	0.712	8.458	428.94		0.000
7	31	32.8	21.1	0.11	25.43	440.5	229.1	6.02	1.00	0.00	4.320	0.355	3.965	0.000	4.320	420.48		0.000
TOTALS										193.40	234.231	16.393	217.845	13.911	248.148			

KSU MODEL 3 FOR SCANDIA CORN 1975

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)	STRESS DAY	BMTS
8	1	28.9	21.1	0.11	7.53	249.1	66.7	5.98	1.00	0.00	1.202	0.100	1.102	0.000	1.202	416.16		0.000
8	2	29.4	18.9	0.12	48.78	666.8	421.0	5.91	1.00	0.00	7.564	0.649	6.915	0.000	7.564	414.96		0.000
8	3	36.7	12.8	0.12	52.76	692.9	443.1	5.84	1.00	0.00	8.468	0.747	7.721	0.772	9.240	407.39		0.000
8	4	36.1	13.3	0.12	51.31	666.8	421.0	5.78	1.00	0.00	8.010	0.723	7.286	0.729	8.738	398.15		0.000
8	5	32.8	16.7	0.13	47.55	614.6	376.7	5.69	1.00	0.00	6.982	0.653	6.329	0.000	6.982	389.42		0.000
8	6	31.1	17.2	0.13	42.33	553.7	325.0	5.61	1.00	17.50	5.919	0.571	5.348	0.000	5.919	399.93		0.000
8	7	35.6	18.9	0.14	55.00	649.4	406.2	5.51	1.00	17.50	7.848	0.787	7.061	0.706	8.554	411.52		0.000
8	8	36.1	22.2	0.14	47.16	579.8	344.3	5.48	1.00	0.00	6.784	0.688	6.096	0.610	7.394	402.96		0.000
8	9	36.7	23.3	0.14	45.41	545.0	317.6	5.37	1.00	0.00	6.328	0.670	5.658	0.566	6.894	395.57		0.000
8	10	36.1	18.3	0.15	68.47	736.4	464.2	5.29	1.00	0.00	9.009	0.984	8.024	0.802	9.811	388.67		0.000
8	11	39.4	18.3	0.15	47.50	536.3	311.0	5.20	1.00	0.00	6.279	0.710	5.568	0.557	6.835	378.86		0.000
8	12	36.7	21.1	0.16	60.79	632.0	384.3	5.11	1.00	9.50	7.589	0.889	6.700	0.670	8.259	381.53		0.000
8	13	29.3	13.3	0.16	13.73	279.6	114.3	5.02	1.00	21.40	2.022	0.245	1.777	0.000	2.022	394.67		0.000
8	14	25.0	18.3	0.17	19.25	279.6	114.3	4.95	1.00	66.10	1.940	0.242	1.698	0.000	1.940	458.74		0.000
8	15	27.8	16.7	0.18	69.59	649.4	397.6	4.85	1.00	0.00	6.938	0.899	6.038	0.000	6.938	456.80		0.000
8	16	31.1	16.1	0.18	67.50	614.6	370.9	4.75	1.00	0.00	6.725	0.906	5.819	0.000	6.725	449.87		0.000
8	17	30.0	17.8	0.19	60.52	548.0	319.9	4.65	1.00	0.50	5.762	0.807	4.954	0.000	5.762	443.64		0.000
8	18	32.2	16.7	0.20	69.84	588.5	351.0	4.52	1.00	0.00	6.462	0.952	5.509	0.000	6.462	437.88		0.000
8	19	31.7	16.1	0.21	75.95	605.9	364.3	4.40	1.00	0.00	6.648	1.027	5.622	0.000	6.648	431.42		0.000
8	20	34.4	16.1	0.22	84.12	623.3	377.6	4.23	1.00	0.00	7.122	1.175	5.947	0.595	7.717	424.77		0.000
8	21	36.1	21.1	0.24	95.09	658.1	404.3	4.09	1.00	0.00	7.931	1.382	6.549	0.655	8.586	417.05		0.000
8	22	35.6	21.1	0.25	101.59	658.1	404.3	3.92	1.00	0.00	7.879	1.467	6.412	0.641	8.520	408.47		0.000
8	23	35.6	21.1	0.27	76.33	501.5	284.3	3.75	1.00	0.00	5.541	0.661	4.439	0.444	5.544	399.94		0.000
8	24	36.7	22.3	0.27	96.56	597.2	357.6	3.55	1.00	0.00	7.109	1.132	5.581	0.558	7.271	394.40		0.000
8	25	26.7	18.3	0.27	89.36	562.4	331.0	3.31	1.00	0.00	5.735	0.869	4.382	0.000	5.250	387.13		0.000
8	26	28.3	9.4	0.27	51.55	379.6	190.9	3.10	1.00	0.00	3.255	0.732	2.422	0.000	3.154	381.88		0.000
8	27	32.2	13.3	0.27	92.54	518.9	342.7	2.85	1.00	0.00	6.228	0.645	4.497	0.000	5.142	378.72		0.000
8	28	30.6	20.0	0.27	64.21	397.0	237.8	2.60	1.00	0.00	4.350	0.583	2.997	0.000	3.580	373.58		0.000
8	29	31.7	16.1	0.27	104.67	571.1	387.7	2.25	1.00	3.30	7.076	0.536	4.553	0.000	5.090	373.30		0.000
8	30	32.8	17.8	0.27	92.54	518.9	342.7	1.95	1.00	0.00	6.381	0.499	3.825	0.000	4.324	368.21		0.000
8	31	36.1	19.4	0.27	104.67	571.1	387.7	1.60	0.40	0.00	7.556	0.469	3.619	0.362	4.450	363.89		0.000
TOTALS										135.80	194.643	23.404	160.449	8.666	192.520			

KSU MODEL 3 FOR SCANDIA CORN 1975

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)	STRESS DAY	BMTS
9	1	37.3	15.6	0.27	110.74	597.2	410.1	1.10	0.40	0.00	8.029	0.444	2.500	0.250	3.194	359.44		0.000
9	2	35.0	17.2	0.27	96.59	536.3	357.7	0.60	0.40	0.00	6.821	0.422	0.736	0.074	1.232	356.24		0.000
9	3	29.4	18.9	0.27	74.32	440.5	275.3	0.20	0.40	0.00	4.946	0.403	0.000	0.000	0.403	355.01		0.000
9	4	31.1	15.6	0.27	58.14	370.9	215.4	0.00	0.40	0.00	3.896	0.387	0.000	0.000	0.387	354.61		0.000
9	5	23.9	15.6	0.27	80.41	466.7	297.8	0.00	0.40	11.20	4.922	0.984	0.000	0.000	0.984	365.42		0.000
TOTALS										11.20	28.615	2.639	3.237	0.324	6.200			

KSU MODEL 3 FOR SCANDIA CORN 1975

MONTH	DAY	THETA VALUES LAYER 1 0-5CM	LAYER 2 5-30CM	LAYER 3 30-60CM	LAYER 4 60-90CM	LAYER 5 90-180CM	TRANSPIRATION LAYER 1 0-5CM	LAYER 2 5-30CM	LAYER 3 30-60CM	LAYER 4 60-90CM	LAYER 5 90-180CM	RUNOFF	DRAINAGE	THETA 0-150CM
5	1	0.1890	0.2944	0.3098	0.3060	0.3090	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	29.7000	453.1887
5	2	0.1890	0.2782	0.3098	0.3060	0.3090	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	449.1467
5	3	0.1890	0.2670	0.3090	0.3068	0.3090	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	446.3423
5	4	0.1890	0.2624	0.3090	0.3068	0.3090	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	445.2102
5	5	0.1890	0.2590	0.3090	0.3068	0.3090	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	444.3416
5	6	0.1890	0.2560	0.3090	0.3068	0.3090	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	443.6091
5	7	0.1890	0.2535	0.3090	0.3068	0.3090	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	442.9641
5	8	0.1890	0.2511	0.3090	0.3068	0.3090	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	442.3806
5	9	0.1890	0.2490	0.3090	0.3068	0.3090	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	441.8442
5	10	0.1890	0.2470	0.3090	0.3068	0.3090	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	441.3452
5	11	0.1890	0.2451	0.3090	0.3068	0.3090	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	440.8762
5	12	0.1890	0.2433	0.3090	0.3068	0.3090	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	440.4329
5	13	0.3432	0.2433	0.3090	0.3068	0.3090	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	448.1409
5	14	0.3351	0.2433	0.3090	0.3068	0.3090	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	447.7378
5	15	0.3013	0.2486	0.3090	0.3068	0.3090	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	447.3511
5	16	0.2938	0.2486	0.3090	0.3068	0.3090	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	446.9792
5	17	0.2867	0.2486	0.3090	0.3068	0.3090	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	446.6204
5	18	0.2797	0.2486	0.3090	0.3068	0.3090	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	446.2732
5	19	0.2730	0.2486	0.3090	0.3068	0.3090	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	445.9368
5	20	0.2664	0.2486	0.3090	0.3068	0.3090	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	445.6101
5	21	0.2601	0.2486	0.3090	0.3068	0.3090	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	445.2922
5	22	0.2539	0.2486	0.3090	0.3068	0.3090	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	444.9827
5	23	0.2479	0.2486	0.3090	0.3068	0.3090	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	444.6809
5	24	0.2420	0.2486	0.3090	0.3068	0.3090	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	444.3862
5	25	0.3530	0.2486	0.3090	0.3068	0.3090	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	449.9382
5	26	0.3474	0.2486	0.3090	0.3068	0.3090	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	449.6563
5	27	0.3931	0.3521	0.3090	0.3068	0.3090	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	477.8398
5	28	0.3332	0.3521	0.3090	0.3068	0.3090	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	474.8440
5	29	0.3090	0.3138	0.3450	0.3068	0.3090	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	474.8440
5	30	0.3090	0.3138	0.3450	0.3068	0.3090	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	474.8440
5	31	0.2718	0.3090	0.3130	0.3428	0.3090	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	472.9832

KSU MODEL 3 FOR SCANDIA CORN 1975

MONTH	DAY	THETA VALUES LAYER 1 0-5CM	LAYER 2 5-30CM	LAYER 3 30-60CM	LAYER 4 60-90CM	LAYER 5 90-180CM	TRANSPIRATION LAYER 1 0-5CM	LAYER 2 5-30CM	LAYER 3 30-60CM	LAYER 4 60-90CM	LAYER 5 90-180CM	RUNOFF	DRAINAGE	THETA 0-150CM
6	1	0.2464	0.3090	0.3130	0.3428	0.3090	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	471.7131
6	2	0.4591	0.3262	0.3089	0.3130	0.3203	0.0082	0.0411	0.0329	0.0000	0.0000	0.0000	0.0000	483.2341
6	3	0.3547	0.3254	0.3084	0.3133	0.3203	0.0386	0.1931	0.1545	0.0000	0.0000	0.0000	0.0000	477.6682
6	4	0.2580	0.3169	0.3212	0.3090	0.3103	0.0660	0.3301	0.2641	0.0000	0.0000	0.0000	10.1364	467.3616
6	5	0.2323	0.3138	0.3192	0.3090	0.3103	0.1501	0.7503	0.6003	0.0000	0.0000	0.0000	0.0000	464.7290
6	6	0.2116	0.3056	0.3108	0.3192	0.3090	0.1697	0.8483	0.6787	0.0000	0.0000	0.0000	1.2078	461.3584
6	7	0.1929	0.3016	0.3081	0.3192	0.3090	0.2017	1.0087	0.8070	0.0000	0.0000	0.0000	0.0000	458.6086
6	8	0.4643	0.4068	0.3072	0.3082	0.3122	0.0500	0.2502	0.2502	0.2502	0.2002	0.0000	0.0000	496.8298
6	9	0.4260	0.4055	0.3062	0.3071	0.3119	0.0634	0.3169	0.3169	0.3169	0.2536	0.0000	0.0000	493.7959
6	10	0.3843	0.3314	0.3858	0.3063	0.3088	0.0502	0.2511	0.2511	0.2511	0.2009	0.0000	2.5994	494.9636
6	11	0.3184	0.3279	0.3829	0.3034	0.3080	0.1724	0.8620	0.8620	0.8620	0.6896	0.0000	0.0000	488.5979
6	12	0.2552	0.3059	0.3206	0.3732	0.3069	0.2484	1.2421	1.2421	1.2421	0.9937	0.0000	0.0000	481.5203
6	13	0.2277	0.3010	0.3166	0.3691	0.3058	0.2451	1.2255	1.2255	1.2255	0.9804	0.0000	0.0000	475.8130
6	14	0.2050	0.2967	0.3054	0.3130	0.3249	0.2141	1.0704	1.0704	1.0704	0.8563	0.0000	0.0000	464.9412
6	15	0.2578	0.2919	0.3015	0.3090	0.3238	0.2385	1.1927	1.1927	1.1927	0.9542	0.0000	0.0000	463.3159
6	16	0.3150	0.2859	0.2964	0.3039	0.3077	0.3048	1.5239	1.5239	1.5239	1.2191	0.0000	13.3453	451.8933
6	17	0.2973	0.2798	0.2913	0.2988	0.3063	0.3043	1.5216	1.5216	1.5216	1.2173	0.0000	0.0000	445.6292
6	18	0.4825	0.3639	0.2893	0.2969	0.3058	0.1181	0.5903	0.5903	0.5903	0.4722	0.0000	0.0000	474.4197
6	19	0.4522	0.3552	0.2855	0.2930	0.3047	0.2319	1.1594	1.1594	1.1594	0.9275	0.0000	0.0000	468.8086
6	20	0.2759	0.3319	0.3226	0.2882	0.3035	0.2861	1.4307	1.4307	1.4307	1.1446	0.0000	0.0000	462.1006
6	21	0.4424	0.3269	0.3184	0.2841	0.3024	0.2507	1.2536	1.2536	1.2536	1.0028	0.0000	0.0000	465.9922
6	22	0.4620	0.3665	0.3174	0.2870	0.3006	0.3894	1.9468	1.9468	1.9468	1.5574	0.0000	0.0000	476.4136
6	23	0.4821	0.3698	0.3141	0.2836	0.2997	0.1984	0.9920	0.9920	0.9920	0.7936	0.0000	0.0000	475.7249
6	24	0.4491	0.3612	0.3019	0.2817	0.2979	0.4255	2.1273	2.1273	2.1273	1.7019	0.0000	0.0000	466.5559
6	25	0.2329	0.3303	0.3398	0.2761	0.2964	0.3375	1.6877	1.6877	1.6877	1.3501	0.0000	0.0000	459.2891
6	26	0.3286	0.3275	0.3375	0.2737	0.2957	0.1401	0.7007	0.7007	0.7007	0.5605	0.0000	0.0000	459.0991
6	27	0.3106	0.3036	0.3199	0.2977	0.2945	0.2688	1.3442	1.3442	1.3442	1.0753	0.0000	0.0000	453.4468
6	28	0.2936	0.2991	0.3158	0.2937	0.2934	0.2444	1.2219	1.2219	1.2219	0.9775	0.0000	0.0000	448.3611
6	29	0.2690	0.2907	0.3020	0.2935	0.2916	0.4177	2.0886	2.0886	2.0886	1.6709	0.0000	0.0000	439.7485
6	30	0.2401	0.2806	0.2936	0.2851	0.2893	0.5052	2.5261	2.5261	2.5261	2.0209	0.0000	0.0000	429.3772

KSU MODEL 3 FOR SCANDIA CCFN 1975

		THETA VALUES					TRANSPIRATION							
MONTH	DAY	LAYER 1	LAYER 2	LAYER 3	LAYER 4	LAYER 5	LAYER 1	LAYER 2	LAYER 3	LAYER 4	LAYER 5	RUNOFF	DRAINAGE	THETA
		0-5CM	5-30CM	30-60CM	60-90CM	90-180CM	0-5CM	5-30CM	30-60CM	60-90CM	90-180CM			0-150CM
7	1	0.2340	0.2784	0.2918	0.2833	0.2889	0.1085	0.5423	0.5423	0.5423	0.4338	0.0000	0.0000	427.1599
7	2	0.2065	0.2682	0.2833	0.2748	0.2866	0.5109	2.5547	2.5547	2.5547	2.0437	0.0000	0.0000	416.7556
7	3	0.1908	0.2619	0.2780	0.2695	0.2852	0.3169	1.5847	1.5847	1.5847	1.2677	0.0000	0.0000	410.3728
7	4	0.1890	0.2521	0.2720	0.2635	0.2836	0.2226	1.8024	1.8024	1.8024	1.4419	0.0000	0.0000	403.2620
7	5	0.1890	0.2397	0.2646	0.2561	0.2816	0.2702	2.2084	2.2084	2.2084	1.7667	0.0000	0.0000	394.5728
7	6	0.1890	0.2281	0.2572	0.2487	0.2796	0.2740	2.2402	2.2402	2.2402	1.7922	0.0000	0.0000	386.0146
7	7	0.1990	0.2164	0.2504	0.2419	0.2778	0.2472	2.0206	2.0206	2.0206	1.6165	0.0000	0.0000	377.9602
7	8	0.1990	0.2044	0.2435	0.2350	0.2760	0.2533	2.0707	2.0707	2.0707	1.6566	0.0000	0.0000	369.7161
7	9	0.4926	0.2348	0.2403	0.2318	0.2751	0.1179	0.9637	0.9637	0.9637	0.7709	0.0000	0.0000	402.5420
7	10	0.4813	0.4195	0.2339	0.2254	0.2734	0.3876	1.9380	1.9380	1.9380	1.5504	0.0000	0.0000	430.7600
7	11	0.4637	0.4122	0.2277	0.2192	0.2718	0.3686	1.8429	1.8429	1.8429	1.4743	0.0000	0.0000	423.3662
7	12	0.2922	0.3328	0.3078	0.2133	0.2702	0.3545	1.7723	1.7723	1.7723	1.4179	0.0000	0.0000	416.2617
7	13	0.2749	0.3255	0.3017	0.2072	0.2686	0.3666	1.8332	1.8332	1.8332	1.4666	0.0000	0.0000	408.9194
7	14	0.2585	0.3021	0.3097	0.2014	0.2670	0.3463	1.7313	1.7313	1.7313	1.3851	0.0000	0.0000	401.9854
7	15	0.2356	0.2936	0.3026	0.1944	0.2652	0.4232	2.1162	2.1162	2.1162	1.6930	0.0000	0.0000	393.5618
7	16	0.2236	0.2851	0.2939	0.1890	0.2633	0.4233	2.1165	2.1165	2.1165	1.6932	0.0000	0.0000	385.1350
7	17	0.4736	0.3116	0.2782	0.1890	0.2607	0.5842	2.9210	2.9210	1.7866	2.3368	0.0000	0.0000	398.1306
7	18	0.4862	0.3942	0.2700	0.1890	0.2593	0.3036	1.5178	1.5178	0.9284	1.2143	0.0000	0.0000	416.1687
7	19	0.4664	0.3855	0.2583	0.1890	0.2574	0.4360	2.1802	2.1802	1.3335	1.7441	0.0000	0.0000	408.3218
7	20	0.3380	0.3334	0.3126	0.1890	0.2558	0.3526	1.7632	1.7632	1.0785	1.4105	0.0000	0.0000	406.7285
7	21	0.3775	0.3291	0.3067	0.1890	0.2548	0.2179	1.0897	1.0897	0.6665	0.8717	0.0000	0.0000	402.7747
7	22	0.2910	0.3150	0.3131	0.1890	0.2531	0.3859	1.9294	1.9294	1.1801	1.5435	0.0000	0.0000	395.8069
7	23	0.4799	0.3646	0.3016	0.1890	0.2512	0.4290	2.1449	2.1449	1.3119	1.7159	0.0000	0.0000	413.0562
7	24	0.4316	0.4533	0.2918	0.1890	0.2496	0.3649	1.8246	1.8246	1.1160	1.4597	0.0000	0.0000	431.3955
7	25	0.4631	0.4461	0.2821	0.1890	0.2480	0.3599	1.7996	1.7996	1.1007	1.4397	0.0000	0.0000	424.8147
7	26	0.2954	0.3343	0.3889	0.1890	0.2468	0.2769	1.3844	1.3844	0.8468	1.1075	0.0000	0.0000	419.7827
7	27	0.2664	0.3226	0.3732	0.1890	0.2442	0.5860	2.9298	2.9298	1.7920	2.3439	0.0000	0.0000	409.1162
7	28	0.2458	0.3008	0.3135	0.2490	0.2423	0.4102	2.0512	2.0512	1.2546	1.6410	0.0000	0.0000	401.6353
7	29	0.4142	0.2923	0.3064	0.2419	0.2405	0.4229	2.1147	2.1147	2.1147	1.6918	0.0000	0.0000	402.5852
7	30	0.4797	0.3053	0.2999	0.2354	0.2387	0.3918	1.9589	1.9589	1.9589	1.5672	0.0000	0.0000	404.1494
7	31	0.4686	0.3014	0.2966	0.2321	0.2378	0.1983	0.9913	0.9913	0.9913	0.7930	0.0000	0.0000	400.0933

KSU MODEL 3 FOR SCANDIA CORN 1975

MONTH	DAY	THETA VALUES LAYER 1 0-5CM	LAYER 2 5-30CM	LAYER 3 30-60CM	LAYER 4 60-90CM	LAYER 5 90-180CM	TRANSPIRATION LAYER 1 0-5CM	LAYER 2 5-30CM	LAYER 3 30-60CM	LAYER 4 60-90CM	LAYER 5 90-180CM	RUNOFF	DRAINAGE	THETA 0-150CM
8	1	0.3059	0.3322	0.2557	0.2312	0.2376	0.0551	0.2754	0.2754	0.2754	0.2203	0.0000	0.0000	398.9648
8	2	0.2860	0.3253	0.2899	0.2254	0.2361	0.3457	1.7287	1.7287	1.7287	1.3830	0.0000	0.0000	391.8616
8	3	0.2626	0.3005	0.2964	0.2183	0.2342	0.4246	2.1232	2.1232	2.1232	1.6986	0.0000	0.0000	383.1380
8	4	0.2401	0.2925	0.2857	0.2117	0.2324	0.4008	2.0038	2.0038	2.0038	1.6030	0.0000	0.0000	374.9839
8	5	0.2207	0.2862	0.2845	0.2064	0.2310	0.3164	1.5822	1.5822	1.5822	1.2658	0.0000	0.0000	368.4241
8	6	0.4832	0.2950	0.2800	0.2019	0.2298	0.2674	1.3371	1.3371	1.3371	1.0697	0.0000	0.0000	38[illegible].3613
8	7	0.4765	0.3538	0.2735	0.1955	0.2281	0.3884	1.9418	1.9418	1.9418	1.5534	0.0000	0.0000	385.8250
8	8	0.4560	0.3471	0.2679	0.1899	0.2266	0.3353	1.6764	1.6764	1.6764	1.3411	0.0000	0.0000	382.8782
8	9	0.2894	0.3322	0.2902	0.1890	0.2252	0.3112	1.5560	1.5560	1.5560	1.2448	0.0000	0.0000	376.3989
8	10	0.2609	0.3234	0.2784	0.1890	0.2232	0.4413	2.2067	2.2067	1.3497	1.7654	0.0000	0.0000	368.0332
8	11	0.2405	0.3029	0.2821	0.1890	0.2219	0.3063	1.5313	1.5313	0.9366	1.2250	0.0000	0.0000	362.2007
8	12	0.4054	0.2955	0.2722	0.1850	0.2202	0.3685	1.8424	1.8424	1.1269	1.4739	0.0000	0.0000	364.6487
8	13	0.4933	0.3604	0.2698	0.1890	0.2198	0.0889	0.4443	0.4443	0.2717	0.3554	0.0000	0.0000	384.3171
8	14	0.4935	0.4983	0.3704	0.1850	0.2195	0.0849	0.4246	0.4246	0.2597	0.3397	0.0000	0.0000	448.7546
8	15	0.4694	0.4923	0.3623	0.1890	0.2181	0.3019	1.5096	1.5096	0.9234	1.2077	0.0000	0.0000	442.8057
8	16	0.2851	0.3353	0.4772	0.2747	0.2168	0.2909	1.4547	1.4547	0.8898	1.1637	0.0000	0.0000	453.7163
8	17	0.2739	0.3303	0.4730	0.2705	0.2157	0.2477	1.2386	1.2386	1.2386	0.9909	0.0000	0.0000	448.7849
8	18	0.2494	0.3035	0.3222	0.4300	0.2145	0.2755	1.3773	1.3773	1.3773	1.1019	0.0000	0.0000	442.6902
8	19	0.2232	0.2979	0.3175	0.4253	0.2133	0.2811	1.4054	1.4054	1.4054	1.1243	0.0000	0.0000	436.4167
8	20	0.1932	0.2913	0.3335	0.3120	0.2506	0.3271	1.6355	1.6355	1.6355	1.3084	0.0000	0.0000	417.5068
8	21	0.1890	0.2780	0.2975	0.3060	0.2490	0.3602	1.8011	1.8011	1.8011	1.4408	0.0000	0.0000	409.4006
8	22	0.1890	0.2642	0.2917	0.3002	0.2474	0.2157	1.7634	1.7634	1.7634	1.4107	0.0000	0.0000	401.4875
8	23	0.1890	0.2561	0.2876	0.2961	0.2463	0.1493	1.2208	1.2208	1.2208	0.9766	0.0000	0.0000	396.3635
8	24	0.1890	0.2447	0.2825	0.2910	0.2450	0.1877	1.5348	1.5348	1.5348	1.2278	0.0000	0.0000	389.6208
8	25	0.1890	0.2363	0.2788	0.2873	0.2440	0.1340	1.0955	1.0955	1.0955	0.8764	0.0000	0.0000	384.7476
8	26	0.1890	0.2306	0.2768	0.2853	0.2434	0.0741	0.6054	0.6054	0.6054	0.4843	0.0000	0.0000	381.8018
8	27	0.1890	0.2230	0.2731	0.2815	0.2424	0.1375	1.1243	1.1243	1.1243	0.8994	0.0000	0.0000	377.0466
8	28	0.1850	0.2173	0.2706	0.2791	0.2418	0.0916	0.7492	0.7492	0.7492	0.5994	0.0000	0.0000	373.7246
8	29	0.2415	0.2127	0.2668	0.2753	0.2408	0.1393	1.1384	1.1384	1.1384	0.9107	0.0000	0.0000	372.3267
8	30	0.2277	0.2089	0.2636	0.2721	0.2399	0.1512	0.9562	0.9562	0.9562	0.7649	0.0000	0.0000	368.2578
8	31	0.2143	0.2049	0.2603	0.2688	0.2390	0.1990	0.9952	0.9952	0.9952	0.7962	0.0000	0.0000	364.0732

KSU MODEL 3 FOR SCANDIA CORN 1975

		THETA VALUES					TRANSPIRATION							
MONTH	DAY	LAYER 1	LAYER 2	LAYER 3	LAYER 4	LAYER 5	LAYER 1	LAYER 2	LAYER 3	LAYER 4	LAYER 5	RUNOFF	DRAINAGE	THETA
		0-5CM	5-30CM	30-60CM	60-90CM	90-180CM	0-5CM	5-30CM	30-60CM	60-90CM	90-180CM			0-150CM
9	1	0.2027	0.2022	0.2580	0.2665	0.2384	0.1375	0.6876	0.6876	0.6876	0.5501	0.0000	0.0000	361.0625
9	2	0.1926	0.2006	0.2569	0.2665	0.2384	0.0810	0.4049	0.3239	0.0000	0.0000	0.0000	0.0000	359.8308
9	3	0.1890	0.1997	0.2569	0.2665	0.2384	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	359.4277
9	4	0.1890	0.1981	0.2569	0.2665	0.2384	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	359.0413
9	5	0.3933	0.1981	0.2569	0.2665	0.2384	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	369.2568

CORE USAGE   OBJECT CODE= 22808 BYTES,ARRAY AREA= 684 BYTES,TOTAL AREA AVAILABLE= 174136 BYTES

DIAGNOSTICS   NUMBER OF ERRORS= 0, NUMBER OF WARNINGS= 0, NUMBER OF EXTENSIONS= 2

COMPILE TIME= 1.79 SEC,EXECUTION TIME= 3.61 SEC, WATFIV - JUL 1973 V1L4 14.29.10 WEDNESDAY 3 MAR 76

APPENDIX E

Scandia - 60% Depletion
Treatment Data

KSU MODEL 3 FOR SCANDIA CORN 1975

MAXIMUM AVAILABLE WATER (MM)......................	182.8800
THETA SUB V (15 BAR)...........................	0.1890
THETA INITIAL IN 5 FT. PROFILE (MM)............	477.8501
THETA SUB 5 CM. LAYER..........................	0.2470
U (MM)..	9.2200
ALPHA (P-T).....................................	1.3500
SOIL CONSTANT (MM DAY TO -1/2).................	2.7330
X SUB 5 (INIT.WATER CONTENT IN 5 CM. LAYER,WT..	0.1490
PLANTING DATE..................................	MAY 1,1975
FIELD/LOCATION.................................	SCANDIA CORN NH3

KSU MODEL 3 FOR SCANDIA CORN 1975

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)	STRESS DAY	BMTS
5	1	18.9	1.7	1.00	424.35	613.7	424.4	0.00	0.00	0.00	6.090	4.511	0.000	0.000	4.511	477.85		0.000
5	2	17.2	8.3	1.00	424.35	613.7	424.4	0.00	0.00	0.51	6.145	4.552	0.000	0.000	4.552	473.85		0.000
5	3	20.0	5.0	1.00	424.35	613.7	424.4	0.00	0.00	0.00	6.310	2.804	0.000	0.000	2.804	469.30		0.000
5	4	26.1	8.3	1.00	424.35	613.7	424.4	0.00	0.00	0.00	6.996	1.132	0.000	0.000	1.132	466.49		0.000
5	5	26.7	11.7	1.00	424.35	613.7	424.4	0.00	0.00	0.00	7.150	0.869	0.000	0.000	0.869	465.36		0.000
5	6	26.7	17.8	1.00	455.08	649.4	455.1	0.00	0.00	0.00	7.868	0.732	0.000	0.000	0.732	464.49		0.000
5	7	23.9	5.0	1.00	432.62	623.3	432.6	0.00	0.00	0.00	6.815	0.645	0.000	0.000	0.645	463.76		0.000
5	8	27.8	3.3	1.00	492.53	692.9	492.5	0.00	0.00	0.00	8.120	0.583	0.000	0.000	0.583	463.11		0.000
5	9	26.1	5.0	1.00	159.92	306.5	159.9	0.00	0.00	0.00	2.598	0.536	0.000	0.000	0.536	462.53		0.000
5	10	26.1	10.6	1.00	159.92	306.5	159.9	0.00	0.00	0.00	2.662	0.499	0.000	0.000	0.499	461.99		0.000
5	11	22.8	9.4	1.00	159.92	306.5	159.9	0.00	0.00	0.00	2.532	0.469	0.000	0.000	0.469	461.49		0.000
5	12	22.8	8.3	1.00	159.92	306.5	159.9	0.00	0.00	0.00	2.519	0.444	0.000	0.000	0.444	461.03		0.000
5	13	15.6	12.2	1.00	159.92	306.5	159.9	0.00	0.00	8.13	2.302	0.422	0.000	0.000	0.422	468.71		0.000
5	14	27.2	10.0	1.00	402.66	588.5	402.7	0.00	0.00	0.00	6.785	0.403	0.000	0.000	0.403	468.29		0.000
5	15	26.7	4.4	1.00	514.99	719.0	515.0	0.00	0.00	0.00	8.407	0.387	0.000	0.000	0.387	467.89		0.000
5	16	23.9	5.0	1.00	475.66	673.3	475.7	0.02	0.01	0.00	7.493	0.372	0.000	0.000	0.372	467.50		0.000
5	17	27.2	7.2	1.00	475.66	673.3	475.7	0.04	0.01	0.00	7.919	0.359	0.000	0.000	0.359	467.13		0.000
5	18	29.4	11.7	1.00	475.66	673.3	475.7	0.05	0.02	0.00	8.300	0.347	0.000	0.000	0.347	466.77		0.000
5	19	33.9	7.8	1.00	475.66	673.3	475.7	0.07	0.02	0.00	8.624	0.336	0.000	0.000	0.336	466.42		0.000
5	20	34.4	20.6	1.00	447.59	640.7	447.6	0.09	0.03	0.00	8.591	0.327	0.000	0.000	0.327	466.09		0.000
5	21	32.8	13.3	1.00	425.13	614.6	425.1	0.11	0.04	0.00	7.776	0.318	0.000	0.000	0.318	465.76		0.000
5	22	28.3	18.9	1.00	187.29	338.3	187.3	0.13	0.04	0.00	3.320	0.309	0.000	0.000	0.309	465.44		0.000
5	23	27.2	15.6	1.00	447.59	640.7	447.6	0.15	0.05	0.00	7.721	0.302	0.000	0.000	0.302	465.13		0.000
5	24	23.9	9.4	1.00	421.34	610.2	421.3	0.17	0.06	0.00	7.234	0.295	0.000	0.000	0.295	464.83		0.000
5	25	27.2	11.7	1.00	421.34	610.2	421.3	0.20	0.07	5.84	7.150	0.288	0.000	0.000	0.288	470.37		0.000
5	26	22.2	8.3	1.00	421.34	610.2	421.3	0.23	0.08	0.00	6.585	0.282	0.000	0.000	0.282	470.09		0.000
5	27	30.0	5.6	1.00	421.34	610.2	421.3	0.25	0.08	33.53	7.218	5.346	0.000	0.000	5.346	503.33		0.000
5	28	24.4	13.3	1.00	245.31	405.7	245.3	0.28	0.09	0.00	4.044	2.996	0.000	0.000	2.996	497.99		0.000
5	29	22.2	13.9	1.00	245.31	101.2	-16.8	0.31	0.10	0.00	0.000	0.000	0.000	0.000	0.000	494.99		0.000
5	30	15.6	11.1	1.00	245.31	109.9	-9.3	0.33	0.11	0.00	0.000	0.000	0.000	0.000	0.000	494.99		0.000
5	31	19.4	5.0	1.00	170.42	318.7	170.4	0.35	0.12	0.00	2.512	1.861	0.000	0.000	1.861	494.99		0.000
TOTALS										48.01	177.786	32.726	0.000	0.000	32.726			

KSU MODEL 3 FOR SCANDIA CORN 1975

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)	STRESS DAY	BMTS
6	1	23.9	9.4	1.00	170.42	318.7	170.4	0.38	0.13	0.76	2.740	2.030	0.000	0.000	2.030	493.89		0.000
6	2	26.7	7.2	0.98	166.46	318.7	170.4	0.43	0.14	17.02	2.817	2.038	0.082	0.000	2.120	508.88		0.000
6	3	28.3	11.1	0.96	407.27	614.6	425.1	0.48	0.16	0.00	7.299	5.180	0.386	0.000	5.566	506.76		0.000
6	4	28.9	18.9	0.91	313.37	518.9	342.7	0.60	0.20	0.00	6.118	2.486	0.660	0.000	3.146	501.19		0.000
6	5	28.3	13.3	0.86	431.25	701.6	500.0	0.75	0.25	0.00	8.665	1.132	1.501	0.000	2.633	498.05		0.000
6	6	29.4	13.9	0.82	356.10	623.3	432.6	0.87	0.29	0.00	7.618	0.869	1.697	0.000	2.565	495.41		0.000
6	7	27.8	15.0	0.78	332.68	614.6	425.1	1.00	0.33	0.00	7.367	0.732	2.017	0.000	2.750	492.85		0.000
6	8	19.4	13.3	0.75	152.48	357.9	204.2	1.12	0.37	41.91	3.139	1.737	1.001	0.000	2.738	532.01		0.000
6	9	27.2	14.4	0.71	145.52	357.9	204.2	1.24	0.41	0.00	3.505	1.851	1.268	0.000	3.119	529.27		0.000
6	10	22.8	10.6	0.68	105.33	301.3	155.4	1.37	0.46	5.08	2.474	1.242	1.004	0.000	2.246	531.23		0.000
6	11	23.9	9.4	0.64	264.23	597.2	410.1	1.50	0.50	0.00	6.596	3.147	3.448	0.000	6.596	528.99		0.000
6	12	23.3	9.4	0.61	322.07	736.4	530.0	1.65	0.55	0.00	9.036	2.441	4.968	0.000	7.409	522.39		0.000
6	13	31.7	13.3	0.58	278.06	675.5	477.6	1.76	0.59	0.00	8.620	1.132	4.902	0.000	6.034	514.98		0.000
6	14	21.7	17.8	0.52	222.19	618.9	428.8	2.06	0.69	0.00	6.948	0.869	4.282	0.000	5.150	508.95		0.000
6	15	27.2	11.1	0.46	198.48	618.9	428.8	2.35	0.78	3.56	7.260	0.732	4.771	0.000	5.503	507.36		0.000
6	16	30.0	15.0	0.41	202.86	692.9	492.5	2.65	0.88	3.81	8.771	0.645	6.095	0.000	6.741	505.66		0.000
6	17	26.7	17.2	0.37	178.46	684.2	485.0	2.94	0.98	0.00	8.367	0.583	6.087	0.000	6.670	498.92		0.000
6	18	28.9	15.0	0.33	58.09	375.6	177.4	3.24	1.00	31.75	3.117	0.756	2.361	0.000	3.117	524.00		0.000
6	19	30.0	15.0	0.29	97.23	562.4	332.4	3.53	1.00	0.00	5.920	1.283	4.638	0.000	5.920	520.89		0.000
6	20	32.2	22.2	0.26	98.04	614.6	376.7	3.83	1.00	0.00	7.090	1.367	5.723	0.000	7.090	514.97		0.000
6	21	29.4	13.3	0.24	81.18	571.1	339.8	4.05	1.00	9.65	6.092	1.078	5.014	0.000	6.092	517.53		0.000
6	22	27.2	15.6	0.22	118.21	806.0	539.0	4.27	1.00	19.20	9.298	1.510	7.787	0.000	9.298	530.63		0.000
6	23	28.3	16.1	0.20	53.56	484.1	266.0	4.49	1.00	3.71	4.663	0.695	3.968	0.000	4.663	525.05		0.000
6	24	36.7	18.9	0.19	84.62	710.3	457.8	4.71	1.00	0.00	8.963	1.227	7.736	0.774	9.736	520.38		0.000
6	25	31.1	18.9	0.17	71.14	666.8	421.0	4.94	1.00	0.00	7.717	0.966	6.751	0.000	7.717	510.65		0.000
6	26	28.9	18.9	0.16	27.52	375.6	177.4	5.16	1.00	2.79	3.167	0.364	2.803	0.000	3.167	505.72		0.000
6	27	29.4	15.0	0.14	48.39	571.1	339.8	5.38	1.00	0.00	6.011	0.634	5.377	0.000	6.011	502.55		0.000
6	28	32.8	20.0	0.13	37.67	510.2	288.2	5.60	1.00	0.00	5.411	0.524	4.887	0.000	5.411	496.54		0.000
6	29	31.7	20.0	0.12	59.37	753.8	494.7	5.82	1.00	0.00	9.169	0.815	8.354	0.000	9.169	491.13		0.000
6	30	32.8	18.9	0.11	67.92	867.0	590.7	5.93	1.00	0.00	11.045	0.941	10.104	0.000	11.045	481.96		0.000
TOTALS										139.24	195.004	41.006	119.671	0.774	161.451			

KSU MODEL 3 FOR SCANDIA CORN 1975

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)	STRESS DAY	BMTS
7	1	32.8	20.0	0.11	13.86	318.7	125.8	6.04	1.00	0.00	2.362	0.193	2.169	0.000	2.362	470.91		0.000
7	2	32.2	18.3	0.11	63.13	875.7	598.1	6.15	1.00	0.00	11.085	0.867	10.219	0.000	11.085	468.55		0.000
7	3	33.3	17.8	0.10	33.62	562.4	332.4	6.26	1.00	0.00	6.229	0.467	5.762	0.576	6.805	457.47		0.000
7	4	33.3	18.3	0.10	37.36	614.6	376.7	6.31	1.00	0.00	7.074	0.520	6.554	0.655	7.729	450.66		0.000
7	5	35.0	18.9	0.10	43.31	701.6	450.5	6.39	1.00	0.00	8.646	0.616	8.031	0.803	9.449	442.93		0.000
7	6	35.6	20.6	0.09	42.64	701.6	450.5	6.43	1.00	0.00	8.761	0.369	8.146	0.815	9.329	433.48		0.000
7	7	33.3	17.8	0.09	38.93	666.8	421.0	6.49	1.00	0.00	7.888	0.668	7.348	0.735	8.750	424.15		0.000
7	8	33.9	17.8	0.09	39.30	675.5	428.3	6.51	1.00	0.00	8.079	0.674	7.530	0.753	8.957	415.40		0.000
7	9	33.9	17.2	0.09	18.03	405.7	199.5	6.55	1.00	34.50	3.756	0.251	3.504	0.350	4.106	440.95		0.000
7	10	27.2	16.1	0.09	42.69	736.4	480.0	6.59	1.00	34.50	8.299	0.547	7.752	0.000	8.299	471.34		0.000
7	11	28.3	14.4	0.09	39.82	704.5	452.9	6.62	1.00	0.00	7.885	0.514	7.372	0.000	7.885	463.04		0.000
7	12	25.6	13.3	0.09	39.36	704.5	452.9	6.65	1.00	0.00	7.577	0.488	7.089	0.000	7.577	455.15		0.000
7	13	28.9	11.1	0.09	38.90	704.5	452.9	6.68	1.00	0.00	7.831	0.498	7.333	0.000	7.831	447.58		0.000
7	14	31.1	8.3	0.09	36.15	666.8	421.0	6.68	1.00	0.00	7.396	0.471	6.925	0.000	7.396	439.75		0.000
7	15	33.9	17.8	0.09	37.42	684.2	435.7	6.68	1.00	0.00	8.218	0.523	7.695	0.770	8.988	432.35		0.000
7	16	34.4	20.6	0.09	36.93	675.5	428.3	6.67	1.00	0.00	8.222	0.525	7.696	0.770	8.991	423.36		0.000
7	17	33.3	21.1	0.09	52.18	875.7	598.1	6.64	1.00	0.00	11.355	0.734	10.622	1.062	12.418	414.37		0.000
7	18	35.0	22.8	0.09	26.73	527.6	302.9	6.61	1.00	0.00	5.904	0.386	5.518	0.552	6.456	401.95		0.000
7	19	40.0	20.6	0.09	36.79	658.1	413.6	6.59	1.00	0.00	8.482	0.559	7.924	0.792	9.275	395.50		0.000
7	20	30.6	19.4	0.09	37.36	658.1	413.6	6.55	1.00	4.80	7.548	0.505	7.043	0.000	7.548	391.02		0.000
7	21	32.2	19.9	0.09	23.24	466.7	251.3	6.49	1.00	0.00	4.667	0.320	4.348	0.000	4.667	383.47		0.000
7	22	35.0	19.4	0.10	37.20	632.0	391.4	6.42	1.00	0.00	7.530	0.530	7.000	0.700	8.230	378.81		0.000
7	23	33.3	20.0	0.10	42.60	692.9	443.1	6.39	1.00	51.00	8.376	0.596	7.779	0.778	9.154	421.58		0.000
7	24	28.3	18.9	0.10	43.44	692.9	443.1	6.34	1.00	51.00	7.856	0.570	7.285	0.000	7.856	463.42		0.000
7	25	31.1	11.7	0.10	43.55	684.2	435.7	6.29	1.00	0.00	7.760	0.575	7.185	0.000	7.760	455.57		0.000
7	26	35.0	14.4	0.10	29.60	510.2	288.2	6.22	1.00	0.00	5.435	0.414	5.022	0.502	5.937	447.81		0.000
7	27	37.8	17.8	0.10	61.10	858.3	583.3	6.17	1.00	0.00	11.520	0.894	10.627	1.063	12.583	441.87		0.000
7	28	36.7	16.3	0.11	44.51	658.1	413.6	6.10	1.00	0.00	8.078	0.644	7.434	0.743	8.822	429.29		0.000
7	29	35.0	18.3	0.11	47.81	684.2	435.7	6.05	1.00	0.00	8.345	0.678	7.667	0.767	9.112	420.46		0.000
7	30	34.4	18.9	0.11	45.45	649.4	406.2	6.00	1.00	0.00	7.746	0.642	7.104	0.710	8.456	411.35		0.000
7	31	32.8	21.1	0.11	26.13	440.5	229.1	5.95	1.00	27.50	4.320	0.365	3.955	0.000	4.320	430.40		0.000
TOTALS										203.30	234.231	16.600	217.637	13.896	248.133			

KSU MODEL 3 FOR SCANDIA CORN 1975

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)	STRESS DAY	BMTS
8	1	28.9	21.1	0.12	7.83	249.1	66.7	5.88	1.00	27.50	1.202	0.104	1.098	0.000	1.202	453.58		0.000
8	2	29.4	18.9	0.12	51.11	666.8	421.0	5.79	1.00	0.00	7.564	0.680	6.884	0.000	7.564	452.37		0.000
8	3	36.7	12.8	0.13	55.72	692.9	443.1	5.70	1.00	0.00	8.468	0.789	7.679	0.768	9.236	444.81		0.000
8	4	36.1	13.3	0.13	55.03	666.8	421.0	5.60	1.00	0.00	8.010	0.776	7.234	0.723	8.733	435.57		0.000
8	5	32.8	16.7	0.14	51.20	614.6	376.7	5.50	1.00	0.00	6.982	0.703	6.279	0.000	6.982	426.84		0.000
8	6	31.1	17.2	0.14	45.93	553.7	325.0	5.40	1.00	0.00	5.919	0.620	5.300	0.000	5.919	419.86		0.000
8	7	35.6	18.9	0.15	59.91	649.4	406.2	5.29	1.00	0.00	7.848	0.857	6.991	0.699	8.547	413.94		0.000
8	8	36.1	22.2	0.15	52.79	579.8	344.3	5.19	1.00	0.00	6.784	0.771	6.014	0.601	7.386	405.39		0.000
8	9	36.7	23.3	0.16	50.83	545.0	317.6	5.08	1.00	0.00	6.328	0.750	5.578	0.558	6.886	398.01		0.000
8	10	36.1	18.3	0.17	77.25	736.4	464.2	4.98	1.00	0.00	9.009	1.110	7.898	0.790	9.799	391.12		0.000
8	11	39.4	19.3	0.17	53.79	536.3	311.0	4.88	1.00	0.00	6.279	0.805	5.474	0.547	6.826	381.32		0.000
8	12	36.7	21.1	0.18	69.65	632.0	384.3	4.76	1.00	23.50	7.589	1.019	6.570	0.657	8.246	398.00		0.000
8	13	28.3	18.3	0.19	21.88	279.6	114.3	4.62	1.00	35.40	2.022	0.287	1.736	0.000	2.022	425.15		0.000
8	14	25.0	18.3	0.20	22.93	279.6	114.3	4.50	1.00	66.10	1.940	0.288	1.652	0.000	1.940	489.23		0.000
8	15	27.8	16.7	0.21	82.90	645.4	357.6	4.40	1.00	0.00	6.938	1.072	5.866	0.000	6.938	487.29		0.000
8	16	31.1	16.1	0.22	81.04	614.6	370.9	4.28	1.00	0.00	6.725	1.088	5.637	0.000	6.725	480.35		0.000
8	17	30.0	17.8	0.23	73.52	548.0	319.9	4.15	1.00	0.50	5.762	0.981	4.781	0.000	5.762	474.12		0.000
8	18	32.2	16.7	0.24	85.16	588.5	351.0	4.01	1.00	0.00	6.462	1.162	5.300	0.000	6.462	468.36		0.000
8	19	31.7	16.1	0.26	93.71	605.9	364.3	3.86	1.00	0.00	6.648	1.267	5.382	0.000	6.648	461.90		0.000
8	20	34.4	16.1	0.27	103.37	623.3	377.6	3.70	1.00	0.00	7.122	1.444	5.678	0.568	7.690	455.25		0.000
8	21	36.1	21.1	0.27	109.15	658.1	404.3	3.52	1.00	0.00	7.931	1.586	6.206	0.621	8.413	447.56		0.000
8	22	35.6	21.1	0.27	109.15	658.1	404.3	3.32	1.00	0.00	7.879	0.946	6.027	0.603	7.575	439.15		0.000
8	23	35.6	21.1	0.27	76.76	501.5	284.3	3.10	1.00	0.00	5.541	1.132	4.122	0.412	5.666	431.57		0.000
8	24	36.7	22.8	0.27	110.74	597.2	410.1	2.89	1.00	0.00	8.154	0.869	5.888	0.589	7.345	425.91		0.000
8	25	26.7	18.3	0.27	102.65	562.4	380.2	2.67	1.00	0.00	6.589	0.732	4.594	0.000	5.326	418.56		0.000
8	26	28.3	9.4	0.27	60.17	379.6	222.8	2.44	1.00	0.00	3.799	0.645	2.542	0.000	3.187	413.23		0.000
8	27	32.2	13.3	0.27	92.54	518.9	342.7	2.21	1.00	0.00	6.228	0.583	3.973	0.000	4.556	410.05		0.000
8	28	30.6	20.0	0.27	64.21	397.0	237.8	1.96	1.00	0.00	4.350	0.536	2.614	0.000	3.151	405.49		0.000
8	29	31.7	16.1	0.27	104.67	571.1	387.7	1.65	0.40	3.30	7.076	0.499	3.495	0.000	3.994	405.64		0.000
8	30	32.8	17.8	0.27	92.54	518.9	342.7	1.40	0.40	0.00	6.381	0.469	2.653	0.000	3.122	401.65		0.000
8	31	36.1	19.4	0.27	104.67	571.1	387.7	1.00	0.40	0.00	7.556	0.444	2.069	0.207	2.719	398.52		0.000
TOTALS										156.30	197.085	25.013	153.213	8.343	186.569			

KSU MCDEL 3 FCR SCANDIA COFN 1975

MO	DAY	MAX TEMP (C)	MIN TEMP (C)	TAU	RNS RAD. (LYS)	SOLAR RAD (LYS)	NET RAD (LYS)	LEAF AREA	COVER	RAIN (MN)	POT. EVAP (MM)	SOIL EVAP (MM)	TRAN EVAP (MM)	A EVAP (MM)	TOTAL EVAP (MM)	THETA (MM)	STRESS DAY	BMTS
9	1	37.8	15.6	0.27	110.74	597.2	410.1	0.65	0.40	0.00	8.029	0.422	1.045	0.104	1.571	395.80		0.000
9	2	35.0	17.2	0.27	96.59	536.3	357.7	0.30	0.40	0.00	6.821	0.403	0.000	0.000	0.403	394.23		0.000
9	3	29.4	18.9	0.27	74.32	440.5	275.3	0.00	0.40	0.00	4.946	0.387	0.000	0.000	0.387	393.83		0.000
9	4	31.1	15.6	0.27	58.14	370.9	215.4	0.00	0.40	0.00	3.896	0.372	0.000	0.000	0.372	393.44		0.000
9	5	23.9	15.6	0.27	80.41	466.7	297.8	0.CC	0.40	11.20	4.922	0.984	0.000	0.000	0.984	404.27		0.000
TOTALS										11.20	28.615	2.568	1.045	0.104	3.717			

KSU MODEL 3 FOR SCANDIA CORN 1975

MONTH	DAY	THETA VALUES LAYER 1 0-5CM	LAYER 2 5-30CM	LAYER 3 30-60CM	LAYER 4 60-90CM	LAYER 5 90-180CM	TRANSPIRATION LAYER 1 0-5CM	LAYER 2 5-30CM	LAYER 3 30-60CM	LAYER 4 60-90CM	LAYER 5 90-180CM	RUNOFF	DRAINAGE	THETA 0-150CM
5	1	0.1890	0.2944	0.3098	0.3060	0.3090	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	29.7000	453.1887
5	2	0.1890	0.2782	0.3098	0.3060	0.3090	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	449.1467
5	3	0.1890	0.2670	0.3090	0.3068	0.3090	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	446.3423
5	4	0.1890	0.2624	0.3090	0.3068	0.3090	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	445.2102
5	5	0.1890	0.2590	0.3090	0.3068	0.3090	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	444.3416
5	6	0.1890	0.2560	0.3090	0.3068	0.3090	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	443.6091
5	7	0.1890	0.2535	0.3090	0.3068	0.3090	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	442.9641
5	8	0.1890	0.2511	0.3090	0.3068	0.3090	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	442.3906
5	9	0.1890	0.2490	0.3090	0.3068	0.3090	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	441.8442
5	10	0.1890	0.2470	0.3090	0.3068	0.3090	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	441.3452
5	11	0.1890	0.2451	0.3050	0.3068	0.3090	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	440.8762
5	12	0.1890	0.2433	0.3090	0.3068	0.3090	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	440.4329
5	13	0.3432	0.2433	0.3090	0.3068	0.3090	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	448.1409
5	14	0.3351	0.2433	0.3090	0.3068	0.3090	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	447.7378
5	15	0.3013	0.2486	0.3090	0.3068	0.3090	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	447.3511
5	16	0.2938	0.2486	0.3090	0.3068	0.3090	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	446.9792
5	17	0.2867	0.2486	0.3090	0.3068	0.3090	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	446.6204
5	18	0.2797	0.2486	0.3090	0.3068	0.3090	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	446.2732
5	19	0.2730	0.2486	0.3090	0.3068	0.3090	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	445.9368
5	20	0.2664	0.2486	0.3090	0.3068	0.3090	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	445.6101
5	21	0.2601	0.2486	0.3090	0.3068	0.3090	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	445.2922
5	22	0.2539	0.2486	0.3090	0.3068	0.3090	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	444.9827
5	23	0.2479	0.2486	0.3090	0.3068	0.3090	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	444.6809
5	24	0.2420	0.2486	0.3090	0.3068	0.3090	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	444.3862
5	25	0.3530	0.2486	0.3090	0.3068	0.3090	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	449.9382
5	26	0.3474	0.2486	0.3090	0.3068	0.3090	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	449.6563
5	27	0.3931	0.3521	0.3050	0.3068	0.3090	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	477.8398
5	28	0.3332	0.3521	0.3050	0.3068	0.3090	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	474.8440
5	29	0.3090	0.3138	0.3450	0.3068	0.3090	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	474.8440
5	30	0.3090	0.3138	0.3450	0.3068	0.3090	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	474.8440
5	31	0.2718	0.3090	0.3130	0.3428	0.3090	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	472.9832

KSU MODEL 3 FOR SCANDIA CORN 1975

MCNTH	DAY	THETA VALLES LAYER 1 0-5CM	LAYER 2 5-30CM	LAYER 3 30-60CM	LAYER 4 60-90CM	LAYER 5 90-180CM	TRANSPIRATION LAYER 1 0-5CM	LAYER 2 5-30CM	LAYER 3 30-60CM	LAYER 4 60-90CM	LAYER 5 90-180CM	RUNOFF	DRAINAGE	THETA 0-150CM
6	1	0.2464	0.3090	0.3130	C.3428	C.3090	C.0CCO	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	471.7131
6	2	C.4591	0.3262	0.3C89	0.3130	0.3203	0.0082	0.0411	0.0329	0.0000	0.000C	0.0000	0.0000	483.2341
6	3	0.3547	0.3254	C.3C84	0.3130	0.3203	0.C386	0.1931	0.1545	0.0000	0.0000	0.0000	0.0000	477.6682
6	4	0.2580	0.3168	0.3212	0.3090	0.3103	0.C660	0.3301	0.2641	0.0000	0.000C	0.0000	10.1364	467.3516
6	5	0.2323	0.3138	0.3192	0.3090	0.3103	0.1501	0.7503	0.6003	0.0000	0.0000	0.0000	C.C000	464.7290
6	6	0.2116	0.3056	C.3108	0.3192	C.3090	C.1697	0.8483	0.6787	0.0000	0.0000	0.0000	1.2078	461.3584
6	7	0.1929	0.3016	0.3081	0.3192	0.3090	0.2017	1.0087	0.8070	0.0000	0.000C	0.0000	0.0000	458.6086
6	8	0.4643	0.4068	C.3C72	0.3082	0.3122	0.0500	0.2502	0.2502	0.2502	0.2002	0.0000	C.0000	496.8298
6	9	0.4260	0.4055	0.3062	0.3071	0.3119	0.0634	0.3169	0.3169	0.3169	0.2536	0.0000	0.0000	493.7959
6	10	0.3948	C.3314	0.3858	0.3063	0.3088	0.0502	0.2511	0.2511	0.2511	0.2009	0.0000	2.5994	494.9636
6	11	0.3184	0.3279	0.3829	0.3034	C.3C80	C.1724	0.8620	0.8620	0.8620	0.6996	0.0000	0.0000	488.5979
6	12	0.2552	0.3059	0.3206	0.3732	0.3069	0.2484	1.2421	1.2421	1.2421	0.9937	0.0000	0.0000	481.5203
6	13	0.2277	0.3010	C.3166	0.3691	0.3058	0.2451	1.2255	1.2255	1.2255	C.9804	0.0000	0.0000	475.8130
6	14	0.2060	0.2967	0.3054	0.3130	0.3249	C.2141	1.0704	1.0704	1.0704	0.8563	0.0000	0.0000	464.9412
6	15	0.2578	0.2919	0.3015	0.3090	0.3239	0.2385	1.1927	1.1927	1.1927	0.9542	0.0000	0.0000	463.3159
6	16	0.3150	0.2659	0.2964	0.3039	0.3077	0.3048	1.5239	1.5239	1.5239	1.2191	0.0000	13.3453	451.8933
6	17	C.2973	0.2798	0.2913	0.2588	0.3063	C.3C43	1.5216	1.5216	1.5216	1.2173	0.0000	0.0000	445.6292
6	18	0.4825	0.3639	0.2893	0.2969	0.3058	0.1181	0.5903	0.5903	0.5903	0.4722	0.0000	0.0000	474.4197
6	19	0.4522	0.3592	0.2855	C.293C	C.3C47	C.2319	1.1594	1.1594	1.1594	0.9275	0.0000	0.0000	468.8086
6	20	0.2759	0.3319	0.3226	0.2882	0.3035	0.2861	1.4307	1.4307	1.4307	1.1446	0.0000	C.0000	462.1006
6	21	C.4424	0.3269	C.3164	0.2841	C.3024	0.2507	1.2536	1.2536	1.2536	1.0028	0.0000	C.0000	465.5922
6	22	C.4620	0.3665	0.3174	0.2870	0.3006	0.3894	1.9468	1.9468	1.9468	1.5574	0.0000	0.0000	476.4136
6	23	0.4821	0.3698	0.3141	0.2836	0.2997	0.1984	0.9920	0.9920	0.9920	0.7936	0.0000	C.0000	475.7249
6	24	0.4491	0.3612	0.3019	0.2817	C.2579	C.4255	2.1273	2.1273	2.1273	1.7019	0.0000	0.0000	466.5559
6	25	C.2829	0.3303	0.3398	0.2761	0.2964	0.3375	1.6877	1.6877	1.6877	1.3501	0.0000	0.0000	459.2891
6	26	0.3286	0.3275	C.3375	0.2737	C.2957	0.1401	0.7007	0.7007	0.7007	0.5605	0.0000	0.0000	459.0991
6	27	0.3106	0.3036	0.3199	0.2977	0.2945	0.2688	1.3442	1.3442	1.3442	1.0753	0.0000	0.0000	453.4468
6	28	0.2936	0.2991	0.3158	0.2937	0.2934	0.2444	1.2219	1.2219	1.2219	0.9775	0.0000	C.C000	448.3611
6	29	0.2690	0.2907	0.3020	0.2935	C.2916	0.4177	2.0886	2.0886	2.0886	1.6709	0.0000	0.0000	439.7485
6	30	0.2401	0.2806	0.2936	0.2851	0.2893	0.5052	2.5261	2.5261	2.5261	2.0209	0.0000	0.0000	429.3772

KSU MODEL 3 FOR SCANDIA CORN 1975

MONTH	DAY	THETA VALUES LAYER 1 0-5CM	LAYER 2 5-30CM	LAYER 3 30-60CM	LAYER 4 60-90CM	LAYER 5 90-180CM	TRANSPIRATION LAYER 1 0-5CM	LAYER 2 5-30CM	LAYER 3 30-60CM	LAYER 4 60-90CM	LAYER 5 90-180CM	RUNOFF	DRAINAGE	THETA 0-150CM
7	1	0.2340	0.2784	0.2918	0.2833	0.2889	0.1085	0.5423	0.5423	0.5423	0.4338	0.0000	0.0000	427.1599
7	2	0.2065	0.2682	0.2833	0.2748	0.2866	0.5109	2.5547	2.5547	2.5547	2.0437	0.0000	0.0000	416.7556
7	3	0.1908	0.2619	0.2780	0.2695	0.2852	0.3169	1.5847	1.5847	1.5847	1.2677	0.0000	0.0000	410.3728
7	4	0.1890	0.2521	0.2720	0.2635	0.2836	0.2226	1.8024	1.8024	1.8024	1.4419	0.0000	0.0000	403.2620
7	5	0.1890	0.2357	0.2646	0.2561	0.2816	0.2702	2.2084	2.2084	2.2084	1.7667	0.0000	0.0000	394.5728
7	6	0.1890	0.2281	0.2572	0.2487	0.2796	0.2740	2.2402	2.2402	2.2402	1.7922	0.0000	0.0000	386.0146
7	7	0.1890	0.2164	0.2504	0.2419	0.2778	0.2472	2.0206	2.0206	2.0206	1.6165	0.0000	0.0000	377.9602
7	8	0.1890	0.2044	0.2435	0.2350	0.2760	0.2533	2.0707	2.0707	2.0707	1.6566	0.0000	0.0000	369.7161
7	9	0.4926	0.2764	0.2403	0.2318	0.2751	0.1179	0.9637	0.9637	0.9637	0.7709	0.0000	0.0000	400.4419
7	10	0.4813	0.4051	0.2339	0.2254	0.2734	0.3876	1.9380	1.9380	1.9380	1.5504	0.0000	0.0000	427.1599
7	11	0.4637	0.3978	0.2277	0.2192	0.2718	0.3686	1.8429	1.8429	1.8429	1.4743	0.0000	0.0000	419.7661
7	12	0.2922	0.3328	0.2958	0.2133	0.2702	0.3545	1.7723	1.7723	1.7723	1.4179	0.0000	0.0000	412.6616
7	13	0.2749	0.3255	0.2857	0.2072	0.2686	0.3666	1.8332	1.8332	1.8332	1.4666	0.0000	0.0000	405.3196
7	14	0.2585	0.3021	0.2977	0.2014	0.2670	0.3463	1.7313	1.7313	1.7313	1.3851	0.0000	0.0000	398.3853
7	15	0.2396	0.2936	0.2906	0.1944	0.2652	0.4232	2.1162	2.1162	2.1162	1.6930	0.0000	0.0000	389.9617
7	16	0.2206	0.2851	0.2819	0.1890	0.2633	0.4233	2.1165	2.1165	2.1165	1.6932	0.0000	0.0000	381.5349
7	17	0.1943	0.2735	0.2662	0.1890	0.2607	0.5842	2.9210	2.9210	1.7866	2.3368	0.0000	0.0000	371.0305
7	18	0.1890	0.2657	0.2580	0.1890	0.2593	0.3035	1.5174	1.5174	0.9281	1.2139	0.0000	0.0000	365.5688
7	19	0.1890	0.2537	0.2463	0.1890	0.2574	0.2666	2.1790	2.1790	1.3328	1.7432	0.0000	0.0000	357.8904
7	20	0.2706	0.2466	0.2368	0.1890	0.2558	0.2154	1.7608	1.7608	1.0770	1.4086	0.0000	0.0000	356.4324
7	21	0.2593	0.2423	0.2310	0.1890	0.2549	0.2174	1.0869	1.0869	0.6648	0.8695	0.0000	0.0000	352.4768
7	22	0.2415	0.2346	0.2207	0.1890	0.2531	0.3850	1.9250	1.9250	1.1774	1.5400	0.0000	0.0000	345.5078
7	23	0.4795	0.3783	0.2092	0.1890	0.2512	0.4279	2.1393	2.1393	1.3085	1.7114	0.0000	0.0000	388.7554
7	24	0.4813	0.4927	0.2646	0.1890	0.2496	0.3643	1.8213	1.8213	1.1140	1.4570	0.0000	0.0000	433.0928
7	25	0.4626	0.4855	0.2549	0.1890	0.2480	0.3593	1.7963	1.7963	1.0987	1.4370	0.0000	0.0000	426.5095
7	26	0.2952	0.3342	0.4082	0.1890	0.2468	0.2762	1.3809	1.3809	0.8447	1.1048	0.0000	0.0000	425.5405
7	27	0.2656	0.3225	0.3925	0.1890	0.2442	0.5845	2.9223	2.9223	1.7874	2.3379	0.0000	0.0000	414.8718
7	28	0.2446	0.3008	0.3134	0.2683	0.2424	0.4089	2.0445	2.0445	1.2505	1.6356	0.0000	0.0000	407.3889
7	29	0.2226	0.2924	0.3064	0.2613	0.2405	0.4217	2.1083	2.1083	2.1083	1.6866	0.0000	0.0000	398.8396
7	30	0.2019	0.2846	0.2999	0.2548	0.2388	0.3907	1.9535	1.9535	1.9535	1.5628	0.0000	0.0000	390.9043
7	31	0.4887	0.3310	0.2566	0.2515	0.2379	0.1978	0.9888	0.9888	0.9888	0.7910	0.0000	0.0000	414.3474

KSU MODEL 3 FOR SCANDIA CORN 1975

MONTH	DAY	THETA VALUES LAYER 1 0-5CM	LAYER 2 5-30CM	LAYER 3 30-60CM	LAYER 4 60-90CM	LAYER 5 90-180CM	TRANSPIRATION LAYER 1 0-5CM	LAYER 2 5-30CM	LAYER 3 30-60CM	LAYER 4 60-90CM	LAYER 5 90-180CM	RUNOFF	DRAINAGE	THETA 0-150CM
8	1	0.4968	0.4377	0.2957	0.2505	0.2377	0.0549	0.2744	0.2744	0.2744	0.2195	0.0000	0.0000	440.7185
8	2	0.4763	0.4308	0.2900	0.2448	0.2361	0.3442	1.7210	1.7210	1.7210	1.3768	0.0000	0.0000	433.6133
8	3	0.2848	0.3340	0.3844	0.2378	0.2342	0.4223	2.1117	2.1117	2.1117	1.6894	0.0000	0.0000	424.9407
8	4	0.2613	0.3261	0.3778	0.2311	0.2325	0.3979	1.9894	1.9894	1.9894	1.5915	0.0000	0.0000	416.7380
8	5	0.2410	0.3027	0.3180	0.2947	0.2311	0.3139	1.5697	1.5697	1.5697	1.2558	0.0000	0.0000	410.1750
8	6	0.2233	0.2974	0.3136	0.2903	0.2299	0.2650	1.3249	1.3249	1.3249	1.0599	0.0000	0.0000	404.6089
8	7	0.1984	0.2897	0.3026	0.2984	0.2282	0.3845	1.9224	1.9224	1.9224	1.5379	0.0000	0.0000	396.5742
8	8	0.1890	0.2806	0.2971	0.2829	0.2267	0.3308	1.6538	1.6538	1.6538	1.3230	0.0000	0.0000	389.6299
8	9	0.1890	0.2707	0.2920	0.2778	0.2254	0.1877	1.5340	1.5340	1.5340	1.2272	0.0000	0.0000	383.2720
8	10	0.1890	0.2565	0.2847	0.2706	0.2234	0.2657	2.1720	2.1720	2.1720	1.7376	0.0000	0.0000	374.2212
8	11	0.1890	0.2465	0.2797	0.2655	0.2221	0.1842	1.5054	1.5054	1.5054	1.2043	0.0000	0.0000	367.9136
8	12	0.4752	0.2711	0.2737	0.2595	0.2205	0.2210	1.8067	1.8067	1.8067	1.4454	0.0000	0.0000	383.7898
8	13	0.4925	0.4060	0.2722	0.2581	0.2201	0.0868	0.4339	0.4339	0.4339	0.3471	0.0000	0.0000	417.2827
8	14	0.4926	0.4983	0.4116	0.2567	0.2197	0.0826	0.4130	0.4130	0.4130	0.3304	0.0000	0.0000	481.5527
8	15	0.4653	0.4925	0.4067	0.2518	0.2184	0.2933	1.4666	1.4666	1.4666	1.1733	0.0000	0.0000	475.0059
8	16	0.2816	0.3346	0.4770	0.4243	0.2172	0.2818	1.4092	1.4092	1.4092	1.1274	0.0000	0.0000	498.4202
8	17	0.2672	0.3298	0.4730	0.4203	0.2161	0.2390	1.1952	1.1952	1.1952	0.9562	0.0000	0.0000	493.4768
8	18	0.2387	0.3037	0.3219	0.4686	0.2801	0.2650	1.3251	1.3251	1.3251	1.0601	0.0000	0.0000	493.0984
8	19	0.2080	0.2983	0.3175	0.4641	0.2789	0.2691	1.3454	1.3454	1.3454	1.0763	0.0000	0.0000	486.8086
8	20	0.1890	0.2988	0.3033	0.3123	0.3292	0.3123	1.5615	1.5615	1.5615	1.2492	0.0000	0.0000	464.0247
8	21	0.1890	0.2748	0.2981	0.3066	0.3277	0.2088	1.7067	1.7067	1.7067	1.3654	0.0000	0.0000	456.1992
8	22	0.1890	0.2636	0.2926	0.3010	0.3075	0.2027	1.6574	1.6574	1.6574	1.3259	0.0000	16.8589	437.9556
8	23	0.1890	0.2540	0.2888	0.2973	0.3065	0.1387	1.1336	1.1336	1.1336	0.9069	0.0000	0.0000	432.6794
8	24	0.1890	0.2432	0.2834	0.2919	0.3051	0.1981	1.6191	1.6191	1.6191	1.2953	0.0000	0.0000	425.8916
8	25	0.1890	0.2352	0.2796	0.2880	0.3041	0.1405	1.1485	1.1485	1.1485	0.9188	0.0000	0.0000	420.9607
8	26	0.1890	0.2297	0.2775	0.2859	0.3035	0.0777	0.6354	0.6354	0.6354	0.5083	0.0000	0.0000	417.9927
8	27	0.1890	0.2229	0.2741	0.2826	0.3026	0.1215	0.9933	0.9933	0.9933	0.7946	0.0000	0.0000	413.7783
8	28	0.1890	0.2179	0.2720	0.2804	0.3020	0.0799	0.6536	0.6536	0.6536	0.5228	0.0000	0.0000	410.8528
8	29	0.2429	0.2144	0.2651	0.2775	0.3013	0.1069	0.8738	0.8738	0.8738	0.6990	0.0000	0.0000	410.4590
8	30	0.2308	0.2117	0.2668	0.2753	0.3007	0.1327	0.6633	0.6633	0.6633	0.5306	0.0000	0.0000	407.5139
8	31	0.2174	0.2072	0.2638	0.2753	0.3007	0.2276	1.1380	0.9104	0.0000	0.0000	0.0000	0.0000	404.7944

KSU MODEL 3 FOR SCANDIA CORN 1975

		THETA VALUES					TRANSPIRATION							
MONTH	DAY	LAYER 1	LAYER 2	LAYER 3	LAYER 4	LAYER 5	LAYER 1	LAYER 2	LAYER 3	LAYER 4	LAYER 5	RUNOFF	DRAINAGE	THETA
		0-5CM	5-30CM	30-60CM	60-90CM	90-180CM	0-5CM	5-30CM	30-60CM	60-90CM	90-180CM			0-150CM
9	1	0.2067	0.2049	0.2623	0.2753	0.3007	0.1149	0.5745	0.4596	0.0000	0.0000	0.0000	0.0000	403.2234
9	2	0.1986	0.2049	0.2623	0.2753	0.3007	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	402.8203
9	3	0.1909	0.2049	0.2623	0.2753	0.3007	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	402.4338
9	4	0.1890	0.2037	0.2623	0.2753	0.3007	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	402.0618
9	5	0.3933	0.2037	0.2623	0.2753	0.3007	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	412.2773

CORE USAGE   OBJECT CODE= 22808 BYTES,ARRAY AREA=   684 BYTES,TOTAL AREA AVAILABLE= 174128 BYTES

DIAGNOSTICS   NUMBER OF ERRORS=   0, NUMBER OF WARNINGS=   0, NUMBER OF EXTENSIONS=   2

COMPILE TIME=   1.22 SEC,EXECUTION TIME=   4.06 SEC, WATFIV - JUL 1973 V1L4   14.36.00   WEDNESDAY   3 MAR 76

APPENDIX F

Scandia - 80% Depletion
Treatment Data

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KSU MODEL 3 FOR SCANDIA CORN 1975

MAXIMUM AVAILABLE WATER (MM)...................  182.8800

THETA SUB V (15 BAR)...........................    0.1890

THETA INITIAL IN 5 FT. PROFILE (MM)............  477.8501

THETA SUB 5 CM. LAYER..........................    0.2470

U (MM).........................................    9.2200

ALPHA (P-T)....................................    1.3500

SOIL CONSTANT (MM DAY TO -1/2).................    2.7330

X SUB 5 (INIT.WATER CONTENT IN 5 CM. LAYER,WT..    0.1490

PLANTING DATE..................................MAY 1,1975

FIELD/LOCATION.................................SCANDIA CORN NH3
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KSU MODEL 3 FOR SCANDIA CORN 1975

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)	STRESS DAY	BMTS
5	1	18.9	1.7	1.00	424.35	613.7	424.4	0.00	0.00	0.00	6.090	4.511	0.000	0.000	4.511	477.85		0.000
5	2	17.2	8.3	1.00	424.35	613.7	424.4	0.00	0.00	0.51	6.145	4.552	0.000	0.000	4.552	473.85		0.000
5	3	20.0	5.0	1.00	424.35	613.7	424.4	0.00	0.00	0.00	6.310	2.804	0.000	0.000	2.804	469.30		0.000
5	4	26.1	8.3	1.00	424.35	613.7	424.4	0.00	0.00	0.00	6.996	1.132	0.000	0.000	1.132	466.49		0.000
5	5	26.7	11.7	1.00	424.35	613.7	424.4	0.00	0.00	0.00	7.150	0.869	0.000	0.000	0.869	465.36		0.000
5	6	26.7	17.8	1.00	455.08	649.4	455.1	0.00	0.00	0.00	7.868	0.732	0.000	0.000	0.732	464.49		0.000
5	7	23.9	5.0	1.00	432.62	623.3	432.6	0.00	0.00	0.00	6.815	0.645	0.000	0.000	0.645	463.76		0.000
5	8	27.9	3.3	1.00	492.53	692.9	492.5	0.00	0.00	0.00	8.120	0.583	0.000	0.000	0.583	463.11		0.000
5	9	26.1	5.0	1.00	159.92	306.5	159.9	0.00	0.00	0.00	2.598	0.536	0.000	0.000	0.536	462.53		0.000
5	10	26.1	10.6	1.00	159.92	306.5	159.9	0.00	0.00	0.00	2.662	0.499	0.000	0.000	0.499	461.99		0.000
5	11	22.8	9.4	1.00	159.92	306.5	159.9	0.00	0.00	0.00	2.532	0.469	0.000	0.000	0.469	461.49		0.000
5	12	22.8	8.3	1.00	159.92	306.5	159.9	0.00	0.00	0.00	2.519	0.444	0.000	0.000	0.444	461.03		0.000
5	13	15.6	12.2	1.00	159.92	306.5	159.9	0.00	0.00	8.13	2.302	0.422	0.000	0.000	0.422	468.71		0.000
5	14	27.2	10.0	1.00	402.66	588.5	402.7	0.00	0.00	0.00	6.785	0.403	0.000	0.000	0.403	468.29		0.000
5	15	26.7	4.4	1.00	514.99	719.0	515.0	0.00	0.00	0.00	8.407	0.387	0.000	0.000	0.337	467.89		0.000
5	16	23.9	5.0	1.00	475.66	673.3	475.7	0.02	0.01	0.00	7.493	0.372	0.000	0.000	0.372	467.50		0.000
5	17	27.2	7.2	1.00	475.66	673.3	475.7	0.04	0.01	0.00	7.919	0.359	0.000	0.000	0.359	467.13		0.000
5	18	29.4	11.7	1.00	475.66	673.3	475.7	0.05	0.02	0.00	8.300	0.347	0.000	0.000	0.347	466.77		0.000
5	19	33.9	7.8	1.00	475.66	673.3	475.7	0.07	0.02	0.00	8.624	0.336	0.000	0.000	0.336	466.42		0.000
5	20	34.4	20.6	1.00	447.59	640.7	447.6	0.09	0.03	0.00	8.591	0.327	0.000	0.000	0.327	466.09		0.000
5	21	32.8	13.3	1.00	425.13	614.6	425.1	0.11	0.04	0.00	7.776	0.318	0.000	0.000	0.318	465.76		0.000
5	22	28.3	18.9	1.00	187.29	338.3	187.3	0.13	0.04	0.00	3.320	0.309	0.000	0.000	0.309	465.44		0.000
5	23	27.2	15.6	1.00	447.59	640.7	447.6	0.15	0.05	0.00	7.721	0.302	0.000	0.000	0.302	465.13		0.000
5	24	28.9	9.4	1.00	421.34	610.2	421.3	0.17	0.06	0.00	7.234	0.295	0.000	0.000	0.295	464.83		0.000
5	25	27.2	11.7	1.00	421.34	610.2	421.3	0.20	0.07	5.84	7.150	0.288	0.000	0.000	0.288	470.37		0.000
5	26	22.2	8.3	1.00	421.34	610.2	421.3	0.23	0.08	0.00	6.585	0.282	0.000	0.000	0.282	470.09		0.000
5	27	30.0	5.6	1.00	421.34	610.2	421.3	0.25	0.08	33.53	7.218	5.346	0.000	0.000	5.346	503.33		0.000
5	28	24.4	13.3	1.00	245.31	405.7	245.3	0.28	0.09	0.00	4.044	2.996	0.000	0.000	2.996	497.99		0.000
5	29	22.2	13.9	1.00	245.31	101.2	-16.8	0.31	0.10	0.00	0.000	0.000	0.000	0.000	0.000	494.99		0.000
5	30	15.6	11.1	1.00	245.31	109.9	-9.3	0.33	0.11	0.00	0.000	0.000	0.000	0.000	0.000	494.99		0.000
5	31	19.4	5.0	1.00	170.42	318.7	170.4	0.35	0.12	0.00	2.512	1.861	0.000	0.000	1.861	494.99		0.000
TOTALS										48.01	177.786	32.726	0.000	0.000	32.726			

KSU MODEL 3 FOR SCANDIA CORN 1975

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)	STRESS DAY	BMTS
6	1	23.9	9.4	1.00	170.42	318.7	170.4	0.38	0.13	0.76	2.740	2.030	0.000	0.000	2.030	493.89		0.000
6	2	26.7	7.2	0.98	166.46	318.7	170.4	0.43	0.14	17.02	2.817	2.038	0.082	0.000	2.120	508.88		0.000
6	3	28.3	11.1	0.96	407.27	614.6	425.1	0.48	0.16	0.00	7.299	5.180	0.386	0.000	5.566	506.76		0.000
6	4	28.9	18.9	0.91	313.37	518.9	342.7	0.60	0.20	0.00	6.118	2.486	0.660	0.000	3.146	501.19		0.000
6	5	28.3	13.3	0.86	431.25	701.6	500.0	0.75	0.25	0.00	8.665	1.132	1.501	0.000	2.633	498.05		0.000
6	6	29.4	13.9	0.82	356.10	623.3	432.6	0.87	0.29	0.00	7.618	0.869	1.697	0.000	2.565	495.41		0.000
6	7	27.8	15.0	0.78	332.68	614.6	425.1	1.00	0.33	0.00	7.367	0.732	2.017	0.000	2.750	492.85		0.000
6	8	19.4	13.3	0.75	152.48	357.9	204.2	1.12	0.37	41.91	3.139	1.737	1.001	0.000	2.738	532.01		0.000
6	9	27.2	14.4	0.71	145.52	357.9	204.2	1.24	0.41	0.00	3.505	1.851	1.268	0.000	3.119	529.27		0.000
6	10	22.8	10.6	0.68	105.33	301.3	155.4	1.37	0.46	5.08	2.474	1.242	1.004	0.000	2.246	531.23		0.000
6	11	23.9	9.4	0.64	264.23	597.2	410.1	1.50	0.50	0.00	6.596	3.147	3.448	0.000	6.596	528.99		0.000
6	12	28.3	9.4	0.61	322.07	736.4	530.0	1.65	0.55	0.00	9.036	2.441	4.968	0.000	7.409	522.39		0.000
6	13	31.7	13.3	0.58	278.06	675.5	477.6	1.76	0.59	0.00	8.620	1.132	4.902	0.000	6.034	514.98		0.000
6	14	21.7	17.8	0.52	222.19	618.9	428.8	2.06	0.69	0.00	6.948	0.869	4.282	0.000	5.150	508.95		0.000
6	15	27.2	11.1	0.46	198.48	618.9	428.8	2.35	0.78	3.56	7.260	0.732	4.771	0.000	5.503	507.36		0.000
6	16	30.0	15.0	0.41	202.86	692.9	492.5	2.65	0.88	3.81	8.771	0.645	6.095	0.000	6.741	505.66		0.000
6	17	26.7	17.2	0.37	178.46	684.2	485.0	2.94	0.98	0.00	8.367	0.583	6.087	0.000	6.670	498.92		0.000
6	18	28.9	15.0	0.33	58.09	379.6	177.4	3.24	1.00	31.75	3.117	0.756	2.361	0.000	3.117	524.00		0.000
6	19	30.0	15.0	0.29	97.23	562.4	332.4	3.53	1.00	0.00	5.920	1.283	4.638	0.000	5.920	520.89		0.000
6	20	32.2	22.2	0.26	98.04	614.6	376.7	3.83	1.00	0.00	7.090	1.367	5.723	0.000	7.090	514.97		0.000
6	21	29.4	13.3	0.24	81.13	571.1	339.8	4.05	1.00	9.65	6.092	1.078	5.014	0.000	6.092	517.53		0.000
6	22	27.2	15.6	0.22	118.21	806.0	539.0	4.27	1.00	19.20	9.298	1.510	7.787	0.000	9.298	530.63		0.000
6	23	28.3	16.1	0.20	53.56	484.1	266.0	4.49	1.00	3.71	4.663	0.695	3.968	0.000	4.663	525.05		0.000
6	24	36.7	18.9	0.18	84.62	710.3	457.8	4.71	1.00	0.00	8.963	1.227	7.736	0.774	9.736	520.38		0.000
6	25	31.1	18.9	0.17	71.14	666.8	421.0	4.94	1.00	0.00	7.717	0.966	6.751	0.000	7.717	510.65		0.000
6	26	28.9	18.9	0.16	27.52	379.6	177.4	5.16	1.00	2.79	3.167	0.364	2.803	0.000	3.167	505.72		0.000
6	27	29.4	15.0	0.14	48.39	571.1	339.8	5.38	1.00	0.00	6.011	0.634	5.377	0.000	6.011	502.55		0.000
6	28	32.8	20.0	0.13	37.67	510.2	288.2	5.60	1.00	0.00	5.411	0.524	4.887	0.000	5.411	496.54		0.000
6	29	31.7	20.0	0.12	59.37	753.8	494.7	5.82	1.00	0.00	9.169	0.815	8.354	0.000	9.169	491.13		0.000
6	30	32.8	18.9	0.11	67.92	867.0	590.7	5.93	1.00	0.00	11.045	0.941	10.104	0.000	11.045	481.96		0.000
TOTALS										139.24	195.004	41.006	119.671	0.774	161.451			

KSU MODEL 3 FOR SCANDIA CORN 1975

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)	STRESS DAY	BMTS
7	1	32.8	20.0	0.11	13.86	318.7	125.8	6.04	1.00	0.00	2.362	0.193	2.169	0.000	2.362	470.91		0.000
7	2	32.2	18.3	0.11	63.13	875.7	598.1	6.15	1.00	0.00	11.085	0.867	10.219	0.000	11.085	468.55		0.000
7	3	33.3	17.8	0.10	33.62	562.4	332.4	6.26	1.00	0.00	6.229	0.467	5.762	0.576	6.805	457.47		0.000
7	4	33.3	18.3	0.10	37.36	614.6	376.7	6.31	1.00	0.00	7.074	0.520	6.554	0.655	7.729	450.66		0.000
7	5	35.0	18.9	0.10	43.31	701.6	450.5	6.39	1.00	0.00	8.646	0.616	8.031	0.803	9.449	442.93		0.000
7	6	35.6	20.6	0.09	42.64	701.6	450.5	6.43	1.00	0.00	8.761	0.369	8.146	0.815	9.329	433.48		0.000
7	7	33.3	17.8	0.09	38.93	666.8	421.0	6.49	1.00	0.00	7.888	0.668	7.348	0.735	8.750	424.15		0.000
7	8	33.9	17.8	0.09	39.30	675.5	428.3	6.51	1.00	0.00	8.079	0.674	7.530	0.753	8.957	415.40		0.000
7	9	33.9	17.2	0.09	18.03	405.7	199.5	6.55	1.00	0.80	3.756	0.309	3.504	0.350	4.164	407.25		0.000
7	10	27.2	16.1	0.09	42.69	736.4	480.0	6.59	1.00	1.80	8.299	0.645	7.752	0.000	8.397	404.88		0.000
7	11	28.3	14.4	0.09	39.97	704.5	452.9	6.61	1.00	0.00	7.885	0.583	7.370	0.000	7.953	396.48		0.000
7	12	25.6	13.3	0.09	39.97	704.5	452.9	6.61	1.00	0.00	7.577	0.536	7.082	0.000	7.618	388.53		0.000
7	13	28.9	11.1	0.09	39.97	704.5	452.9	6.61	1.00	0.00	7.831	0.499	7.319	0.000	7.818	380.91		0.000
7	14	31.1	8.3	0.09	37.30	666.8	421.0	6.60	1.00	0.00	7.396	0.469	6.911	0.000	7.379	373.09		0.000
7	15	33.9	17.8	0.09	38.60	684.2	435.7	6.60	1.00	0.00	8.218	0.444	7.679	0.768	8.890	365.71		0.000
7	16	34.4	20.6	0.09	38.10	675.5	428.3	6.59	1.00	0.00	8.222	0.422	7.680	0.768	8.870	356.82		0.000
7	17	33.3	21.1	0.09	54.03	875.7	598.1	6.55	1.00	66.00	11.355	0.760	10.596	1.060	12.415	413.95		0.000
7	18	35.0	22.3	0.09	27.69	527.6	302.9	6.52	1.00	66.00	5.904	0.400	5.504	0.550	6.454	467.54		0.000
7	19	40.0	20.6	0.09	38.10	658.1	413.6	6.50	1.00	0.00	8.482	0.579	7.904	0.790	9.273	461.08		0.000
7	20	30.6	19.4	0.09	38.85	658.1	413.6	6.45	1.00	4.80	7.548	0.525	7.023	0.000	7.548	456.61		0.000
7	21	32.2	18.9	0.10	24.16	466.7	251.3	6.39	1.00	0.00	4.667	0.332	4.335	0.000	4.667	449.06		0.000
7	22	35.0	19.4	0.10	38.98	632.0	391.4	6.30	1.00	0.00	7.530	0.555	6.975	0.697	8.227	444.40		0.000
7	23	33.3	20.0	0.10	45.16	692.9	443.1	6.24	1.00	0.00	8.376	0.632	7.743	0.774	9.150	436.17		0.000
7	24	28.3	13.9	0.10	46.23	692.9	443.1	6.18	1.00	0.00	7.856	0.607	7.249	0.000	7.856	427.02		0.000
7	25	31.1	11.7	0.11	46.89	684.2	435.7	6.10	1.00	0.00	7.760	0.619	7.141	0.000	7.760	419.16		0.000
7	26	35.0	14.4	0.11	32.24	510.2	288.2	6.00	1.00	0.00	5.435	0.450	4.985	0.498	5.934	411.40		0.000
7	27	37.8	17.8	0.12	68.13	858.3	583.3	5.89	1.00	0.00	11.520	0.997	10.524	1.052	12.573	405.47		0.000
7	28	36.7	18.3	0.12	50.22	658.1	413.6	5.79	1.00	0.00	8.078	0.727	7.352	0.735	8.814	392.90		0.000
7	29	35.0	18.3	0.13	55.00	684.2	435.7	5.69	1.00	0.00	8.345	0.780	7.565	0.756	9.101	384.08		0.000
7	30	34.4	18.9	0.13	53.52	649.4	406.2	5.58	1.00	0.00	7.746	0.756	6.990	0.699	8.445	374.98		0.000
7	31	32.8	21.1	0.14	31.74	440.5	229.1	5.45	1.00	40.00	4.320	0.444	3.877	0.000	4.320	406.54		0.000
TOTALS										179.40	234.231	17.442	216.815	13.837	248.094			

KSU MODEL 3 FOR SCANDIA CORN 1975

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)	STRESS DAY	BMTS
8	1	29.9	21.1	0.14	9.65	249.1	66.7	5.34	1.00	40.00	1.202	0.129	1.073	0.000	1.202	442.22		0.000
8	2	29.4	13.9	0.15	64.05	666.8	421.0	5.21	1.00	0.00	7.564	0.853	6.712	0.000	7.564	441.01		0.000
8	3	36.7	12.8	0.16	70.36	692.9	443.1	5.10	1.00	0.00	8.468	0.996	7.472	0.747	9.215	433.45		0.000
8	4	36.1	13.3	0.17	69.77	666.8	421.0	4.99	1.00	0.00	8.010	0.983	7.026	0.703	8.712	424.23		0.000
8	5	32.8	16.7	0.18	65.93	614.6	376.7	4.85	1.00	0.00	6.982	0.905	6.077	0.000	6.982	415.52		0.000
8	6	31.1	17.2	0.18	60.07	553.7	325.0	4.71	1.00	0.00	5.919	0.810	5.109	0.000	5.919	408.54		0.000
8	7	35.6	18.9	0.19	78.35	649.4	406.2	4.60	1.00	0.00	7.848	1.121	6.727	0.673	8.521	402.62		0.000
8	8	36.1	22.2	0.20	70.40	579.8	344.3	4.45	1.00	0.00	6.784	1.028	5.757	0.576	7.360	394.10		0.000
8	9	36.7	23.3	0.22	69.12	545.0	317.6	4.29	1.00	0.00	6.328	1.020	5.308	0.531	6.859	386.74		0.000
8	10	36.1	18.3	0.23	105.44	736.4	464.2	4.18	1.00	0.00	9.009	0.909	7.493	0.749	9.152	379.88		0.000
8	11	39.4	18.3	0.24	75.17	536.3	311.0	4.02	1.00	0.00	6.279	1.132	5.154	0.515	6.802	370.73		0.000
8	12	36.7	21.1	0.17	65.96	632.0	384.3	4.90	1.00	26.00	7.589	0.965	6.624	0.662	8.251	389.93		0.000
8	13	28.3	18.3	0.26	30.22	279.6	114.3	3.79	1.00	37.90	2.022	0.396	1.626	0.000	2.022	419.57		0.000
8	14	25.0	19.3	0.27	30.87	279.6	114.3	3.60	1.00	66.10	1.940	0.388	1.531	0.000	1.919	483.65		0.000
8	15	27.8	16.7	0.27	107.35	649.4	397.6	3.50	1.00	0.00	6.938	1.388	5.417	0.000	6.805	481.73		0.000
8	16	31.1	16.1	0.27	100.15	614.6	370.9	3.35	1.00	0.00	6.725	1.345	5.162	0.000	6.508	474.93		0.000
8	17	30.0	17.8	0.27	86.38	548.0	319.9	3.20	1.00	0.50	5.762	1.152	4.342	0.000	5.495	468.92		0.000
8	18	32.2	16.7	0.27	94.76	588.5	351.0	3.05	1.00	0.00	6.462	1.292	4.775	0.000	6.067	463.43		0.000
8	19	31.7	16.1	0.27	112.76	605.9	417.6	2.89	1.00	0.00	7.622	1.524	5.504	0.000	7.029	457.36		0.000
8	20	34.4	16.1	0.27	116.81	623.3	432.6	2.70	1.00	0.00	8.160	1.632	5.718	0.572	7.922	450.33		0.000
8	21	36.1	21.1	0.27	124.89	658.1	462.6	2.55	1.00	0.00	9.075	1.089	6.197	0.620	7.905	442.41		0.000
8	22	35.6	21.1	0.27	124.39	658.1	462.6	2.33	1.00	0.00	9.016	1.132	5.900	0.590	7.623	434.50		0.000
8	23	35.6	21.1	0.27	88.50	501.5	327.8	2.10	1.00	0.00	6.388	0.869	3.974	0.397	5.240	426.88		0.000
8	24	36.7	22.8	0.27	110.74	557.2	410.1	1.80	0.40	0.00	8.154	0.732	4.381	0.438	5.552	421.64		0.000
8	25	26.7	18.3	0.27	102.65	562.4	380.2	1.50	0.40	0.00	6.589	0.645	2.952	0.000	3.597	416.09		0.000
8	26	23.3	9.4	0.27	60.17	379.6	222.8	1.31	0.40	0.00	3.799	0.583	1.466	0.000	2.049	412.49		0.000
8	27	32.2	13.3	0.27	92.54	518.9	342.7	1.05	0.40	0.00	6.228	0.536	1.824	0.000	2.360	410.44		0.000
8	28	30.6	20.0	0.27	64.21	397.0	237.8	0.78	0.40	0.00	4.350	0.499	0.808	0.000	1.307	408.08		0.000
8	29	31.7	16.1	0.27	104.67	571.1	387.7	0.59	0.40	3.30	7.076	0.469	0.732	0.000	1.201	410.07		0.000
8	30	32.8	17.8	0.27	92.54	518.9	342.7	0.39	0.40	0.00	6.381	0.444	0.063	0.000	0.507	408.87		0.000
8	31	36.1	19.4	0.27	104.67	571.1	387.7	0.00	0.40	0.00	7.556	0.422	0.000	0.000	0.422	408.37		0.000
TOTALS										173.80	202.223	27.390	132.905	7.773	168.068			

KSU MODEL 3 FOR SCANDIA CORN 1975

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)	TCTAL EVAP (MM)	THETA (MM)	STRESS DAY	BMTS
9	1	37.8	15.6	0.27	110.74	557.2	410.1	0.00	0.40	0.00	8.029	0.403	0.000	0.000	0.403	407.94		0.000
9	2	35.0	17.2	0.27	96.59	536.3	357.7	0.0C	0.4C	0.00	6.821	0.387	0.000	0.000	0.387	407.54		0.000
9	3	29.4	18.9	0.27	74.32	440.5	275.3	0.00	0.40	0.00	4.946	0.372	0.000	0.000	0.372	407.15		0.000
9	4	31.1	15.6	0.27	58.14	370.9	215.4	0.00	0.40	0.00	3.896	0.359	0.000	0.000	0.359	406.78		0.000
9	5	23.9	15.6	0.27	80.41	466.7	297.8	0.00	0.40	11.20	4.922	0.984	0.000	0.000	0.984	417.62		0.000
TOTALS										11.20	28.615	2.505	0.000	0.000	2.505			

KSU MODEL 3 FOR SCANDIA CORN 1975

MONTH	DAY	THETA VALUES LAYER 1 0-5CM	LAYER 2 5-30CM	LAYER 3 30-60CM	LAYER 4 60-90CM	LAYER 5 90-180CM	TRANSPIRATION LAYER 1 0-5CM	LAYER 2 5-30CM	LAYER 3 30-60CM	LAYER 4 60-90CM	LAYER 5 90-180CM	RUNOFF	DRAINAGE	THETA 0-150CM
5	1	0.1890	0.2944	0.3098	0.3060	0.3090	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	29.7000	453.1887
5	2	0.1890	0.2782	0.3098	0.3060	0.3090	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	449.1467
5	3	0.1890	0.2670	0.3090	0.3068	0.3090	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	446.3423
5	4	0.1890	0.2624	0.3090	0.3068	0.3090	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	445.2102
5	5	0.1890	0.2590	0.3090	0.3068	0.3090	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	444.3416
5	6	0.1890	0.2560	0.3090	0.3068	0.3090	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	443.6051
5	7	0.1890	0.2535	0.3090	0.3068	0.3090	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	442.9641
5	8	0.1890	0.2511	0.3090	0.3068	0.3090	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	442.3906
5	9	0.1890	0.2490	0.3090	0.3068	0.3090	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	441.8442
5	10	0.1890	0.2470	0.3090	0.3068	0.3090	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	441.3452
5	11	0.1890	0.2451	0.3090	0.3068	0.3090	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	440.8762
5	12	0.1890	0.2433	0.3090	0.3068	0.3090	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	440.4329
5	13	0.3432	0.2433	0.3090	0.3068	0.3090	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	448.1409
5	14	0.3351	0.2433	0.3090	0.3068	0.3090	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	447.7378
5	15	0.3013	0.2486	0.3090	0.3068	0.3090	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	447.3511
5	16	0.2933	0.2486	0.3090	0.3068	0.3090	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	446.9792
5	17	0.2867	0.2486	0.3090	0.3068	0.3090	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	446.6204
5	18	0.2797	0.2486	0.3090	0.3068	0.3090	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	446.2732
5	19	0.2730	0.2486	0.3090	0.3068	0.3090	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	445.9368
5	20	0.2664	0.2486	0.3090	0.3068	0.3090	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	445.6101
5	21	0.2601	0.2486	0.3090	0.3068	0.3090	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	445.2922
5	22	0.2539	0.2486	0.3090	0.3068	0.3090	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	444.9827
5	23	0.2479	0.2486	0.3090	0.3068	0.3090	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	444.6809
5	24	0.2420	0.2486	0.3090	0.3068	0.3090	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	444.3862
5	25	0.3530	0.2486	0.3090	0.3068	0.3090	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	449.9382
5	26	0.3474	0.2486	0.3090	0.3068	0.3090	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	449.6563
5	27	0.3931	0.3521	0.3090	0.3068	0.3090	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	477.8398
5	28	0.3332	0.3521	0.3090	0.3068	0.3090	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	474.8440
5	29	0.3090	0.3138	0.3450	0.3068	0.3090	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	474.8440
5	30	0.3090	0.3138	0.3450	0.3068	0.3090	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	474.8440
5	31	0.2718	0.3090	0.3130	0.3428	0.3090	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	472.9832

KSU MODEL 3 FOR SCANDIA CORN 1975

MONTH	DAY	THETA VALUES LAYER 1 0-5CM	LAYER 2 5-30CM	LAYER 3 30-60CM	LAYER 4 60-90CM	LAYER 5 90-180CM	TRANSPIRATION LAYER 1 0-5CM	LAYER 2 5-30CM	LAYER 3 30-60CM	LAYER 4 60-90CM	LAYER 5 90-180CM	RUNOFF	DRAINAGE	THETA 0-150CM
6	1	0.2464	0.3090	0.3130	0.3428	0.3090	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	471.7131
6	2	0.4591	0.3262	0.3089	0.3130	0.3203	0.0082	0.0411	0.0329	0.0000	0.0000	0.0000	0.0000	483.2341
6	3	0.3547	0.3254	0.3084	0.3130	0.3203	0.0386	0.1931	0.1545	0.0000	0.0000	0.0000	0.0000	477.6682
6	4	0.2580	0.3168	0.3212	0.3090	0.3103	0.0660	0.3301	0.2641	0.0000	0.0000	0.0000	10.1364	467.3616
6	5	0.2323	0.3138	0.3192	0.3090	0.3103	0.1501	0.7503	0.6003	0.0000	0.0000	0.0000	0.0000	464.7290
6	6	0.2116	0.3056	0.3108	0.3192	0.3090	0.1697	0.8483	0.6787	0.0000	0.0000	0.0000	1.2078	461.3584
6	7	0.1929	0.3016	0.3081	0.3192	0.3090	0.2017	1.0087	0.8070	0.0000	0.0000	0.0000	0.0000	458.6096
6	8	0.4643	0.4068	0.3072	0.3082	0.3122	0.0500	0.2502	0.2502	0.2502	0.2002	0.0000	0.0000	496.8298
6	9	0.4260	0.4055	0.3062	0.3071	0.3119	0.0634	0.3169	0.3169	0.3169	0.2536	0.0000	0.0000	493.7959
6	10	0.3848	0.3314	0.3858	0.3063	0.3088	0.0502	0.2511	0.2511	0.2511	0.2009	0.0000	2.5994	494.9636
6	11	0.3184	0.3279	0.3829	0.3034	0.3080	0.1724	0.8620	0.8620	0.8620	0.6896	0.0000	0.0000	498.5979
6	12	0.2552	0.3059	0.3206	0.3732	0.3069	0.2484	1.2421	1.2421	1.2421	0.9937	0.0000	0.0000	481.5203
6	13	0.2277	0.3010	0.3166	0.3691	0.3058	0.2451	1.2255	1.2255	1.2255	0.9804	0.0000	0.0000	475.8130
6	14	0.2060	0.2967	0.3054	0.3130	0.3249	0.2141	1.0704	1.0704	1.0704	0.8563	0.0000	0.0000	464.9412
6	15	0.2578	0.2919	0.3015	0.3090	0.3238	0.2385	1.1927	1.1927	1.1927	0.9542	0.0000	0.0000	463.3159
6	16	0.3150	0.2859	0.2964	0.3039	0.3077	0.3048	1.5239	1.5239	1.5239	1.2191	0.0000	13.3453	451.8933
6	17	0.2973	0.2798	0.2913	0.2988	0.3063	0.3043	1.5216	1.5216	1.5216	1.2173	0.0000	0.0000	445.6292
6	18	0.4825	0.3639	0.2853	0.2969	0.3058	0.1181	0.5903	0.5903	0.5903	0.4722	0.0000	0.0000	474.4197
6	19	0.4522	0.3592	0.2855	0.2930	0.3047	0.2319	1.1594	1.1594	1.1594	0.9275	0.0000	0.0000	468.8086
6	20	0.2759	0.3319	0.3226	0.2882	0.3035	0.2861	1.4307	1.4307	1.4307	1.1446	0.0000	0.0000	462.1006
6	21	0.4424	0.3269	0.3184	0.2841	0.3024	0.2507	1.2536	1.2536	1.2536	1.0028	0.0000	0.0000	465.9922
6	22	0.4620	0.3665	0.3174	0.2870	0.3006	0.3894	1.9468	1.9468	1.9468	1.5574	0.0000	0.0000	476.4136
6	23	0.4821	0.3698	0.3141	0.2836	0.2997	0.1984	0.9920	0.9920	0.9920	0.7936	0.0000	0.0000	475.7249
6	24	0.4491	0.3612	0.3019	0.2817	0.2979	0.4255	2.1273	2.1273	2.1273	1.7019	0.0000	0.0000	466.5559
6	25	0.2829	0.3303	0.3399	0.2761	0.2964	0.3375	1.6877	1.6877	1.6877	1.3501	0.0000	0.0000	459.2891
6	26	0.3286	0.3275	0.3375	0.2737	0.2957	0.1401	0.7007	0.7007	0.7007	0.5605	0.0000	0.0000	459.0991
6	27	0.3106	0.3036	0.3199	0.2977	0.2945	0.2688	1.3442	1.3442	1.3442	1.0753	0.0000	0.0000	453.4468
6	28	0.2936	0.2991	0.3158	0.2937	0.2934	0.2444	1.2219	1.2219	1.2219	0.9775	0.0000	0.0000	448.3611
6	29	0.2690	0.2907	0.3020	0.2935	0.2916	0.4177	2.0886	2.0886	2.0886	1.6709	0.0000	0.0000	439.7485
6	30	0.2401	0.2806	0.2936	0.2851	0.2893	0.5052	2.5261	2.5261	2.5261	2.0209	0.0000	0.0000	429.3772

KSU MODEL 3 FOR SCANDIA CORN 1975

MONTH	DAY	THETA VALUES LAYER 1 0-5CM	THETA VALUES LAYER 2 5-30CM	THETA VALUES LAYER 3 30-60CM	THETA VALUES LAYER 4 60-90CM	THETA VALUES LAYER 5 90-180CM	TRANSPIRATION LAYER 1 0-5CM	TRANSPIRATION LAYER 2 5-30CM	TRANSPIRATION LAYER 3 30-60CM	TRANSPIRATION LAYER 4 60-90CM	TRANSPIRATION LAYER 5 90-180CM	RUNOFF	DRAINAGE	THETA 0-150CM
7	1	0.2340	0.2784	0.2918	0.2833	0.2889	0.1085	0.5423	0.5423	0.5423	0.4338	0.0000	0.0000	427.1599
7	2	0.2065	0.2682	0.2833	0.2748	0.2866	0.5109	2.5547	2.5547	2.5547	2.0437	0.0000	0.0000	416.7556
7	3	0.1908	0.2619	0.2780	0.2695	0.2852	0.3169	1.5847	1.5847	1.5847	1.2677	0.0000	0.0000	410.3728
7	4	0.1890	0.2521	0.2720	0.2635	0.2836	0.2226	1.8024	1.8024	1.8024	1.4419	0.0000	0.0000	403.2620
7	5	0.1890	0.2397	0.2646	0.2561	0.2816	0.2702	2.2084	2.2084	2.2084	1.7667	0.0000	0.0000	394.5728
7	6	0.1890	0.2281	0.2572	0.2487	0.2796	0.2740	2.2402	2.2402	2.2402	1.7922	0.0000	0.0000	386.0146
7	7	0.1890	0.2164	0.2504	0.2419	0.2778	0.2472	2.0206	2.0206	2.0206	1.6165	0.0000	0.0000	377.9602
7	8	0.1890	0.2044	0.2435	0.2350	0.2760	0.2533	2.0707	2.0707	2.0707	1.6566	0.0000	0.0000	369.7161
7	9	0.1965	0.2006	0.2403	0.2318	0.2751	0.1179	0.9637	0.9637	0.9637	0.7709	0.0000	0.0000	366.6841
7	10	0.2118	0.1928	0.2339	0.2254	0.2734	0.3876	1.9380	1.9380	1.9380	1.5504	0.0000	0.0000	360.6038
7	11	0.1890	0.1890	0.2254	0.2192	0.2718	0.3685	1.8424	1.8424	1.8424	1.4739	0.0000	0.0000	353.1418
7	12	0.1890	0.1890	0.2134	0.2133	0.2702	0.2166	1.0829	1.7704	1.7704	1.4163	0.0000	0.0000	346.8210
7	13	0.1890	0.1890	0.2011	0.2072	0.2686	0.2238	1.1192	1.8298	1.8298	1.4638	0.0000	0.0000	340.3433
7	14	0.1890	0.1890	0.1896	0.2015	0.2670	0.2113	1.0567	1.7276	1.7276	1.3821	0.0000	0.0000	334.2297
7	15	0.1890	0.1890	0.1890	0.1890	0.2557	0.2583	1.2916	2.1117	2.1117	1.6894	0.0000	0.0000	323.5125
7	16	0.1890	0.1890	0.1890	0.1890	0.2437	0.2584	1.2918	1.2918	1.2918	1.6896	0.0000	0.0000	316.3118
7	17	0.4777	0.3765	0.1890	0.1890	0.2391	0.3564	1.7822	1.7822	1.7822	2.3310	0.0000	0.0000	374.8889
7	18	0.4860	0.4939	0.2962	0.1890	0.2378	0.3027	1.5136	0.9258	0.9258	1.2109	0.0000	0.0000	436.0137
7	19	0.4657	0.4853	0.2845	0.1890	0.2358	0.4347	2.1735	2.1735	1.3294	1.7388	0.0000	0.0000	428.1646
7	20	0.3875	0.3333	0.4358	0.1890	0.2343	0.3511	1.7557	1.7557	1.0739	1.4046	0.0000	0.0000	430.7131
7	21	0.3765	0.3290	0.4300	0.1890	0.2333	0.2167	1.0837	1.0837	0.6629	0.8670	0.0000	0.0000	426.7556
7	22	0.2902	0.3148	0.3193	0.3061	0.2316	0.3836	1.9180	1.9180	1.1731	1.5344	0.0000	0.0000	419.7847
7	23	0.2691	0.3063	0.3122	0.2990	0.2297	0.4259	2.1294	2.1294	2.1294	1.7035	0.0000	0.0000	411.2024
7	24	0.2497	0.2991	0.3030	0.2961	0.2281	0.3624	1.8121	1.8121	1.8121	1.4497	0.0000	0.0000	403.8298
7	25	0.2302	0.2919	0.2970	0.2902	0.2265	0.3571	1.7853	1.7853	1.7853	1.4282	0.0000	0.0000	396.5461
7	26	0.2157	0.2864	0.2924	0.2856	0.2253	0.2742	1.3708	1.3708	1.3708	1.0966	0.0000	0.0000	390.9783
7	27	0.1890	0.2739	0.2828	0.2759	0.2227	0.5788	2.8940	2.8940	2.8940	2.3152	0.0000	0.0000	379.1772
7	28	0.1890	0.2619	0.2761	0.2692	0.2209	0.2473	2.0218	2.0218	2.0218	1.6174	0.0000	0.0000	371.0596
7	29	0.1890	0.2494	0.2691	0.2623	0.2191	0.2545	2.0803	2.0803	2.0803	1.6642	0.0000	0.0000	362.6746
7	30	0.1890	0.2378	0.2627	0.2559	0.2174	0.2351	1.9222	1.9222	1.9222	1.5378	0.0000	0.0000	354.8916
7	31	0.4888	0.3317	0.2595	0.2526	0.2165	0.1186	0.9692	0.9692	0.9692	0.7754	0.0000	0.0000	390.9048

KSU MODEL 3 FOR SCANDIA CORN 1975

MONTH	DAY	THETA VALUES LAYER 1 0-5CM	LAYER 2 5-30CM	LAYER 3 30-60CM	LAYER 4 60-90CM	LAYER 5 90-180CM	TRANSPIRATION LAYER 1 0-5CM	LAYER 2 5-30CM	LAYER 3 30-60CM	LAYER 4 60-90CM	LAYER 5 90-180CM	RUNOFF	DRAINAGE	THETA 0-150CM
8	1	0.4964	0.4884	0.2586	0.2517	0.2163	0.0537	0.2683	0.2683	0.2683	0.2147	0.0000	0.0000	429.7744
8	2	0.4726	0.4817	0.2530	0.2461	0.2148	0.3356	1.6779	1.6779	1.6779	1.3424	0.0000	0.0000	422.6572
8	3	0.2809	0.3335	0.4020	0.2393	0.2130	0.4109	2.0547	2.0547	2.0547	1.6438	0.0000	0.0000	417.5906
8	4	0.2535	0.3258	0.3956	0.2328	0.2112	0.3154	1.9322	1.9322	1.9322	1.5458	0.0000	0.0000	409.3933
8	5	0.2293	0.3029	0.3179	0.3144	0.2099	0.3038	1.5191	1.5191	1.5191	1.2153	0.0000	0.0000	402.8169
8	6	0.2080	0.2978	0.3137	0.3101	0.2088	0.2554	1.2772	1.2772	1.2772	1.0218	0.0000	0.0000	397.2383
8	7	0.1890	0.2882	0.3028	0.3075	0.2075	0.3700	1.8498	1.8498	1.8498	1.4799	0.0000	0.0000	389.0977
8	8	0.1890	0.2770	0.2976	0.3022	0.2061	0.1937	1.5831	1.5831	1.5831	1.2665	0.0000	0.0000	382.2827
8	9	0.1890	0.2664	0.2927	0.2973	0.2048	0.1786	1.4598	1.4598	1.4598	1.1678	0.0000	0.0000	375.9263
8	10	0.1890	0.2535	0.2858	0.2905	0.2029	0.2521	2.0606	2.0606	2.0606	1.6485	0.0000	0.0000	367.4841
8	11	0.1890	0.2426	0.2811	0.2859	0.2017	0.1734	1.4175	1.4175	1.4175	1.1340	0.0000	0.0000	361.1704
8	12	0.4762	0.2771	0.2750	0.2797	0.2001	0.2228	1.8216	1.8216	1.8216	1.4573	0.0000	0.0000	379.5461
8	13	0.4905	0.4223	0.2737	0.2783	0.1997	0.0813	0.4066	0.4066	0.4066	0.3253	0.0000	0.0000	415.5320
8	14	0.4907	0.4985	0.4764	0.2770	0.1994	0.0766	0.3828	0.3828	0.3828	0.3062	0.0000	0.0000	479.8147
8	15	0.4575	0.4931	0.4219	0.2725	0.1982	0.2709	1.3543	1.3543	1.3543	1.0834	0.0000	0.0000	473.3711
8	16	0.2769	0.3335	0.4770	0.4754	0.1970	0.2581	1.2906	1.2906	1.2906	1.0325	0.0000	0.0000	501.1738
8	17	0.2595	0.3292	0.4734	0.4718	0.1961	0.2171	1.0856	1.0856	1.0856	0.8685	0.0000	0.0000	496.4655
8	18	0.2289	0.3042	0.3219	0.4694	0.2946	0.2387	1.1936	1.1936	1.1936	0.9549	0.0000	0.0000	501.6821
8	19	0.1929	0.2987	0.3173	0.4649	0.2934	0.2752	1.3760	1.3760	1.3760	1.1008	0.0000	0.0000	495.0205
8	20	0.1850	0.2854	0.3038	0.3120	0.3440	0.3145	1.5726	1.5726	1.5726	1.2580	0.0000	0.0000	471.9319
8	21	0.1890	0.2734	0.2581	0.3063	0.3425	0.2085	1.7041	1.7041	1.7041	1.3633	0.0000	0.0000	464.6135
8	22	0.1890	0.2616	0.2927	0.3009	0.3076	0.1985	1.6226	1.6226	1.6226	1.2981	0.0000	30.1193	437.4700
8	23	0.1890	0.2532	0.2890	0.2973	0.3066	0.1337	1.0930	1.0930	1.0930	0.8744	0.0000	0.0000	432.6060
8	24	0.1890	0.2449	0.2850	0.2933	0.3055	0.1474	1.2049	1.2049	1.2049	0.9639	0.0000	0.0000	427.4688
8	25	0.1890	0.2390	0.2825	0.2908	0.3049	0.0903	0.7379	0.7379	0.7379	0.5904	0.0000	0.0000	424.1260
8	26	0.1890	0.2350	0.2813	0.2896	0.3045	0.0448	0.3664	0.3664	0.3664	0.2931	0.0000	0.0000	422.2031
8	27	0.1890	0.2308	0.2798	0.2881	0.3041	0.0558	0.4559	0.4559	0.4559	0.3647	0.0000	0.0000	420.0000
8	28	0.1890	0.2270	0.2787	0.2881	0.3041	0.0494	0.4041	0.3233	0.0000	0.0000	0.0000	0.0000	418.7241
8	29	0.2447	0.2256	0.2778	0.2881	0.3041	0.0448	0.3659	0.2927	0.0000	0.0000	0.0000	0.0000	420.8516
8	30	0.2357	0.2254	0.2777	0.2881	0.3041	0.0063	0.0317	0.0253	0.0000	0.0000	0.0000	0.0000	420.3447
8	31	0.2273	0.2254	0.2777	0.2881	0.3041	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	419.9229

KSU MCDEL 3 FCR SCANDIA CCRN 1975

MCNTH	DAY	THETA VALUES LAYER 1 0-5CM	LAYER 2 5-30CM	LAYER 3 30-60CM	LAYER 4 60-90CM	LAYER 5 9C-180CM	TRANSPIRATION LAYER 1 0-5CM	LAYER 2 5-30CM	LAYER 3 30-60CM	LAYER 4 60-90CM	LAYER 5 90-180CM	PUNOFF	DRAINAGE	THETA 0-150CM
9	1	0.2192	C.2254	C.2777	0.2881	0.3041	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.C000	419.5200
9	2	0.2115	0.2254	0.2777	0.2881	0.3041	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	419.1333
9	3	0.2041	0.2254	0.2777	0.2881	0.3041	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	C.0000	418.7612
9	4	0.1969	0.2254	C.2777	0.2881	0.3041	0.0CC0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	418.4023
9	5	0.4012	0.2254	0.2777	0.2881	0.3041	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	428.6179

CORE USAGE OBJECT CODE= 228C8 BYTES,ARRAY AREA= 684 BYTES,TOTAL AREA AVAILABLE= 174144 BYTES

DIAGNCSTICS NUMBER OF ERRORS= 0, NUMBER OF WARNINGS= 0, NUMBER OF EXTENSIONS= 2

COMPILE TIME= 1.11 SEC,EXECUTICN TIME= 3.67 SEC, WATFIV - JUL 1973 V1L4 14.37.45 WEDNESDAY 3 MAR 76

DEVELOPMENT AND ANALYSIS OF AN
EVAPOTRANSPIRATION MODEL FOR CORN [Zea Mays (L.)]

by

WESLEY DEAN ROSENTHAL

B. S., University of Nebraska, 1970

AN ABSTRACT OF 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

1976

ABSTRACT

Many empirical evapotranspiration models are being proposed as a method to schedule irrigation. Several models require meteorological parameters not routinely measured by the National Weather Service; thus, their applicability is somewhat limited. Other models lose their ability to accurately estimate evapotranspiration when extrapolated to geographical locations outside the calibration site. Therefore, research was conducted to develop and test a model for corn [Zea mays (L.) 'Dekalb XL72A'], requiring a minimum number of daily parameters--solar (or net) radiation, effective precipitation (or irrigation), leaf-area index, and maximum and minimum temperatures. Daily outputs include evaporation, transpiration, advective contribution, deep percolation out of the 150-cm profile, and soil moisture within the 150-cm profile.

Corn was planted at two locations in Kansas: the Scandia Irrigation Experiment Field and the Manhattan Evapotranspiration Research Field. Crop response and meteorological relationships, as required by the model, were developed from Manhattan data and tested on the Scandia data.

Negligible deep percolation into or out of the 150-cm profile from July through September was indicated by tensiometer data and permitted soil moisture to be estimated from evapotranspiration and precipitation (or irrigation). Model estimates of soil moisture were compared with neutron attenuation estimates from three moisture regimes at Scandia and one moisture regime at Manhattan. Model estimates were within 6% of neutron attenuation estimates, up to denting stage. After denting stage, the model overestimated soil

moisture, presumably due to an underestimation of leaf-area index and consequently, transpiration. This study suggests that the evapotranspiration model can be used to accurately estimate soil moisture over the season and, thus, has potential in scheduling irrigation on a regional basis.