

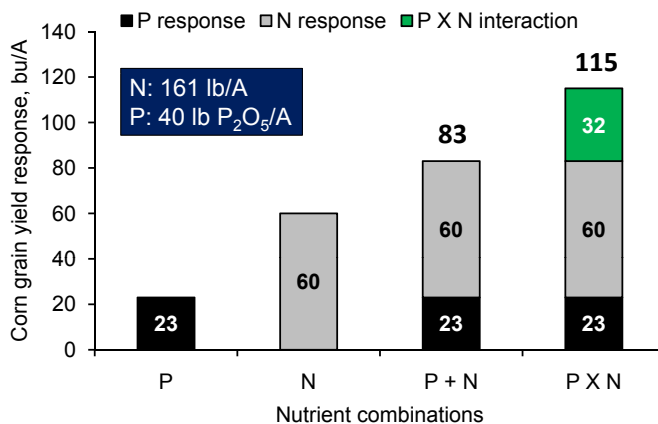
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## NITROGEN PLAYS WELL WITH OTHERS

**“Plays well with others” is a comment every parent likes to hear about his or her child.** It means that the child is interacting positively with other children and is being a good influence. Such glowing reports are often the result of good parenting. Although you may think it’s a stretch, in the world of soil fertility, N has also been known to play well with other nutrients.

**To quote from the widely read book *Soil Fertility and Fertilizers*, “An interaction takes place when the response of two or more inputs used in combination is unequal to the sum of their individual responses.”** To illustrate what an interaction looks like, we consider an example from a long-term Kansas study investigating crop response to both N and P. In the graph below, we see that applying P without any N increased corn grain yield by 23 bu/A (the first bar on the left). Applying N without any P increased yield by 60 bu/A (the second bar from the left).

**Now according to our definition of an interaction, if N and P were both applied and no interaction took place, their combined effects would simply be additive.** If this were the case, we would expect crop response to the addition of both nutrients to simply be the sum of the P effect (23 bu/A) and the N effect (60 bu/A), for a total response of 83 bu/A (second bar from the right). However, actual results from the long-term study itself indicate a yield increase of 115 bu/A, which is 32 bu/A more than the sum of the individual responses to N and P (first bar on the right). This additional 32 bu/A is the result of the positive interaction of N and P.



Note: Data are from 30th year of a long-term, irrigated study in Kansas  
Source: Schlegel et al. 1996. J. Prod. Agric. 9:114-118.

**Are all interactions among nutrients positive?** No. Nutrients, like any other input, can be properly managed or mismanaged. Managing nutrients properly takes the fullest advantage possible of positive interactions. Because positive interactions lead to greater yield increases for the same amount of fertilizer applied, agronomic efficiency is increased. When nutrients are mismanaged, efficiency is decreased.

**So is N playing well with others?** The potential is there. Nutrient stewardship, like good parenting, will realize the potentially positive impacts that N can have with other nutrients.

—TSM—

For more information, contact Dr. T. Scott Murrell, Northcentral Director, IPNI, 1851 Secretariat Dr., West Lafayette, IN 47906. Phone: (765) 413-3343. E-mail: [smurrell@ipni.net](mailto:smurrell@ipni.net).

Abbreviations: N = nitrogen, P = phosphorus.

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