

EXHIBIT

N

2019 Arkansas Soybean Quick Facts

Dr. Jeremy Ross – Extension Agronomist – Soybean
Chris Elkins & Chad Norton – Program Associate – Soybean/ Wheat Verification



2018 Facts:

- 3.25 million acres harvested
- 50 bushel/acre state average
- 62.8 bushel/acre SRVP average
- Average dates in 2018 SRVP
0 Planting: May 7
0 Emergence: May 14
0 Harvest: October 9
- 60 lbs = 1 bu
- 13.0% moisture is dry

Growth and Development:

Description of Vegetative Stages		
Stage No.	Abbreviated Stage Title	Description
VE	Emergence	Cotyledons above soil surface
VC	Cotyledon	Unifoliate leaves unrolled sufficiently so the leaf edges are not touching
V1	First- Node	Fully developed leaves at unifoliate node
V2	Second-Node	Fully developed trifoliate leaf at node above the unifoliate nodes
V3	Third-Node	Three nodes on the main stem with fully developed leaves beginning with the unifoliate nodes
Vn	<i>n</i> th-Node	<i>n</i> number of nodes on the main stem with fully developed leaves beginning with the unifoliate nodes
Description of Reproductive Stages		
Stage No.	Abbreviated Stage Title	Description
R1	Beginning bloom	One open flower at any node on the main stem
R2	Full bloom	Open flower at one of the two uppermost nodes on the main stem with a fully developed leaf
R3	Beginning pod	Pod 3/16 inch long at one of the four uppermost nodes on the main stem with a fully developed leaf

R4	Full pod	Pod 3/4 inch long at one of the four uppermost nodes on the main stem with a fully developed leaf
R5	Beginning seed	Seed 1/8 inch long in a pod at one of the four uppermost nodes in the main stem with a fully developed leaf
R6	Full seed	Pod containing a green seed that fills the pod cavity at one of the four uppermost nodes on the main stem with a fully developed leaf
R7	Beginning maturity	One normal pod on the main stem that has reached its mature pod color
R8	Full maturity	95 percent of the pods have reached their mature pod color; 5-10 days of drying weather are required after R8 before the soybeans have less than 15 percent moisture

Days for a Plant to Develop From One Stage to Next		
Stages	Average Number of Days	Range in Number of Days
Vegetative Stages		
Plant to VE	10	5-15
VE to VC	5	3-10
VC to V1	5	3-10
V1 to V2	5	3-10
V2 to V3	5	3-8
V3 to V4	5	3-8
V4 to V5	5	3-8
V5 to V6	3	2-5
V6 and later	3	2-5
Reproductive Stages		
R1 to R2	0*, 3	0-7
R2 to R3	10	5-15
R3 to R4	9	5-15
R4 to R5	9	4-26
R5 to R6	15	11-20
R6 to R7	18	9-30
R7 to R8	9	7-18

* Stages R1 to R2 generally occur simultaneously in determinate varieties. The time interval between R1 and R2 in indeterminate varieties is about 3 days

Seeding:

- Plant when ground temp is 55° @ 2 inches deep by 9:00 a.m. for three days
- Place seed between 1 to 1.5 inches deep
- Seeding rate should be around 150,000 seeds per acre for a final plant population of around 130,000 plants per acre

Determining Final Plant Stands

- 38" rows measure 13 ft 9 in
- 30" rows measure 17 ft 5 in
- 20" rows measure 26 ft 2 in
- 15" rows measure 34 ft 10"

Count plants in that distance and multiply by 1,000. This will equal plants per acre. Do this in at least ten stops in the field to get an accurate count. Example: 30" row, count 130 plants in 17 ft 5 in
130 x 1,000 = 130,000 plants per acre

Seed Treatments:

- Systemic insecticides applied on the seed are recommended for early season insect control.
- Systemic fungicides applied on the seed are recommended if soybeans are planted early under cool/wet conditions or planted late under hot/dry conditions

Weed Control:

- Start clean with a burndown and a residual herbicide or tillage
- PPO-resistant Pigweed is widespread North of I-40, Cultivars tolerant to metribuzin are recommended.

Link: [Metribuzin Variety Tolerance](#)

- Metribuzin plus Anthem/Zidua or metolachlor at planting is recommended.
- Refer to MP 44 Recommended Chemicals for weed and brush control for latest herbicide recommendations

Insect Control:

Treatment Levels

- Bollworm

Crop Value (\$/bu)	Larvae/25 sweeps						
	Control Cost (\$/ac)						
	8	10	12	14	16	18	20
6	6.5	8.2	9.8	11.4	13.1	14.7	16.3
7	5.6	7.0	8.4	9.8	11.2	12.6	14.0
8	5.0	6.1	7.4	8.6	9.8	11.0	12.3
9	5.0	5.4	6.5	7.6	8.7	9.8	10.9
10	5.0	5.0	5.9	6.9	7.8	8.8	9.8
12	5.0	5.0	5.0	5.7	6.5	7.4	8.2
13	5.0	5.0	5.0	5.3	6.0	6.8	7.5
15	5.0	5.0	5.0	5.0	5.2	5.9	6.5

- Stink bugs – 9 SB per 25 sweeps until R6, 18 SB per 25 sweeps until R6.5
- Redbanded Stink Bug- 4 per 25 sweeps until R6.5 10 per 25 sweeps through R7
- Defoliators – 29 per 25 sweeps with 40% defoliation b/f bloom or 25% defoliation after bloom treat through R6.5
- Refer to MP 144 Insecticide Recommendations for Arkansas for latest insecticide recommendations

Irrigation:

- Soybeans require 20 – 25 inches of water per growing season

General Soybean Water Use	
Crop Development	Water Use (in/day)
Germination & Seedling	0.05 – 0.10
Rapid Vegetative Growth	0.10 – 0.20
Flowering to Pod Fill	0.20 – 0.30
Maturity to Harvest	0.05 – 0.20

Irrigation Termination:

- When at least 50 percent of the pods have seeds that are touching within the pod (R6) with good soil moisture present irrigation can be terminated

Fertility:

Nitrogen (N):

- Applying nitrogen fertilizer to soybeans is not a recommended practice as long as proper nodulation occurs

Phosphorus (P) and Potassium (K):

Nutrient	Soil Test Level	Soil Test Value	Production System	
			Full-Season Soybeans	Wheat and Double-Crop Soybeans*
		ppm P	----- lb P2O5/acre -----	
Phosphorus	Very Low	≤8	80	120
	Low	9–16	60	120
	Medium	17-25	50	90
	Optimum	26-50	0	50
	Above Optimu	≥51	0	0
		ppm K	----- lb K2O/acre -----	
Potassium	Very Low	≤60	160	180
	Low	61–90	120	120
	Medium	91 - 130	75	80
	Optimum	131- 175	50	60
	Above Optimum	≥176	0	0

*Double-crop soybean P and K fertilizer recommendations include the recommendations for winter wheat. The cumulative fertilizer rate can be applied in the fall.

Chloride Toxicity:

To reduce problems from Cl toxicity select a chloride-excluding variety. Chloride-excluding varieties do not readily translocate Cl from plant roots to the shoots.

Diseases and Disease Control:

- Fungicides should only be applied when disease is present
- Reproductive stages is usually when we start seeing development of disease
- Frogeye Leafspot, Aerial Web Blight and Cercospora leaf blight are among the more common foliar soybean diseases found in Arkansas soybeans
- Refer to MP 154 Arkansas Plant Disease Control products guide for the latest disease recommendations

Harvest:

- 4 -5 beans per square foot can add up to one bushel per acre loss
- Match harvest speed to conditions at time of harvest
- Adjust combine settings to harvest conditions
- Try to harvest soybeans as close 13% moisture as possible to avoid moisture loss

More information and additional copies of this fact sheet are available at:

<https://www.uaex.edu/farm-ranch/crops-commercial-horticulture/soybean/> & <http://www.arkansascrops.com>