CORN Growth and Development

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UK UNIVERSITY OF KENTUCKY College of Agriculture

Corn Growth Stages

- Vegetative (V)
- Reproductive (R)

How a Corn Plant Develops, Special Report No. 48
Iowa State University
http://www.agronext.iastate.edu/corn/production/management/growth/

Corn Emergence (VE) … almost

Emergence occurs when the plant pokes through the soil surface.

VE (Emergence)

The collar of the first leaf is still wrapped tightly around the stalk.

Once the collar opens, the young plant will be at V1

Corn Growth Stages: Vegetative

V3 **3 Collars**	
V6 **6 collars**	
V12 **12 collars**	
V15 **15 collars**	
VT **tassel**	

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Corn Growth Stages

V3 **3 Collars**	**Nodal roots active.** **Growing point below ground**
V6 **6 collars**	**Growing point above ground.** **Tassel and ear development starting.**
V12 **12 collars**	**Ear size, kernel size and kernel number being determined.** **Limits on water and/or nutrients will reduce yields.**

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Corn Growth Stages

V15 **15 collars**	**Rapid growth, about 10 to 12 days before silking.** **Most sensitive to stress.**
VT **tassel**	**Last tassel branch is visible but prior to silking.** **Complete leaf loss will cause nearly 100% yield loss.**

Corn Growth Stages

Comparing visible collars to actual nodes.

Tassel and ear development start early.

Corn Growth Stages: Reproductive

R1 **Silking**	
R2 **Blister**	
R4 **Dough**	
R5 **Dent**	
R6 **Physiological Maturity**	

Corn Growth Stages

R1 **Silking**	**N and P uptake are rapid.** **About 50% of total N is taken up after R1.** **K uptake is nearly complete.** **Water needed for pollination.** **Pollination occurs.**
R2 **Blister**	**Ear size nearly complete.** **Silks begin to dry out.** **A miniature corn plant is being formed in each fertilized kernel.**

R1: Silking.

Silks remained attached to the ovules until after the ovule is pollinated.

R1 Silking

Corn needs to capture as much light as possible by R1 to maximize yield.

Corn Growth Stages

R4 **Dough**	**Kernels have accumulated ½ of total dry weight.** **Five leaves have formed in the kernel.**
R5 **Dent**	**Most kernels have dented and are near 55% moisture at start.** **Starch layer has formed and progresses down the kernel.**

R5

Corn Growth Stages

R6

Physiological Maturity

Blacklayer has formed at bottom of kernel. Kernel is about 30 to 35% moisture.

Corn Growing Degree Days

- Each day has a slightly different average temperature.
- Temperature affects corn growth rate.
- GDDs attempt to relate temperature to corn growth rate.

- Corn Growing Degree Day (GDD)
  - Base 50 °F
  - Max 86 °F
  - Min 50 °F
- GDD = Average daily temp minus base temp
  - Average temp with Max of 86 °F and Min of 50 °F
  - Base temp of 50 °F

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Calculating Corn GDDs

- GDD
- Base 50 °F
- Max 86 °F
- Min 50 °F

- Example 1:
  - High: 75 Low: 55
  - Average Daily Temp = (75+55)/2=65
  - 65 – 50 = 15 GDDs
- Example 2:
  - High: 98 Low: 66
  - Average Daily Temp = (86+66)/2=76
  - 76 – 50 = 26 GDDs

Max Temp: 86 used in calculation

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Corn Growing Degree Days

Corn Maturity (Days)	GDD
85 to 100	2100 – 2400
101 to 130	2400 – 2800
131 to 145	2900 – 3200

GDD Requirements of a 2700 GDD Hybrid

Growth Stage	GDD
V2	200
V6	475
V12	870
VT	1135
R1	1400
R6	2700

From NCH-40 Growing Season Characteristics and Requirements in the Corn Belt. National Corn Handbook.

Planting Date and GDDs

Hybrid: DKC66-96, 116 day relative maturity
1350 GDDs to mid-pollination; 2820 GDDs to Black Layer

Planting Date (Henderson, KY)	Expected GDD's accumulated by:	
	July 31	Aug 31
April 1	2512	3289
April 15	2335	3112
May 1	2121	2898
May 15	1896	2672
June 1	1548	2325

From University of Kentucky Ag Weather Center: http://wwwagwx.ca.uky.edu/
Corn Growing Degree Day calculator: http://wwwagwx.ca.uky.edu/cgi-bin/cropdd_www.pl
Expected GGD's based on 30-year weather data

Planting Date and GDDs

Hybrid: DKC66-96, 116 day relative maturity
1350 GDDs to mid-pollination; 2820 GDDs to Black Layer

Planting Date (Bowling Green, KY)	Expected GDD's accumulated by:	
	July 31	Aug 31
April 1	2411	3150
April 15	2225	2965
May 1	1993	2732
May 15	1797	2536
June 1	1483	2223

From University of Kentucky Ag Weather Center: http://wwwagwx.ca.uky.edu/
Corn Growing Degree Day calculator: http://wwwagwx.ca.uky.edu/cgi-bin/cropdd_www.pl
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Corn Ears: Good and Bad

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