CROP FOCUS

DUPONT PIONEER

Pioneer® Field360™ Tools App for Crop Management Decisions

Pioneer® Field360™ Tools App Can Improve Management Decisions and Practices

- Select appropriate hybrid maturities to reduce fall frost risk.
- Plan equipment and labor availability for future field operations.
- Plan scouting for crop pests.

Pioneer Field360 Tools App Uses a GDU Model to Estimate Crop Development

- Growing Degree Units – or GDUs (sometimes referred to as GDDs) are a measure of the daily heat that contributes to plant growth.
- GDUs are calculated from the average daily temperature, adjusted for the minimum and maximum base temperatures that support growth of a crop.
- For corn, the minimum and maximum base temperatures are 50˚F and 86˚F, respectively.

GDU Calculation

$$GDUs = \frac{\text{min} + \text{max daily temperature}^{a}}{2} - \text{minimum base temp}$$

[a] if min temp < min base temp, use min base temp
If max temp > max base temp, use max base temp

- Accumulated GDUs are the sum of the GDUs for each day since planting.

Estimating Corn Development Stage

- Corn development stage (phenology) can be estimated by comparing GDU accumulation to models of crop development.
- The GDUs needed to reach key development stages depend on the Comparative Relative Maturity (CRM) rating of the hybrid.

Predicting Corn Development Stage

*Approximate GDUs to reach specified stage**

	CRM				
Stage	**80**	**90**	**100**	**110**	**120**
V6	525	570	595	620	630
V9	695	765	800	835	840
VT	920	1075	1175	1280	1420
R1	1155	1295	1440	1585	1725
R2	1305	1470	1635	1800	1965
R3	1405	1580	1760	1940	2120
R4	1570	1775	1980	2180	2385
R5	1735	1960	2185	2410	2640
R6	1895	2145	2390	2640	2890

*Assumes normal planting date prior to May 1

- For example, a 110 CRM hybrid is modeled to reach the VT (tassel) stage at about 1280 GDUs and the R6 (maturity) stage at about 2640 GDUs after planting.
- By determining what date 1280 or 2640 GDUs will accumulate in the field, the date of tasseling or maturity can be estimated.

Pioneer Field360 Tools App Automates this Process and Customizes it by Field

- Each situation can be uniquely defined by these three parameters: location, planting date, and CRM of the hybrid.

- Location – Determines weather effects (i.e., the temperature that drive GDU calculations).
- Planting Date – Sets a “0” point for GDU accumulation.
- CRM – Determines the growth model to be used.

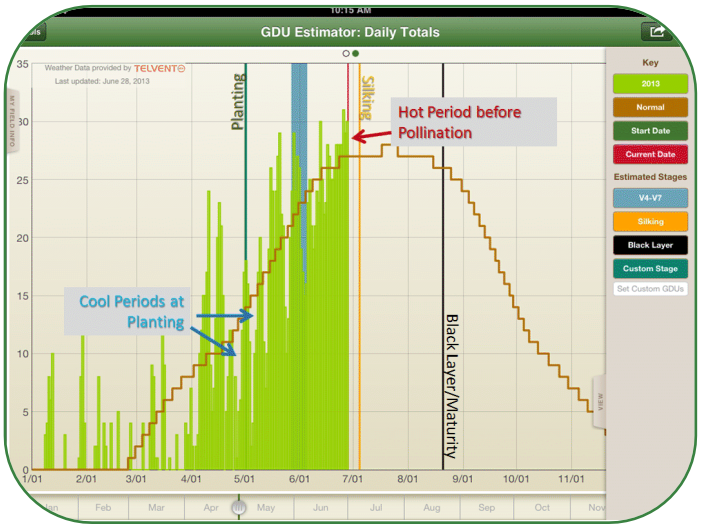
Location/Weather Data

- Weather information is automatically retrieved by using zip code to approximate latitude and longitude.
- ***Actual***, ***forecast*** and ***historical*** weather data are used in the GDU calculations.
  - Actual data until today (from Telvent®) provides known values.
  - Current forecast provides expected values for the next two weeks.
  - Beyond two weeks, historical temperatures provide the best estimate of GDUs.
- A timeline using the previous year's weather is provided for comparison.
- Up to five situations can easily be compared at a time.

Use the Accumulated GDU Screen

- Estimated GDU accumulation is shown on the graph beginning at 0 GDUs on the lower left.
- For each of the major crop stages, a horizontal threshold line is created at the appropriate GDU level.
- Where this threshold intersects the line for GDU accumulation, an estimate of the date of occurrence for that stage can be read on the horizontal axis.
- Tapping on the threshold line displays an information balloon that helps clarify the expected date.
- Tapping in any vertical date will display a balloon with the accumulation for that date.

Daily Totals Show Detailed Information



Uses of Pioneer® Field360™ Tools App in Crop Production

- Before planting, use the Pioneer Field360 Tools App to test historical data with planned planting dates and hybrids to ensure they match the expected season.
- During the growing season, use it to plan field operations such as post emergent sprays, scouting or irrigation, etc.
- After the season, use the detailed view to look for events that might have impacted hybrid performance.

Estimating Non-Crop Development

Some events are not based on crop development but can still be estimated by the tool. Examples:

- Black cutworm scouting should begin about 300 GDUs after peak moth flights.
  - Find when to begin scouting by entering the date of moth flight into Start Date and 300 GDUs into the Custom Stage.
- European corn borer (first generation) damage begins about 800-1000 GDUs after January 1.
  - Set Start Date to January 1 and enter 800 into Custom Stage and begin scouting on the calendar date on which 800 GDUs are reached.
- Watch DuPont Pioneer information for other examples of insect, weed and crop management practices that utilize GDUs to estimate crop management timing.

[1] Pioneer® brand products are provided subject to the terms and conditions of purchase which are part of the labeling and purchase documents.

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