Simulated Hail and Hail Assessments in Row Crops

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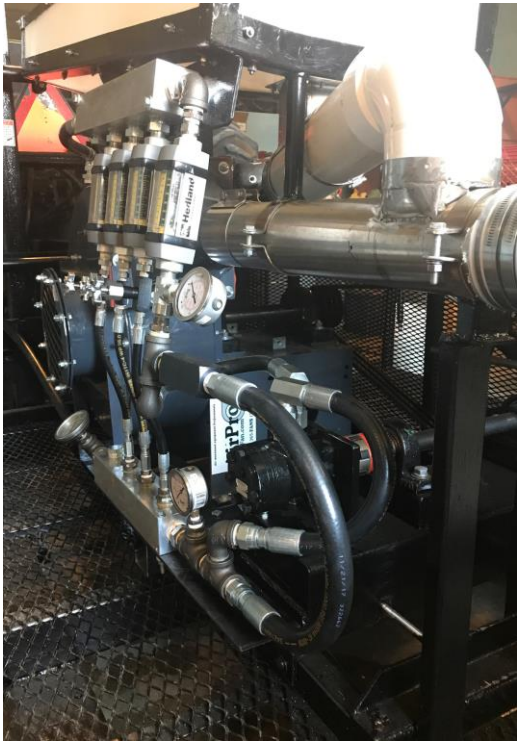
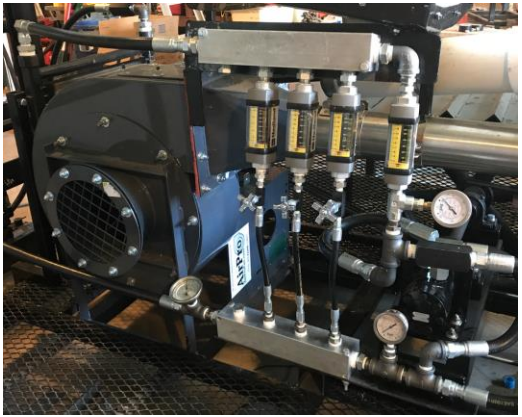
RESEARCH AND EXTENSION CENTER

Simulated Hail Machine

Hail Raiser 2.0



Hail Raiser 2.0



Built in Metrics

Variable Wind Speed
(Bypass Hydraulics)
(Pitot Static Tube)

Ice Flow
(Optical RPM)

Arduino
Computer System

Research Questions

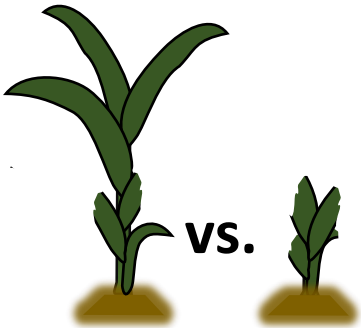
Early Season Damage Assessments

1

Do all surviving plants have similar yield potentials?

2

Can we improve final grain yield prediction if we account for plant damage?



3

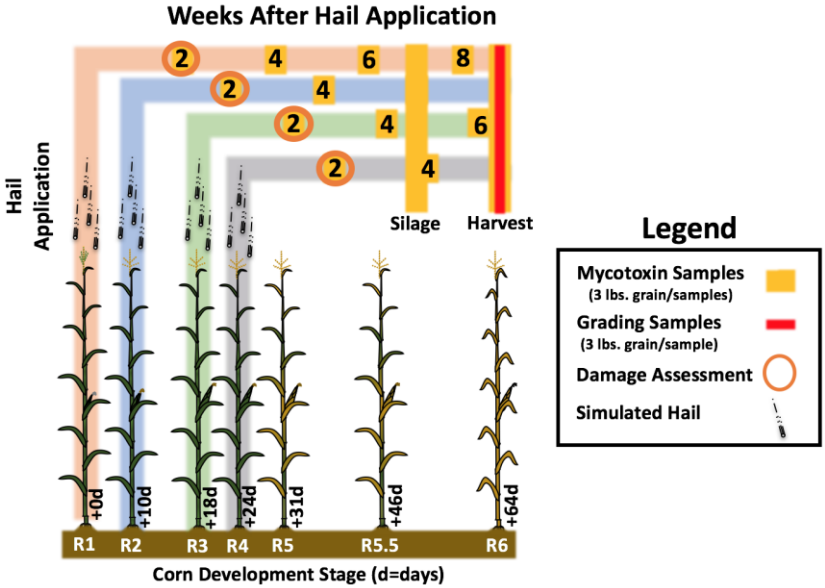
What happens to yield predictions if Goss's wilt is present?

4

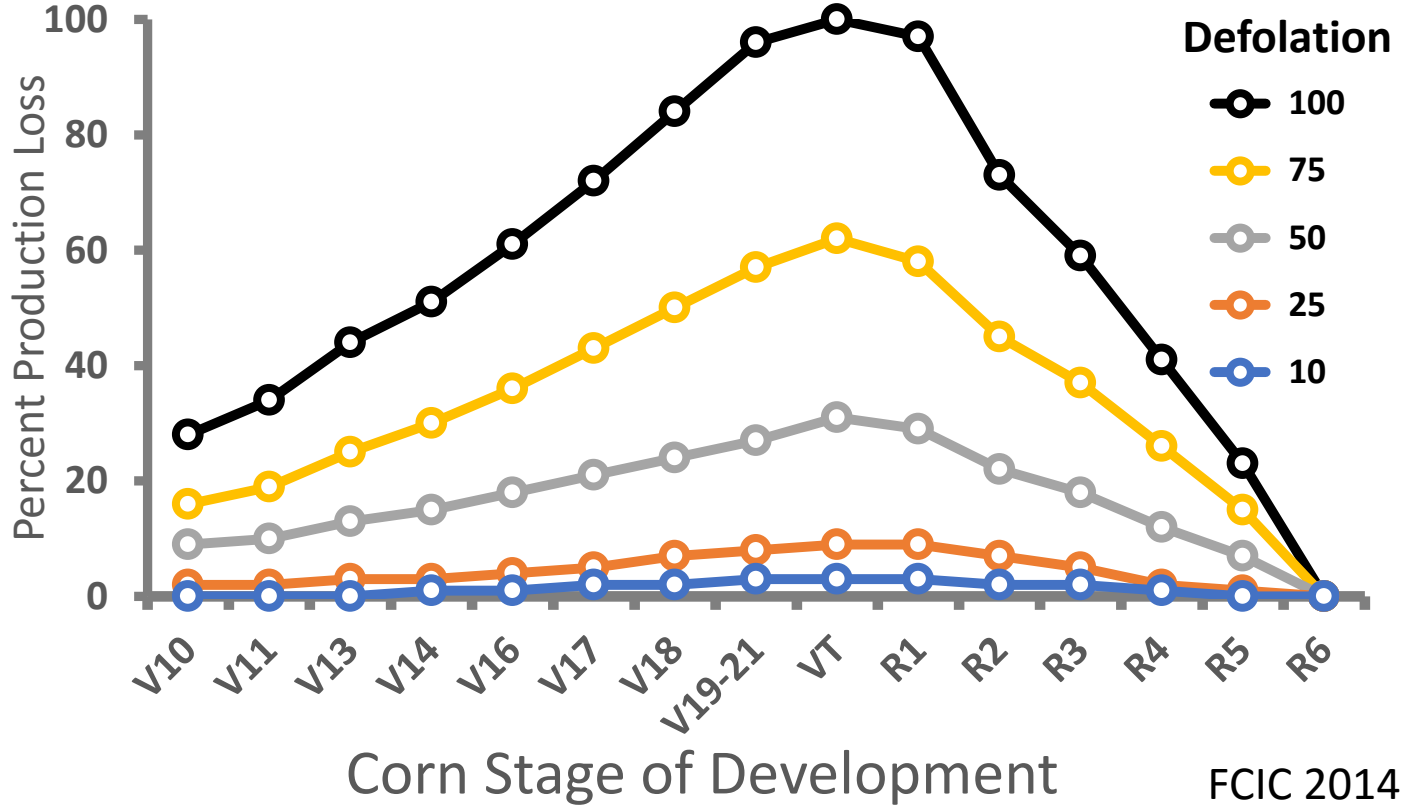
Does timing of evaluation change the yield predictions?

Evaluating Hail Damage

- Late season disease interactions
- Bacterial and fungal pathogen interactions
- UAV evaluation methods



Production Loss and Defoliation

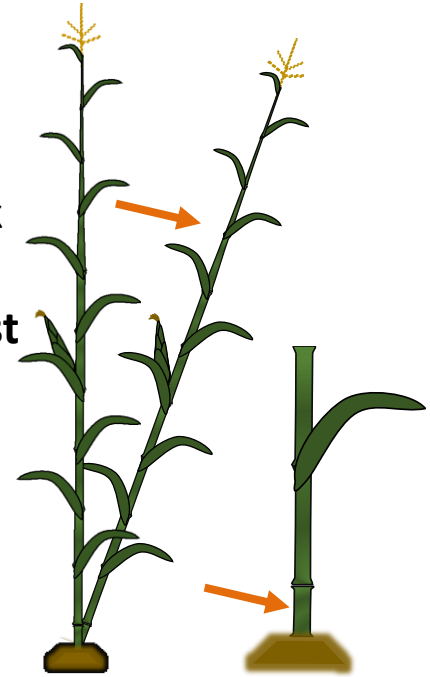


FCIC 2014

Stalk Damage

Evaluating Stalk Damage
Push / Pinch Test

Evaluate 100 plants



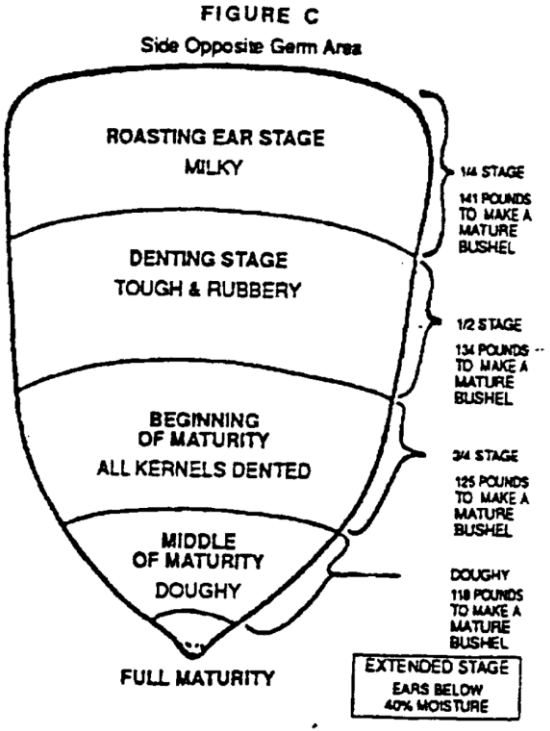
Prioritize harvest based on fields with highest frequency of damage stalks

Ear Damage

- **Ear damage**
  - ❖ direct losses
  - ❖ insects
    - ❖ Sap beetles
  - ❖ ear diseases

Late Season Evaluations

- **Maturity Line Weight**
  - **1/100th of an acre (<20 bu/acre)**
  - **1/1000th of an acre (>20 bu/acre)**
- **Determine development stage**
  - **Break ear in half and determine milk line**
- **Weight**
  - **Shell and discard portions of ear without kernels**
- **Stage x weight factor for total yield**



FCIC 2014

FCIC Loss Adjustment Standards

USDA

United States Department of Agriculture

FCIC

Federal Crop Insurance Corporation

CORN LOSS ADJUSTMENT STANDARDS HANDBOOK

FCIC-25080 (11-2013)

2014 and Succeeding Crop Years

Appraisal Method…	Use…
Stand Reduction Method	for planted acreage with no emerged seed, and from emergence to the milk stage.
Hail Damage Method	for hail damaged corn beginning with the 7th leaf stage and until the corn reaches the milk stage.
Maturity Line Weight Method	For corn grain appraisals, from the milk stage until kernels are fully mature and moisture drops below 40 percent.
Weight Method	for all corn appraisals after the corn kernels are fully mature and kernel moisture drops below 40 percent.

USDA

United States Department of Agriculture

FCIC

Federal Crop Insurance Corporation

LOSS ADJUSTMENT MANUAL STANDARDS HANDBOOK

FCIC-25010 (10-2016)

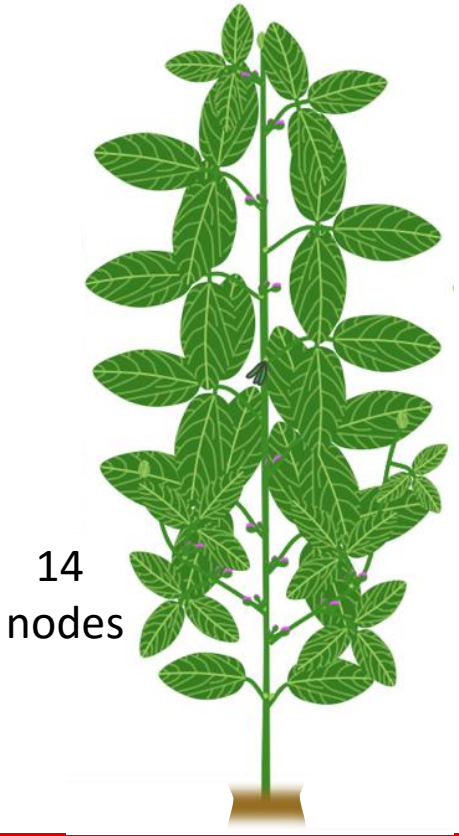
2017 and Succeeding Crop Years

PART 11 ADJUSTMENTS TO PRODUCTION

1101 General Information 218
1102 Quality Adjustment 219
1103 Adjustments for Moisture 246
1104 Adjustments for Foreign Material & Dockage 247
1105 Consolidating Same Moisture, Foreign Material, or Dockage Percentage Entries 251
1106 Averaging Moisture or Foreign Material Percentage Entries 251
1107 Test Weight & Test Weight Factor 252
1108 Flooded Crops 254
1109 Quality Adjustment when Production Contains Mycotoxins, Other Substances, or Conditions at Levels Injurious to Human or Animal Health 255
1110-1200 (Reserved)

Plant Damage: Node Cut/Breaks

- **Node Cut Off / Broken**
  - **Applies to V1 through R3.5**
  - **20 plant sample**
  - **Determine total number of nodes per plant**
  - **Begin at node above unifoliate leaves**

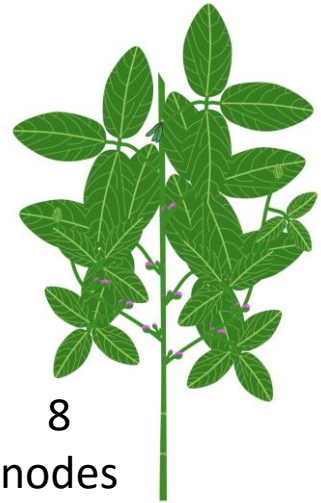


Plant Damage: Node Cut/Breaks

❖ Node Cut Off / Broken

14 nodes

FCIC counts unifoliate node



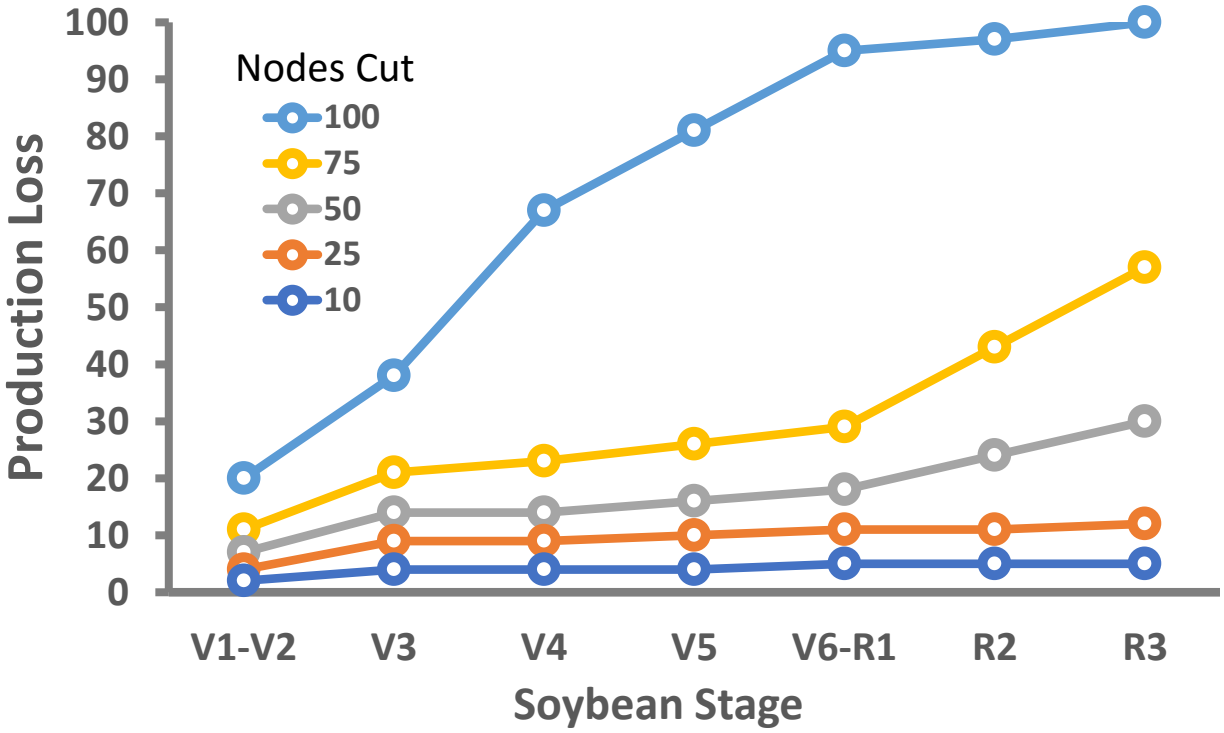
8 nodes

8/14 = 57% Cutoff

Stage: R2

Stage of Growth	51	52	53	54	55	56	57
V1-V2	6.9	7.0	7.1	7.2	7.3	7.4	7.5
V3	13.8	14.0	14.2	14.4	14.6	14.9	15.1
V4	13.8	14.0	14.2	14.4	14.6	14.9	15.1
V5	15.8	16.0	16.3	16.5	16.7	17.0	17.2
V6-R1	17.9	18.1	18.3	18.6	18.8	19.1	19.3
R2-R2.5	24.1	24.6	25.2	25.8	26.3	27.0	27.6
R3-R3.5	30.2	31.1	32.0	32.9	33.9	34.8	35.8

Node Cut and Production Loss

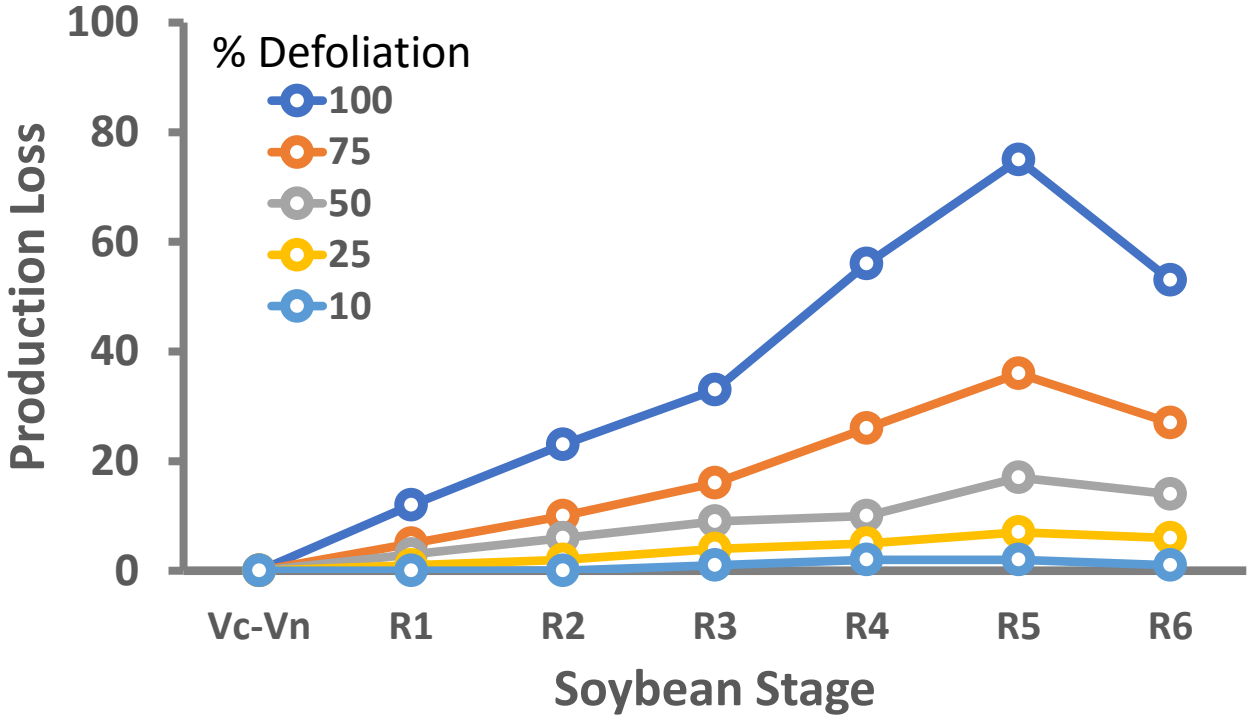


FCIC 2016

Plant Damage: Leaf Defoliation

- Defoliation begins at R1
- Only estimate on trifoliates below cut or broken node
- 30% = 5% loss
- Total Loss: 32.6%

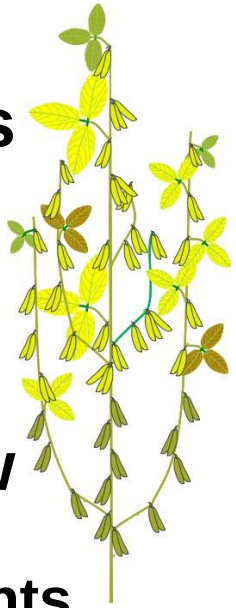
Defoliation and Production Loss



FCIC 2016

Seed Count Method

- **Stages: R7-R8**
- **Determines seeds per square foot**
  - **Converted to bushels per acre**
- **Number of live plants in 10-ft row**
  - **Select 5 representative plants**
  - **Don't count plants without seed**



Determine

Average number of plants per foot

Average number of seed per plant

Seed size: 100 seeds in graduated cylinder (cc filled)

Seed Count Method

- **Multiply**
  - **Row Width Factor 30” – 0.80**

Row Width	Factor	Row Width	Factor	Row Width	Factor
6”	4.00	22”	1.09	38”	0.63
8”	3.00	24”	1.00	40”	0.60
10”	2.40	26”	0.92	42”	0.57
12”	2.00	28”	0.86	44”	0.55
14”	1.71	30”	0.80	46”	0.52
16”	1.50	32”	0.75	48”	0.50
18”	1.33	34”	0.71	B*	2.22
20”	1.20	36”	0.67		

Seed Count Method

- **Multiply**
  - **Row Width Factor 30” – 0.80**
  - **Seed Size Factor: 25 CC’s per 100 seeds = 0.085**

CC’s Per 100 Seeds	Factor	CC’s Per 100 Seeds	Factor	CC’s Per 100 Seeds	Factor
5	0.017	21	0.071	36	0.122
6	0.020	22	0.075	37	0.126
7	0.024	23	0.078	38	0.129
8	0.027	24	0.081	39	0.132
9	0.031	25	0.085	40	0.136
10	0.034	26	0.088	41	0.139
11	0.037	27	0.092	42	0.143
12	0.041	28	0.095	43	0.146
13	0.044	29	0.098	44	0.149
14	0.047	30	0.102	45	0.153
15	0.051	31	0.105	46	0.156
16	0.054	32	0.109	47	0.160
17	0.058	33	0.112	48	0.163
18	0.061	34	0.115	49	0.166
19	0.064	35	0.119	50	0.170
20	0.068				

If unable to obtain 100 mature beans in sample due to immaturity or swelling from excess moisture, use factor .092 unless otherwise authorized.

Seed Count Method

- **Multiply**
  - **Row Width Factor 30” – 0.80**
  - **Seed Size Factor: 25 CC’s per 100 seeds = 0.085**
  - **Plants per foot: 4 plants**
  - **Seeds per plant: 50 seeds**
  - **Yield: 13.6 bu/acre**

What about stem damage?

- Difficult to evaluate, not taken into account by adjuster
- Plants may be more susceptible to lodging in the fall

Soybean Development and Yield Components

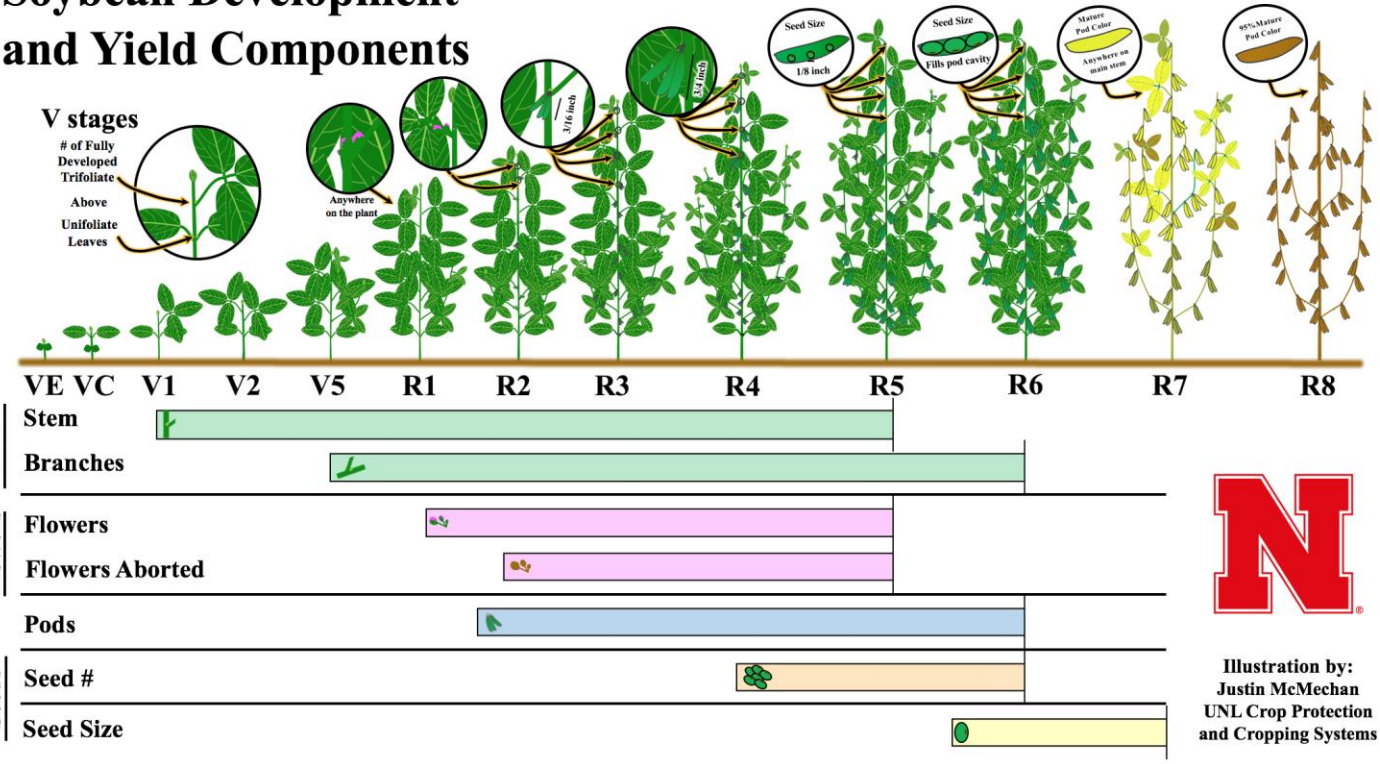


Illustration by:
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UNL Crop Protection and Cropping Systems

Hail Know


HAIL KNOW
1 The Hail Storm
2 Assess My Damage
3 Handle My Insurance
4 Replant My Crop
5 Manage My Recovering Crop
6 Are Cover Crops For Me?


Crop Damage Assessment
Prepare for and recover from hail
Scout Fields for Damage
Make a list of hail-damaged fields to give to your crop insurance agent.
Assess your fields by driving by or walking in them. See what's going on.
Call Insurance Agent
Contact your insurance agent as soon as you've got a handle on the damage.
Take notes from your discussion.
Be sure you understand your coverage policy.
Wait 4 to 6 Days...or More
Be patient. Give your crop a chance to recover and grow. The wait time is dependent on time of year and weather.
During that time, contact your local Extension educator for resources and post-storm program information.
If the hail storm occurred early in the season, contact your seed dealer to check availability of seed. Consider product characteristics.
Assess Plant Regrowth
Before you decide to replant, assess regrowth potential of damaged plants.
Determine surviving plants per acre and use decision tables to calculate yield potential.
For more information visit cropwatch.unl.edu/hail
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EXTENSION
HAIL KNOW

Thank You
What questions do you have?

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