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### LAPPING IN THE MIDDLES?

**Maximum economic crop yields are closely associated with maximum photosynthetic efficiency.** For most crops, the faster the leaves develop, the greater the capture of light energy and the greater the root and shoot growth. Rapid early leaf growth and the efficient capture of sunlight encourage rapid root development. Rapid, early root development enables plants to absorb nutrients and moisture more efficiently during peak demand and prepares the plants for the drier periods that usually occur in summer. As plants begin reproductive growth, research has shown that photosynthates are shifted away from roots and into plant reproductive structures. When this happens, root growth slows. So, if a healthy root system is not well established by the beginning of reproductive growth, plants can be more susceptible to nutrient shortages and drought.

**Most experienced farmers and crop advisers recognize that if plants are not “lapping in the middles” by the flowering stage, yields will be reduced.** What this means is the canopy has not closed because leaf area has not developed properly to maximize the capture of sunlight. For many crops, the leaf area index (LAI)—the ratio of leaf area to land surface area—should be above 3.0 to 5.0 at flowering to achieve good yields. Plant population is a key factor in achieving the optimum leaf area growth rate. So, both row width and the number of plants per foot of row must be optimized to achieve high yields.

**Optimum plant spacing may differ among fields and soil types because of differences in soil productivity.** It certainly varies according to plant species and often may vary according to plant variety or hybrid because of differences in the amount of branching, maturity group, heat unit requirement, etc. Many plant breeders consider the heat unit requirements and plant architecture in developing advanced breeding lines. Their goal is to provide plants that will maximize the use of solar radiation during the peak seed or grain-filling period. Most plant varieties and hybrids available to farmers today, if managed properly at the optimum spacing and population per acre, will provide very good yields.

**If crops in the fields on your farm are not “lapping in the middles” by the time plants begin blooming, consider the possible causes.** Perhaps row width needs to be narrowed. If moisture has been adequate, as it has been in many parts of the eastern U.S. this year, and if plants still did not canopy the soil in the row middles by the flowering stage, what were the possible causes? Were soil phosphorus, potassium, and soil pH levels below optimum? Were the appropriate nitrogen rate, source, and timing used? Was a starter fertilizer part of your cropping system? Were secondary and micronutrient fertility levels adequate? Have nematodes, soil insects, or root diseases been considered as production-limiting factors?

If nematodes, root diseases, soil fertility, and soil moisture did not limit plant growth this year, but you could still see bare ground in the middles between rows when plants began to flower, it is time to consider narrowing your row width. **By making sure your crops are “lapping in the middles” by the time plants bloom, you will be well on your way to achieving efficient production and high yields.**

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