Remaking the Long-Standing Publication *How a Corn Plant Develops* to *Corn Growth and Development*

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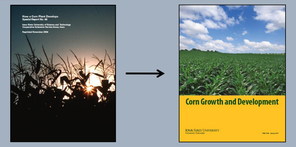
Background and Reasons to Remake

•*Corn Growth and Development (CGD)* is replacing *How a Corn Plant Develops*[1] *(HACPD)*



•*HACPD* is the most circulated and referenced publication on corn growth and development in the U.S.

•*HACPD* was originally published in 1966 by J.J. Hanway

•*HACPD* was rewritten in 1982 and revised in 1986 by S.W. Ritchie, J.J. Hanway, and G.O. Benson

•Text, images, and dry matter and nutrient accumulation figures have become out-of-date in *HACPD* to varying degrees

•*Corn Growth and Development* differs from *HACPD* by:
- •Including and citing new scientific research on corn growth and development
- •Including images of the above- and below-ground portions of a modern corn hybrid
- •Construction of developmental timelines across large periods of time
- •Incorporating biomass and nutrient accumulation figures derived from Iowa State University research conducted in 2007 and 2008[2]

•*CGD* is written to equip producers, agronomists, and scientists with a thorough and technical understanding of corn growth and development

Development of Publication

•**2007 & 2008**: A M.S. thesis project investigating the dry matter and nutrient accumulation in 1960 to 2000 era hybrids was conducted near Ames, IA[2] (Image 1). Ten samplings occurred each year with plants dissected into five components for analysis. Nutrient accumulation (N, P, and K) from the modern hybrids are included in *CGD*.

•**FEB 2009:** Construction of a studio platform allowed for full size plant photography (Image 2).

•**MAR 2009:** A commercial hybrid was grown in the greenhouse for early-season (VE to V3) photography.

•**2009 GROWING SEASON:** Three plantings of corn occurred outside in pots, which allowed for full root growth and excavation. Up to 30 plants were grown for each photography session, V6 to R1 (Image 3). Plants were staged and leaves painted so exact leaf number was known for image labeling later. Ear and kernel images for R2 to R6 came from a nearby field of the same hybrid.

Image 1. Two hectares (4.5 acres) of field research at ISU in 2007 and 2008.

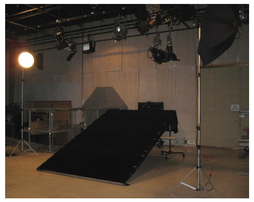


Image 2. Professional photography studio at ISU used for sessions. Full size plants were able to be photographed because of high ceiling, angled platform (8 ft by 12 ft) and a tall ladder.

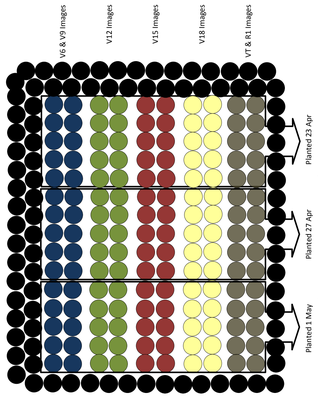


Image 3. Pot design ensured suitable plants were present for each photography session. Black circles represent plants grown simply to serve as an environmental buffer.

•**APR TO SEPT 2009:** Fourteen photography sessions took place (Images to the right); each required approx. 25 man hours. Approximately 5000 total images were taken of stages: germination, VE, V1, V2, V3, V6, V9, V12, V15, V18, VT/R1, R2, R3, R4, R5, and R6. Above-ground, below-ground, and dissected versions of most stages were photographed. The selection of uniform plants and ears were very important to provide consistency across images.

•**OCT 2009 TO APR 2010:** Image sorting, organizing, proofing, and development of timelines. Process required approx. 100 hours.

•**MAY TO SEPT 2010:** Dry matter and nutrient accumulation figures developed from 2007-2008 research[2] using SigmaPlot software.[3] Text written based off of scientific literature. Process required approx. 300 hours.

•**OCT 2010:** Publication submitted for peer review process.

•**NOV TO DEC 2010:** Graphic design and layout by ISU Extension.

•**JAN 2011:** Publication available (see handout).

[1]Ritchie, S.W., J.J. Hanway, and G.O. Benson. 1986. How a corn plant develops. Spec. Rep. 48. Iowa State Univ. Coop. Ext. Serv., Ames.
[2]Boyer, M.J. 2010. Dry matter and nutrient uptake in maize hybrids from the 1960's to 2000's in central Iowa. M.S. thesis. Iowa State University, Ames.
[3]Systat Software, Inc. 2006. SigmaPlot for Windows. Version 10.0. Systat Software, Inc. Point Richmond, CA.