DIVISION OF AGRICULTURE
RESEARCH & EXTENSION
University of Arkansas System

Agriculture and Natural Resources

FSA2017

Computer Technical Series

RICESEED

Jarrod T. Hardke
Rice Extension Agronomist and Assistant Professor, Crop, Soil and Environmental Sciences

Charles E. Wilson, Jr.
Director, Rice Research and Extension Center

Rebecca Bridges
Computer Specialist

Arkansas Is Our Campus

Visit our web site at:
https://www.uaex.uada.edu

RICESEED is a computer program that calculates the recommended seeding rates for rice under varying conditions. The RICESEED program generates the recommended seeding rate for rice varieties based on research conducted on the effects of various factors, including soil texture, seeding date, seeding method and seedbed condition.

Technical Information

Much of the data upon which this program is based was obtained from research conducted by Wade Faw and R. K. Porter at the Rice Branch Experiment Station in Stuttgart, Ark., from 1971 through 1973. The results were published as MS-287, *Effect of Seeding Rate on Performance of Rice Varieties*. Additional research conducted by Dr. R. S. Helms and Dr. K. A. Gravois in 1992 has been incorporated into the program for several new varieties. A brief summary follows.

The objective of Faw and Porter's research was to determine the effect of seeding rate on seedling density, yield components and rough rice yields. Briefly, the results indicated a positive correlation between seeding rates and seedling densities, panicles per square foot and lodging. A negative correlation was found between seeding rates and florets per panicle, grains per square foot and mature plant height. No correlation was found to link rate of seeding to percentage of empty florets or grain weights. An effective maximum grain yield was observed due to the inverse relationship between the number of panicles per square foot and number of grains per panicle.

Helms and Gravois examined the yield response of Adair, Katy and Millie to seeding rate and stand density. Results indicated that Katy and Millie produced higher yields when the stand density was about 25 plants per square foot compared to the previous recommended optimum stand density of 15 to 20 plants per square foot. Based on this research, seeding rate recommendations for Katy and Millie were increased by 20 percent. Thousand seed weights were determined from research tests involving rice variety performance testing by Dr. K. A. K. Moldenhauer, University of Arkansas plant breeder.

Description of Calculations

The percent increase in the optimum seeding rate can be determined by utilizing the description of seeding method and date, soil type and seedbed preparation (Tables 1 and 2). For a particular situation, the percent increase under each factor in Tables 1 and 2 is additive. However, the cumulative increase of these factors will cease at 85 percent. Seeding rates 85 percent greater than normal should be sufficient to produce an adequate stand of rice under most environmental and soil conditions.

Table 1. Additive Factors Increasing Optimum Seeding Rate

Variable	% Added
Seeding Method	
Dry seeded – drilled	0
Dry seeded – broadcast	20
Water seeded – broadcast	30
Soil Type	
Sand	0
Silt	0
Clay	20
Seedbed Preparation	
Good	0
Fair	10
Poor	20
Seeding Date	
Early	
Before April 5 (South Arkansas)	10
Before April 10 (Central Arkansas)	10
Before April 15 (North Arkansas)	10
Optimum	0
Late (after June 1)	30

Table 2. Factors for Increasing Seeding Rate for Water-Seeded Rice

Variable	% Added
Water Seed[1]	30
Seedbed Preparation[2]	
No-till	20
Conventional till	
Good (Grooved)	0
Poor (Ungrooved)	20
Seeding Date	
Early	
Before April 5 (South Arkansas)	10
Before April 10 (Central Arkansas)	10
Before April 15 (North Arkansas)	10
Optimum Dates	0
Late (after June 1)	10

[1]Based on optimum seeding rate (Table 3). Factors are additive to a maximum of 85 percent above optimum.
[2]Soil type is not considered a factor for seeding rate in a water-seeded system.

Utilizing Tables 1 and 2, the following calculations can be made for a given variety of rice:

Equation 1

Seeds per square foot = (optimum number seeds per sq ft) × [1 + decimal % increase from Table 1 or 2 (cumulative to 85%)]

Equation 2

Pounds of seed per acre = [(seeds per sq ft × 43,560 sq ft per acre)/(1,000 × 454 grams/lb)] × (1,000 seed weight in grams from Table 3)

Equation 3

Bushels of seed per acre = lb seed per acre/45

Equation 4

Calculation for seed per linear row ft in 6- to 12-inch row spacing: Seed per row ft = (seeds per sq ft) × (drill row spacing in inches/12)

Water Seeding

The following seeding rate recommendations for water seeding are based on the use of pre-germinated seed (soak 24 to 36 hours and drain 24 to 36 hours before planting).

Seeding rates for water-seeded rice are increased 30 percent over conventional drill-seeded rice due to several factors that may influence stand establishment. Water-seeded rice is more susceptible to stand reduction from seedling drift, the rice midge and blackbirds compared to dry-seeded rice. Soil type has less of an effect on stand establishment in a water-seeded system and is, therefore, disregarded in the calculation of optimum seeding rate.

Seedbed preparation is very important since seedling drift can be a major problem with conventional tillage. A good seedbed is defined as one that has been grooved or heavy clay that is rough and cloddy. The groover (implement) packs the soil while making indentations in which the seed will settle, thus reducing potential for seedling drift. Increase the seeding rate 20 percent if the final seedbed has been prepared with an implement such as a field cultivator. The soil surface may become smooth after flooding a loose seedbed, especially on silt loam and sandy soils.

Table 3. Minimum, Optimum and Maximum Seeding Rates for Rice Varieties

Variety	Seed Weight[z]	Seeding Rate								
		Min.[1]	Opt.[2]	Max.[3]	Min.[1]	Opt.[2]	Max.[3]	Min.[1]	Opt.[2]	Max.[3]
	grams	seeds/square foot			pounds/acre			bushels/acre		
Ahrent	22.30	25	30	45	53.5	64.2	96.3	1.19	1.43	2.14
Banks	22.90	25	30	45	54.9	65.9	98.9	1.22	1.46	2.20
Bengal	27.40	25	30	45	65.7	78.9	118.3	1.46	1.75	2.63
Caffey	28.71	25	30	45	68.9	82.6	124.0	1.53	1.84	2.75
Catahoula	26.52	25	30	45	63.6	76.3	114.5	1.41	1.70	2.54
Cheniere	21.80	25	30	45	52.3	62.7	94.1	1.16	1.39	2.09
CL 111	26.00	25	30	45	62.4	74.8	112.3	1.39	1.66	2.49
CL 142 AR	25.90	25	30	45	62.1	74.6	111.8	1.38	1.66	2.49
CL 151	23.30	25	30	45	55.9	67.1	100.6	1.24	1.49	2.24
CL 152	20.46	25	30	45	49.1	58.9	88.3	1.09	1.31	1.96
CL 161	23.40	25	30	45	56.1	67.4	101.0	1.25	1.50	2.25
CL 162 MS	25.90	25	30	45	62.1	74.6	111.8	1.38	1.66	2.49
CL 171 AR	22.10	25	30	45	53.0	63.6	95.4	1.18	1.41	2.12
CL 181 AR	24.20	25	30	45	58.0	69.7	104.5	1.29	1.55	2.32
CL 261	24.60	25	30	45	59.0	70.8	106.2	1.31	1.57	2.36
Cocodrie	25.60	25	30	45	61.4	73.7	110.5	1.36	1.64	2.46
Cypress	24.60	25	30	45	59.0	70.8	106.2	1.31	1.57	2.36
Drew	22.90	25	30	45	54.9	65.9	98.9	1.22	1.46	2.20
Francis	22.80	25	30	45	54.7	65.6	98.4	1.22	1.46	2.19
Jazzman	25.20	25	30	45	60.4	72.5	108.8	1.34	1.61	2.42
Jefferson	28.70	25	30	45	68.8	82.6	123.9	1.53	1.84	2.75
JES	26.50	25	30	45	63.6	76.3	114.4	1.41	1.70	2.54
Jupiter	25.80	25	30	45	61.9	74.3	111.4	1.38	1.65	2.48
LaGrue	25.10	25	30	45	60.2	72.2	108.4	1.34	1.61	2.41
Mermentau	23.33	25	30	45	56.0	67.2	100.7	1.24	1.49	2.24
Neptune	27.40	25	30	45	65.7	78.9	118.3	1.46	1.75	2.63
Newbonnet	21.74	25	30	45	52.1	62.6	93.9	1.16	1.39	2.09
Presidio	24.30	25	30	45	58.3	69.9	104.9	1.30	1.55	2.33
Rex	27.60	25	30	45	66.2	79.4	119.2	1.47	1.77	2.65
RT CL XL729	21.79	10	12	15	20.9	25.1	31.4	0.46	0.56	0.70
RT CL XL745	21.70	10	12	15	20.8	25.0	31.2	0.46	0.56	0.69
RT XL723	21.14	10	12	15	20.3	24.3	30.4	0.45	0.54	0.68
RT XL753	20.50	10	12	15	19.7	23.6	29.5	0.44	0.52	0.66
Roy J	22.90	25	30	45	54.9	65.9	98.9	1.22	1.46	2.20
Saber	20.65	25	30	45	49.5	59.4	89.2	1.10	1.32	1.98
Spring	21.80	25	30	45	52.3	62.7	94.1	1.16	1.39	2.09
Taggart	27.40	25	30	45	65.7	78.9	118.3	1.46	1.75	2.63
Templeton	22.70	25	30	45	54.5	65.3	98.0	1.21	1.45	2.18
Wells	25.20	25	30	45	60.4	72.5	108.8	1.34	1.61	2.42

[1]Only recommended under optimum conditions[2] with addition of an insecticide/fungicide seed treatment.
[2]Assumes good seedbed, drill-seeded, silt loam soil, optimum planting date and conventional tillage.
[3]Reason for increasing seeding rate above optimum seeding rate may include broadcast-seeding, clay soil, poor seedbed preparation, early planting date or late planting date.
[z]Grams per 1,000 seed.

The last factor to consider is seeding date. Seeding date primarily influences the rate of seedling development and stand establishment. Seeding rates should be increased 10 percent for early or late planting. Contact your county Extension agent for additional information.

The computer program is available online at https://www.uaex.uada.edu.

For producers who do not have Internet access, the program can be run in the county Extension office after the relevant information has been provided.

For more information on rice seeding rates or other rice management topics, contact your local county Extension office or visit our web page at https://www.uaex.uada.edu.

Printed by University of Arkansas Cooperative Extension Service Printing Services.

DR. JARROD T. HARDKE is rice Extension agronomist and assistant professor in the Department of Crop, Soil and Environmental Sciences, Rice Research and Extension Center, Stuttgart. **DR. CHARLES E. WILSON, JR.**, is director, Rice Research and Extension Center, Stuttgart. **REBECCA BRIDGES** is computer specialist in the Little Rock state office. All are with the University of Arkansas Division of Agriculture.

FSA2017-PD-6-13RV