

Take Time to Evaluate Corn Stand Establishment

R.L. (Bob) Nielsen
Agronomy Department
Purdue Univ., West Lafayette, IN
Email: rnielsen@purdue.edu

With the majority of Indiana's corn crop planted, the next phase of the growing season is stand establishment. Growers intuitively strive for fields of corn with evenly spaced plants that emerge quickly and uniformly.

Uneven emergence can be caused by spatial variability for seeding depth, seed-to-soil coverage, seedbed moisture, seedbed temperature, or damage from soil-borne insects and diseases. Uneven plant spacing within the row is most commonly due to problems related to the planter, including worn seed meter components, poorly lubricated chains and fittings, mismatch of seed size with seed meters, and excessive planting speed. Stand losses due to pests or weather often result not only in lower plant densities, but also in unevenly spaced survivors. Corn that initially emerges and develops uniformly through early leaf stages can take a turn for the worse around the three- to four-leaf stage if the kernel or mesocotyl is damaged by insect or disease prior to the successful development of nodal roots from the crown area of the plant.

Take time over the next few weeks to assess the uniformity of stand establishment in fields as plants emerge and develop through their early leaf stages. Identify the cause(s) of uneven stands before the evidence disappears and determine whether changes in your planting operation or agronomic decisions may improve the odds of uniform stand establishment in the future.

- Early-planted corn remains at risk for the development of seedling diseases given the recent onset of cool, wet conditions plus the fact that seed-applied fungicides begin to lose their effectiveness 2 to 3 weeks after planting. Brownish or otherwise discolored seed roots, kernel tissue, or mesocotyls are symptoms of seedling disease and can have devastating effects on young plants prior to successful development of nodal roots from the crown area.
- Some early-planted fields were also “nipped” by light frost in recent weeks at the time that the seedlings were just beginning to emerge from the soil. Frost injury to coleoptiles may hinder the normal splitting of the coleoptile tip and emergence of true leaves; resulting in a “laddered” or “knotted” appearance as the true leaves rupture through the sides of discolored and injured coleoptiles.
- Fields planted more recently and not yet emerged are at risk of damage from cold, saturated soils and/or subsequent development of hard soil crusts once fields

- begin to dry. Be prepared with the rotary hoe if we experience a quick return to sunny warm days before the crop emerges. Bare soil temperatures have dropped by as much as 10 degrees F since the mid-week onset of the rains. Water-logged soils translate to soil oxygen deficits that can be detrimental to germination and early seedling development. Germination and emergence will occur at a slow pace until temperatures rise to normal levels or beyond. Slow seedling development further aggravates their susceptibility to disease, insect, and weather stresses.
- Uneven plant spacing within the row can be measured and quantified by simply measuring plant spacings within a set length of row. The simplest measuring technique requires a 25-ft tape measure with large easy-to-read numbers, a pad of paper and pencil (or handheld PDA), a good pair of walking shoes (and/or hip waders), and a computer with a spreadsheet program like Microsoft® Excel. Record consecutive plant spacings (inches) within 25ft of row (for each row unit of the planter if you want) at several locations within a field. Enter the numbers in columns on a computer spreadsheet and calculate the standard deviation for each list of plant spacings using Excel's built-in mathematical formula (=stdev). My research suggests that corn grain yield may decrease up to 2.5 bu/ac per inch increase in standard deviation of plant spacing within a standard deviation range of 2 to 8 inches.

Related References

Nielsen, R.L. 2001. **Stand Establishment Variability in Corn (AGRY-91-01)**. Purdue Univ. Online at http://www.agry.purdue.edu/ext/pubs/AGRY-91-01_v5.pdf [URL verified 5/12/06].

Nielsen, R.L. 2006. **Effect of Plant Spacing Variability on Corn Grain Yield: 2005 Research Update**. Purdue Univ. Online at <http://www.kingcorn.org/research/psv/Report2005.pdf> [URL verified 5/12/06].

Don't forget, this and other timely information about corn can be viewed at the Chat 'n Chew Café on the Web at <http://www.kingcorn.org/cafe>. For other information about corn, take a look at the Corn Growers' Guidebook on the Web at <http://www.kingcorn.org>.

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