

4-9-2007

## Corn seeding rates and variable-rate seeding

Lori Abendroth

Iowa State University, labend@iastate.edu

Roger W. Elmore

Iowa State University, relmore@iastate.edu

Follow this and additional works at: <http://lib.dr.iastate.edu/cropnews>

 Part of the [Agricultural Science Commons](#), [Agriculture Commons](#), and the [Agronomy and Crop Sciences Commons](#)

---

### Recommended Citation

Abendroth, Lori and Elmore, Roger W., "Corn seeding rates and variable-rate seeding" (2007). *Integrated Crop Management News*. 1109.

<http://lib.dr.iastate.edu/cropnews/1109>

**The Iowa State University Digital Repository provides access to Integrated Crop Management News for historical purposes only. Users are hereby notified that the content may be inaccurate, out of date, incomplete and/or may not meet the needs and requirements of the user. Users should make their own assessment of the information and whether it is suitable for their intended purpose. For current information on integrated crop management from Iowa State University Extension and Outreach, please visit <https://crops.extension.iastate.edu/>.**

---

# Corn seeding rates and variable-rate seeding

## **Abstract**

The current demand for corn has generated a great deal of discussion this past winter of corn yields exceeding 300 bushels per acre. What management considerations should producers make when aiming for high yields? As corn hybrids have developed, the focus by scientists has been toward increasing stress tolerance of individual corn plants. Corn yield potential per plant has not increased over the past 50 years, but the amount of yield per acre has increased. Hybrids can tolerate their neighbors today better than ever and are therefore able to withstand higher plant densities while still producing an ear.

## **Keywords**

Agronomy

## **Disciplines**

Agricultural Science | Agriculture | Agronomy and Crop Sciences

# INTEGRATED CROP MANAGEMENT

Search

Get the latest research-based information on crops. [Sign up to be notified](#) when new content is available!

ICM > 2007 > IC-498 (5) -- April 9, 2007

## Current Newsletter

You are viewing **archives** for the newsletter from 1993-2007. For current news, see [Integrated Crop Management News](#).

## Archives 1993-2007



Announcements



Crop Production



Insects and Mites



Pesticide Education



Plant Diseases



Soils



Weed Management

[Image Gallery](#)

## Printable Version

Printable version of this page

## Related Articles

How many seeds does it really take to get 100,000 plants per acre at harvest?  
**April 9, 2007**

Soybean seeding rates: The balance between cost and yield  
**April 2, 2007**

How to plant all the acres

## Corn seeding rates and variable-rate seeding

by Lori Abendroth and Roger Elmore, Department of Agronomy

The current demand for corn has generated a great deal of discussion this past winter of corn yields exceeding 300 bushels per acre. What management considerations should producers make when aiming for high yields? As corn hybrids have developed, the focus by scientists has been toward increasing stress tolerance of individual corn plants. Corn yield potential per plant has not increased over the past 50 years, but the amount of yield per acre has increased. Hybrids can tolerate their neighbors today better than ever and are therefore able to withstand higher plant densities while still producing an ear. A significant portion of the observed yield increase per year is directly correlated with increased plant populations. Over the past 50 years, seeding rates have increased annually. Iowa plant populations have increased about 425 plants per acre per year since 2001. Although plant populations continue to increase, producers and agronomists must consider whether the yield advantage of planting more seed is economically productive. Corn seed prices have increased an average of \$1.50 per acre per year since 2000.

### 2006 Iowa State University seeding rate research

Seeding rates were evaluated across 10 locations in Iowa this past year and ranged from 25,000 to 45,000 seeds per acre. The optimum seeding rate, averaged across all locations, was approximately 35,000 seeds per acre. Location played a huge role in the final yield results. Yield at four of the 10 locations significantly dropped off past 30,000 or 35,000 seeds per acre, whereas six of the 10 locations had the highest yields from 35,000 to 45,000 seeds per acre. It is interesting to note that there were 200-bushel yields in both of these groupings. Early-season vegetative growth and conditions surrounding pollination no doubt were factors influencing which seeding rates were best. Therefore, a seeding rate of 35,000 seeds per acre is a good general recommendation based on 2006 data; yet, it is imperative to consider the field and environment when selecting which seeding rate to use.

### Can seeding rates be even more fine-tuned?

Economically optimum seeding rates may vary within fields but may be difficult to actually pinpoint. New planter technology called variable-rate seeding (VRS) allows growers to change seeding rates within a field. A couple of research papers were written in the past few years discussing the feasibility of using variable rate technology to improve profit. The first study was conducted across the Midwest on producer fields during 1987 to 1996. More than 42,000 plots were thinned to plant populations ranging from 18,000 to 42,000 plants per acre. The economically optimum final plant population was approximately 27,500 plants per acre. Some

**February 12, 2007**

What is the best seeding rate for corn based on seed prices and yield level?

**April 10, 2006**

Soybean seed quality in 2006

**April 3, 2006**

What is the best soybean seeding rate

**April 27, 1998**

fields were more productive and responded favorably to higher plant populations. For every 16-bushel-per-acre increase in average yield at a site, the optimum plant density increased 485 plants per acre. Yet, the economic value of variable plant populations within a field versus one overall plant population was not evident. The scientists determined that more detailed and costly site information was necessary to make VRS feasible and economic. Scientists in Colorado during the late 1990s investigated the rain fed yield response to seeding rates in relation to their variable landscape. High yields were 120 bushels per acre and plant densities ranged from 10,000 to 25,000 seeds per acre. Obviously, these variables are much lower than we would experience in Iowa. The economically optimum plant densities changed approximately 2,000 seeds per acre between high and low yielding parts of fields; the higher plant densities produced higher yields. "High" and "low" yielding areas were related to characteristics such as elevation, soil brightness, and soil apparent electrical conductivity. Placing variable populations in the fields was found to only save \$2.50 per acre in seed costs (although this is based on lower seed costs [\$1.25/1,000 seeds] than the current costs).

A more recent article by some of the same authors suggests that the optimum plant population within a field can vary from 5,000 to 12,000 plants per acre in a given year based on the environmental conditions unique to that season. Thus, using variable seeding rates within fields at this time will not likely result in significant savings given current technology and the year-to-year variability that exists. For the papers cited here, as well as other corn production topics, please visit the [Extension Corn Production Web site](#).

*Lori Abendroth is an agronomy specialist with research and extension responsibilities in corn production. Roger Elmore is professor of agronomy with research and extension responsibilities in corn production.*



*Corn seedling. (Lori Abendroth)*

This article originally appeared on pages 110-111 of the IC-498 (5) -- April 9, 2007 issue.

Updated 04/13/2007 - 1:18pm